# INTERNATIONAL BULLETIN ON ATOMIC AND MOLECULAR DATA FOR FUSION

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#### FOREWORD

The International Bulletin on Atomic and Molecular Data for Fusion is prepared by the Atomic and Molecular Data Unit, International Atomic Energy Agency (IAEA), and published and distributed free of charge by the IAEA to assist in the development of fusion research and technology.

The references and indexations included in the Bulletin are provided by atomic data centres at the following institutions:

Oak Ridge National Laboratory, Oak Ridge, USA National Institute for Standards and Technology, Gaithersburg, USA Kurchatov Institute, Moscow, Russian Federation National Institute for Fusion Science, Toki-shi, Japan Universite de Paris XI, Paris-Sud, Orsay, France Nuclear Data Section, IAEA, Vienna, Austria

Information in this Bulletin is presented in four parts. The Atomic and Molecular Data Information System (AMDIS) of the International Atomic Energy Agency is presented in Part 1. The indexed papers are listed separately for structure and spectra, atomic and molecular collisions, and surface interactions in Part 2. The structure and spectra indexation lines are grouped by process. The first column gives the process, the second one the reactants and then the character of the data contained (Th for theoretical, Ex for experimental, and E/T for both experimental and theoretical). The number in the last column is the reference number in Part 3 of the Bulletin. The atomic and molecular indexation lines are grouped by one collision partner (photon, electron or heavy particle). The first column gives the reactants, the second column gives the process, the third column gives the energy range with the appropriate units, and the last two columns are the same as in the structure and spectra indexation lines. The particle-surface interactions indexation lines are grouped by process. The first column gives the reactants, the second the energy range with the appropriate units, and the last two columns are the same as in the previous cases. Part 3 contains all the bibliographic data for both the indexed and non-indexed references. Those references which are indexed in Part 1 are identified by the repeated indexation lines. The Author Index (Part 4) refers to the bibliographic references contained in Part 3.

Contributions are solicited on data generation work in progress and on new data in the course of publication. Contributions should include an explanation of their applicability to fusion research and should be sent to:

Atomic and Molecular Data Unit Nuclear Data Section International Atomic Energy Agency Wagramer Strasse 5 P.O. Box 100 A-1400 Vienna, Austria

e-mail: D.Humbert@iaea.org WWW access: http://www-amdis.iaea.org/ All data published in the Bulletin are included in AMBDAS, the IAEA Atomic and Molecular Data Unit bibliographic database. AMBDAS is freely available on line at http://www-amdis.iaea.org/AMBDAS.

Vienna, December 2008

The Editors

#### News on the Atomic and Molecular Data Unit

This edition of the Bulletin contains a large amount of data due to the recovery of missing data from the year 1999 by the Oak Ridge National Laboratories (ORNL) and the National Institute of Standards and Technology (NIST) Data Centres. Also are included entries of the Bulletin Corrigendum published in April 2008, concerning errors in collisional data indexing from the previous Bulletin, number 66. For consistency all data from section 2.2. onward in Bulletin 66 were retabulated:

- Atomic and Molecular Collisions, section 3.2, p. 204
- Surface Interactions, section 3.3, p. 236
- Particle Beam-Matter Interactions, section 3.4, p. 256
- Interactions of Atomic Particles with fields, section 3.5, p. 276

This Bulletin edition, number 67, makes obsolete the above sections in Bulletin 66, as well as the corrigendum published in April 2008.

The A+M Data Unit is organizing a joint ICTP-IAEA workshop on atomic and molecular data for fusion to be held on 20-30 April, 2009 at the ICTP facility in Trieste, Italy. The purpose of the workshop is to train potential new researchers in fusion energy in the basics of atomic, molecular and plasma-material interaction data. The Workshop participants are guided through the use of such data in fusion-relevant plasma situations and are introduced to a variety of sources of data. Workshop exercises make use of specific modelling codes using data from sources available through Internet links. Topics of the workshop are:

- Plasma-material interaction data for pure materials
- Co-deposition of materials and the Interaction of the mixed materials with the plasma
- Electron collision processes in atoms and molecules and their ions
- Molecular formation and dissociation
- Charge transfer processes

Additional information may be found on the ICTP web site at:

http://cdsagenda5.ictp.it/full\_display.php?email=0&ida=a08151

Co-ordinated Reasearch Projects (CRP) are the main tool by which the Atomic and Molecular Data Unit (AMD Unit) collects and evaluates data for the establishment of recommended numerical databases for use in fusion energy research. The AMD unit operates three to four CRPs simultaneously. A CRP is a three to five-year joint project involving approximately 12 laboratories, research teams or institutions, performing coordinated research to achieve a certain well defined goal (e.g. establishment of a particular database, data generation, compilation and assessment for specific types of A+M collision processes, or classes of such processes, etc.). Results of two completed CRPs, "Data for molecular processes in edge plasmas" and "Atomic and molecular data for fusion diagnostics", were published in the IAEA APID Series: volumes 13 and 14 and are available online at http://www-amdis.iaea.org/publications/APID/. The CRP on "Atomic and molecular

data for plasma modelling" held its final Research Coodinated Meeting (RCM) in November. The CRP on "Atomic data for heavy element impurities" will hold its final RCM on 4-6 March 2009. The CRP on "Data for surface composition dynamics relevant to erosion processes" will hold its second RCM on 11-13 March 2009. Finally the CRP on "Characterization of Size, Composition and Origins of Dust in Fusion Devices" hold its first meeting December 2008. More information on the CRPs are available in previous editions of the Bulletin and on the A+M Data Unit web site.

http://www-amdis.iaea.org/CRP/

OPEN-ADAS is a IAEA/ADAS joint project. The purpose is to search and download atomic data from the Atomic Data and Analysis Structure (ADAS) over the web. The first version of OPEN-ADAS was launched last summer. The interface allows a number of flexible searching mechanisms of the ADAS database. At present time, ADAS contains around 20,000 data files for a total size of 2.8GB.

http://open.adas.ac.uk/

XSAMS (XML Schema for Atoms, Molecules and Solids) is a joint effort to develop a new standard for atomic, molecular and particle surface interaction data exchange (AM/PSI) based on XML (eXtensible Markup Language). XSAMS is in its final phase for release of version 0.1. This work is supported by the IAEA in collaboration with the following institutions: NIST, ORNL and Observatoire Paris-Meudon, and progress has been reported during the ICAMDATA meetings. More information is posted on the IAEA A+M Data Unit web site.

http://www-amdis.iaea.org/XML/

### Contents

FOREWORD			
Ν	ews	on the Atomic and Molecular Data Unit	iii
1	The	e Atomic and Molecular Data Information System	1
<b>2</b>	INI	DEXATION	3
	2.1	Structure and Spectra	3
	2.2	Atomic and Molecular Collisions	22
		2.2.1 Photon Collisions	22
		2.2.2 Electron Collisions	48
		2.2.3 Heavy Particles Collisions	86
	2.3	Surface Interactions	120
	2.4	Data Collection, Bibliographic and Progress Report	136
	2.5	Fusion Research of General Interest	136
	2.6	Particle Beam-Matter Interactions	136
	2.7	Interactions of Atomic Particles with Fields	150
3	BIE	BLIOGRAPHY	155
	3.1	Structure and Spectra	155
	3.2	Atomic and Molecular Collisions	211
		3.2.1 Photon Collisions	211
		3.2.2 Electron Collisions	268
		3.2.3 Heavy Particles Collisions	322
	3.3	Surface Interactions	372
	3.4	Data Collection, Bibliographic and Progress Report	407
	3.5	Fusion Research of General Interest	407
	3.6	Particle Beam-Matter Interactions	407
	3.7	Interactions of Atomic Particles with Fields	428

#### AUTHOR INDEX

vi

### Chapter 1

## The Atomic and Molecular Data Information System

**AMDIS** is the Atomic and Molecular Data Information System of the International Atomic Energy Agency, established and maintained by the Atomic and Molecular Data Unit, Nuclear Data Section.

AMDIS contains two main parts: AMBDAS, a bibliographic database for atomic and molecular data for fusion research; ALADDIN, a numerical database of recommended and evaluated atomic, molecular and plasma-surface interaction data.

AMBDAS, Atomic and Molecular Bibliographic Data System, is an on-line bibliographic database http://www-amdis.iaea.org/AMBDAS. It contains more than 45,000 bibliographic entries with atomic, molecular and plasma-surface interaction data of interest to fusion research, and dating back to 1950. Entries may be retrieved by author, process, reactants, type of reference, year of publication and data source (theoretical or experimental). The interface is a web-based application, easy to use with no required registration. AMBDAS data are regurlarly published in the International Bulletin on Atomic and Molecular Data for Fusion.

**ALADDIN** is the online numerical database of the Atomic and Molecular Data Unit of the IAEA **http://www-amdis.iaea.org/ALADDIN**. It provides atomic, molecular and plasma-material interaction data of interest to fusion research. ALADDIN provides two similar interfaces, one for collisional data and one for particle surface interactions. An ALADDIN entry consists of searchable labels that characterize the process and reactants; the source of the data, date, laboratory or data centre, and reference; comment lines and the numerical data. When possible all requested data are displayed in the same units to permit easy comparison. A unit conversion tool is available and all results can be displayed in tabular and graphical mode.

### Chapter 2

## **INDEXATION**

### 2.1 Structure and Spectra

$^{1}\mathbf{H}$	Energy Levels, Wavelengths	$\mathrm{Th}$	149
н	Energy Levels, Wavelengths	$\mathrm{Th}$	149
$^{1}\mathbf{H}$	Energy Levels, Wavelengths	$\mathrm{Th}$	182
Н	Energy Levels, Wavelengths	$\mathrm{Th}$	182
Н	Energy Levels, Wavelengths	$\mathrm{Th}$	183
н	Energy Levels, Wavelengths	$\mathrm{Th}$	232
Н	Energy Levels, Wavelengths	$\operatorname{Exp}$	233
н	Energy Levels, Wavelengths	E/T	235
$^{1}\mathbf{H}$	Energy Levels, Wavelengths	Exp	236
н	Energy Levels, Wavelengths	Exp	236
н	Energy Levels, Wavelengths	$\mathrm{Th}$	254
н	Energy Levels, Wavelengths	$\mathrm{Th}$	265
н	Energy Levels, Wavelengths	E/T	285
н	Energy Levels, Wavelengths	$\mathrm{Th}$	300
н	Energy Levels, Wavelengths	$\mathrm{Th}$	302
$\mathbf{H}^{-}$	Energy Levels, Wavelengths	$\mathrm{Th}$	312
He	Energy Levels, Wavelengths	E/T	20
He	Energy Levels, Wavelengths	$\mathrm{Th}$	38
${}^{4}\mathbf{He}$	Energy Levels, Wavelengths	E/T	48
He	Energy Levels, Wavelengths	E/T	48
He	Energy Levels, Wavelengths	Exp	56
He	Energy Levels, Wavelengths	$\mathrm{Th}$	57
${}^{4}\mathbf{He}$	Energy Levels, Wavelengths	$\mathrm{Th}$	100
He	Energy Levels, Wavelengths	$\mathrm{Th}$	100
He	Energy Levels, Wavelengths	$\mathrm{Th}$	109
${}^{3}$ He	Energy Levels, Wavelengths	$\mathrm{Th}$	119
He	Energy Levels, Wavelengths	$\mathrm{Th}$	119
He	Energy Levels, Wavelengths	E/T	146
${}^{3}\mathrm{He}^{+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	149
$\mathrm{He^{+}}$	Energy Levels, Wavelengths	$\mathrm{Th}$	149
He	Energy Levels, Wavelengths	$\mathrm{Th}$	155
He	Energy Levels, Wavelengths	$\operatorname{Exp}$	157
He	Energy Levels, Wavelengths	$\mathrm{Th}$	163
<sup>3</sup> He	Energy Levels, Wavelengths	$\mathrm{Th}$	164
${}^{4}\mathbf{He}$	Energy Levels, Wavelengths	$\mathrm{Th}$	164
He	Energy Levels, Wavelengths	$\mathrm{Th}$	164
$\mathrm{He^{-}}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	168
He	Energy Levels, Wavelengths	$\operatorname{Exp}$	175
He	Energy Levels, Wavelengths	Th	176
${}^{3}\mathrm{He}$	Energy Levels, Wavelengths	E/T	187

He	Energy Levels, Wavelengths
${}^{3}\mathrm{He}$	Energy Levels, Wavelengths
He	Energy Levels, Wavelengths
$He^{0+-+}$	Energy Levels, Wavelengths
${}^{3}\mathrm{He^{+}}$	Energy Levels, Wavelengths
$^{4}\mathrm{He^{+}}$	Energy Levels Wavelengths
He <sup>+</sup>	Energy Levels, Wavelengths
	Energy Levels, wavelengths
Не	Energy Levels, Wavelengths
He	Energy Levels, Wavelengths
He	Energy Levels, Wavelengths
$\mathrm{He}^{0+-+}$	Energy Levels, Wavelengths
He	Energy Levels, Wavelengths
$\mathrm{He}^-$	Energy Levels, Wavelengths
${ m He}$	Energy Levels, Wavelengths
He	Energy Levels, Wavelengths
${}^{3}\mathbf{He}$	Energy Levels, Wavelengths
${}^{4}\mathbf{He}$	Energy Levels, Wavelengths
He	Energy Levels, Wavelengths
He	Trans. prob., Oscill. Strengths
$^{7}$ Li	Energy Levels, Wavelengths
Li	Energy Levels, Wavelengths
$Li^{0+-2+}$	Energy Levels, Wavelengths
$Li^{0+-+}$	Energy Levels, Wavelengths
Li	Energy Levels, Wavelengths
Li	Energy Levels, Wavelengths
$^{7}$ Li	Energy Levels, Wavelengths
Li-Ge	Energy Levels, Wavelengths
Li-Es	Energy Levels, Wavelengths
$Li-Ar^+$	Energy Levels, Wavelengths
$Li-Bi^+$	Energy Levels, Wavelengths
$Li^-$	Energy Levels, Wavelengths
Li	Energy Levels, Wavelengths
${}^{9}\text{Be}^{+}$	Energy Levels, Wavelengths
Be <sup>+</sup>	Energy Levels Wavelengths
<sup>9</sup> Be	Energy Levels, Wavelengths
Be	Energy Levels, Wavelengths
$Be^{0+-+}$	Energy Levels, Wavelengths
<sup>9</sup> Be	Energy Levels, Wavelengths
Bo	Energy Levels, Wavelengths
Bo	Energy Levels, Wavelengths
9 <b>B</b> o	Energy Levels, Wavelengths
Bo	Energy Levels, Wavelengths
$9\mathbf{p}_{0}^{0+}$	Energy Levels, Wavelengths
$\mathbf{D}_{\mathbf{c}}^{0+}$	Energy Levels, Wavelengths
De <sup>*</sup> ' - '	Energy Levels, wavelengths
ве 9р. +	Energy Levels, wavelengths
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$10 \mathbf{p}_{-} +$	Energy Levels, wavelengths
De   D - +	Energy Levels, wavelengths
Be' = B = 0 + + + + + + + + + + + + + + + + + +	Energy Levels, wavelengths
B6,	Energy Levels, wavelengths
<sup>"</sup> В6	Energy Levels, Wavelengths
Ве	Energy Levels, Wavelengths
ве	Energy Levels, Wavelengths
Ве	Energy Levels, Wavelengths

E/T	187
12/1 TD	107
Th	232
$\mathrm{Th}$	232
Exp	233
$\Gamma/T$	225
	200
E/T	235
E/T	235
Evn	2/0
шлр	240
Th	262
$\mathrm{Th}$	265
Th	265
Th	270
	210
Th	271
E/T	285
Evn	305
ть	000
Ιn	312
$\mathrm{Th}$	322
Th	330
Fun	226
Exp	330
Exp	336
Exp	336
Evn	330
Exp T	10
Th	18
$\mathrm{Th}$	18
Th	38
Th	57
	51
Th	84
$\mathrm{Th}$	105
Th	125
$\mathbf{F}/\mathbf{T}$	285
E/T	285
E/T E/T	$285 \\ 285$
E/T E/T E/T	285 285 285
E/T E/T E/T E/T	285 285 285 285
E/T E/T E/T E/T Th	285 285 285 285 285 312
E/T $E/T$ $E/T$ $E/T$ Th	285 285 285 285 312
E/T $E/T$ $E/T$ $Th$ $Th$	285 285 285 285 312 330
E/T $E/T$ $E/T$ $E/T$ Th Th Th Th	285 285 285 285 312 330 18
$\begin{array}{c} \mathrm{E/T} \\ \mathrm{E/T} \\ \mathrm{E/T} \\ \mathrm{E/T} \\ \mathrm{Th} \\ \mathrm{Th} \\ \mathrm{Th} \\ \mathrm{Th} \\ \mathrm{Th} \end{array}$	285 285 285 285 312 330 18 18
E/T $E/T$ $E/T$ $Th$ $Th$ $Th$ $Th$ $Th$	285 285 285 285 312 330 18 18 21
E/T $E/T$ $E/T$ $Th$ $Th$ $Th$ $Th$ $Th$	285 285 285 285 312 330 18 18 21
E/T $E/T$ $E/T$ $Th$ $Th$ $Th$ $Th$ $Th$ $Th$ $Th$	285 285 285 285 312 330 18 18 21 21
E/T $E/T$ $E/T$ $Th$ $Th$ $Th$ $Th$ $Th$ $Th$ $Th$ $T$	285 285 285 285 312 330 18 18 21 21 57
E/T $E/T$ $E/T$ $Th$ $Th$ $Th$ $Th$ $Th$ $Th$ $Th$ $T$	$\begin{array}{c} 285\\ 285\\ 285\\ 285\\ 312\\ 330\\ 18\\ 18\\ 21\\ 21\\ 57\\ 59\\ \end{array}$
E/T E/T E/T Th Th Th Th Th Th Th T	$\begin{array}{c} 285\\ 285\\ 285\\ 285\\ 312\\ 330\\ 18\\ 18\\ 21\\ 21\\ 57\\ 59\\ 59\\ 50\end{array}$
E/T $E/T$ $E/T$ $Th$ $Th$ $Th$ $Th$ $Th$ $Th$ $Th$ $T$	$\begin{array}{c} 285\\ 285\\ 285\\ 285\\ 312\\ 330\\ 18\\ 18\\ 21\\ 21\\ 57\\ 59\\ 59\\ 22\end{array}$
$\begin{array}{c} \mathrm{E}/\mathrm{T} \\ \mathrm{E}/\mathrm{T} \\ \mathrm{E}/\mathrm{T} \\ \mathrm{E}/\mathrm{T} \\ \mathrm{Th} \\ \mathrm{Exp} \end{array}$	$\begin{array}{c} 285\\ 285\\ 285\\ 285\\ 312\\ 330\\ 18\\ 18\\ 21\\ 21\\ 57\\ 59\\ 82\\ \end{array}$
E/T E/T E/T Th Th Th Th Th Th Th T	$\begin{array}{c} 285\\ 285\\ 285\\ 285\\ 312\\ 330\\ 18\\ 18\\ 21\\ 21\\ 57\\ 59\\ 82\\ 90\\ \end{array}$
E/T E/T E/T Th Th Th Th Th Th Th T	$\begin{array}{c} 285\\ 285\\ 285\\ 285\\ 312\\ 330\\ 18\\ 18\\ 21\\ 21\\ 57\\ 59\\ 59\\ 82\\ 90\\ 90\\ \end{array}$
E/T E/T E/T Th Th Th Th Th Th Th T	285 285 285 312 330 18 18 21 21 57 59 82 90 90
E/T E/T E/T E/T Th	285 285 285 312 330 18 18 21 21 57 59 82 90 90 90
E/T E/T E/T Th Th Th Th Th Th Th T	285 285 285 312 330 18 18 21 57 59 82 90 90 90 90 90
E/T $E/T$ $E/T$ $Th$ $Th$ $Th$ $Th$ $Th$ $Th$ $Th$ $T$	285 285 285 285 312 330 18 18 18 21 21 57 59 82 90 90 90 90 90 90 97
E/T E/T E/T Th Th Th Th Th Th Th T	285 285 285 285 312 330 18 18 18 21 21 57 59 82 90 90 90 90 90 90 97 125
E/T E/T E/T Th Th Th Th Th Th Th T	285 285 285 285 312 330 18 18 18 21 21 57 59 82 90 90 90 90 90 90 97 125
E/T E/T E/T Th Th Th Th Th Th Th T	285 285 285 285 312 330 18 18 18 21 57 59 82 90 90 90 90 90 90 90 97 125 171
E/T E/T E/T Th Th Th Th Th Th Th T	$\begin{array}{c} 285\\ 285\\ 285\\ 285\\ 285\\ 312\\ 330\\ 18\\ 18\\ 21\\ 21\\ 57\\ 59\\ 82\\ 90\\ 90\\ 90\\ 90\\ 90\\ 97\\ 125\\ 171\\ 171\\ \end{array}$
E/T E/T E/T E/T Th Th Th Th Th Th Th T	285 285 285 285 285 312 330 18 18 21 21 57 59 82 90 90 90 90 90 97 125 171 171
E/T E/T E/T E/T Th Th Th Th Th Th Th T	285 285 285 285 285 312 330 18 18 21 21 57 59 82 90 90 90 90 90 97 125 171 171 180
E/T E/T E/T E/T Th Th Th Th Th Th Th T	285 285 285 285 285 312 330 18 18 21 21 57 59 82 90 90 90 90 90 97 125 171 171 180
E/T E/T E/T E/T Th Th Th Th Th Th Th T	285 285 285 285 285 285 285 285 285 285
E/T E/T E/T E/T Th Th Th Th Th Th Th T	$\begin{array}{c} 285\\ 285\\ 285\\ 285\\ 312\\ 330\\ 18\\ 18\\ 21\\ 21\\ 57\\ 59\\ 82\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90$
E/T E/T E/T E/T Th Th Th Th Th Th Th T	$\begin{array}{c} 285\\ 285\\ 285\\ 285\\ 312\\ 330\\ 18\\ 18\\ 21\\ 21\\ 57\\ 59\\ 82\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90$
E/T E/T E/T E/T Th Th Th Th Th Th Th T	$\begin{array}{c} 285\\ 285\\ 285\\ 285\\ 312\\ 330\\ 18\\ 18\\ 21\\ 21\\ 57\\ 59\\ 82\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90\\ 90$

Be	Energy Levels, Wavelengths	$\mathrm{Th}$	223
${}^{10}\mathbf{Be}^{3+}$	Energy Levels, Wavelengths	E/T	235
$\mathbf{Be}^{3+}$	Energy Levels, Wavelengths	$\dot{\mathrm{E}/\mathrm{T}}$	235
$\mathrm{Be}^+$	Energy Levels, Wavelengths	Éxp	252
Be <sup>-</sup>	Energy Levels, Wavelengths	Th	312
$B^{0+-+}$	Energy Levels, Wavelengths	Th	57
- B-	Energy Levels, Wavelengths	 Е/Т	81
$\mathbf{B}^+$	Energy Levels, Wavelengths	2/1 Th	84
<sup>10</sup> <b>B</b>	Energy Levels, Wavelengths	E/T	85
${}^{11}B$	Energy Levels, Wavelengths	E/T	85
B	Energy Levels, Wavelengths	E/T	85
B <sup>+</sup>	Energy Levels, Wavelengths	$\frac{D}{1}$	97
B	Energy Levels, Wavelengths	Th	105
$^{11}B^{2+}$	Energy Levels, Wavelengths	Th	125
$\mathbf{B}^{3+}$	Energy Levels, Wavelengths	Exp	165
$\mathbf{B}^{4+}$	Energy Levels, Wavelengths	Exp	165
$\mathbf{B}^{2+}$	Energy Levels, Wavelengths	E/T	314
${\bf B}^{3+}$	Energy Levels, Wavelengths	E/T	314
$C^{3+}$	Energy Levels, Wavelengths	Ц/ 1 Тh	76
$C^{+3+}$	Energy Levels, Wavelengths	111 Th	84
13C3+	Energy Levels, Wavelengths	111 Th	125
$\mathbf{C}^+$	Energy Levels, Wavelengths	111 Th	120
$\mathbf{C}^{4+}$	Energy Levels, Wavelengths	I II Fyp	165
$\mathbf{C}^{5+}$	Energy Levels, Wavelengths	Exp	165
C C-	Energy Levels, Wavelengths	Exp	100
13C <sup>5+</sup>	Energy Levels, Wavelengths	Exp Th	183
$C^{5+}$	Energy Levels, Wavelengths	111 Th	183
$C^{0+-3+}$	Energy Levels, Wavelengths	111 Th	100
$C^{0+-2+}$	Energy Levels, Wavelengths	III Fyr	192
$12C^{5+}$	Energy Levels, Wavelengths	Exp F/T	200
$C^{5+}$	Energy Levels, Wavelengths	E/ I F/T	235
$\mathbf{C}^{2+}$	Energy Levels, Wavelengths	E/ 1 Evn	200
$C^+$	Energy Levels, Wavelengths	Exp	240
$\mathbf{C}^{2+}$	Energy Levels, Wavelengths	Exp	252
$\mathbf{C}^{5+}$	Energy Levels, Wavelengths	Exp	252
$\mathbf{C}^{2+}$	Energy Levels, Wavelengths	Exp Th	202
$13C^{2+}$	Energy Levels, Wavelengths	I II Fyp	201
$\mathbf{C}^{2+}$	Energy Levels, Wavelengths	Exp	291
C	Energy Levels, Wavelengths	Exp	291
$C^{3+}$	Energy Levels, Wavelengths	Exp	290
C	Energy Levels, Wavelengths	Exp	290
C	Energy Levels, Wavelengths	Exp	290
$C^{0+-+}$	Trans prob Oscill Strongths	EXP F/T	373
<b>N</b> 4+	Fnorgy Lovels Wavelengths	D/1Th	84
N5+	Energy Levels, Wavelengths	ти F/T	101
15N4+	Energy Levels, Wavelengths	Ш/ 1 Тh	101
14 <b>N</b> 3+	Energy Levels, Wavelengths	111 Th	161
N <sup>5+</sup>	Energy Levels, Wavelengths	I II Fyp	165
N <sup>6+</sup>	Energy Levels, Wavelengths	Exp	165
14 N	Energy Levels, Wavelengths	Exp	203
<sup>15</sup> N	Energy Levels, Wavelengths	Exp	200 200
N	Energy Levels, Wavelengths	Exp Fyr	200 200
N	Energy Levels, Wavelengths	Exp	-∠∪ə 922
$N^{2+}$	Energy Levels, Wavelengths	Exp Fyr	∠ეე ევე
N <sup>2+</sup> 3+	Energy Levels, Wavelengths	Exp Fyr	∠əə <u>२२</u> ४
N <sup>+</sup>	Energy Levels, Wavelengths	Exp Fyr	204 959
<b>N</b> 6+	Energy Levels, wavelengths Energy Levels, Weyelengths	Exp	202 959
T N .	Energy Levels, wavelengths	Бхр	202

14 N	Energy Levels Wavelengths	Evn	280
<sup>15</sup> N	Energy Levels, Wavelengths	Evn	280
N	Energy Levels, Wavelengths	Exp	280
$\mathbf{N}^{4+}$	Energy Levels, Wavelengths	Exp	200
N	Energy Levels, Wavelengths	Exp	328
N	Trans prob Oscill Strengths	Exp	347
N	Trans prob Oscill Strengths	<u>т</u> р	348
N	Trans prob. Oscill Strengths	Exp	363
$N^{0+-+}$	Trans prob. Oscill Strengths	E/T	373
$O^{5+}$	Energy Levels Wavelengths	Eyn	1
$\mathbf{O}^{5+}$	Energy Levels, Wavelengths	Ξπρ Th	84
$\mathbf{O}^+$	Energy Levels, Wavelengths	Th	124
$170^{5+}$	Energy Levels, Wavelengths	Th	125
$\tilde{\mathbf{O}^{3+}}$	Energy Levels, Wavelengths	Exp	144
$\tilde{17}$ $\mathbf{O}^{4+}$	Energy Levels, Wavelengths	Th	161
$\mathbf{O}^{6+}$	Energy Levels, Wavelengths	Exp	165
$\mathbf{O}^{7+}$	Energy Levels, Wavelengths	Exp	165
$^{17}\mathbf{O}^{7+}$	Energy Levels, Wavelengths	Th	183
$\mathbf{O}^{7+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	183
$\mathbf{O}^{2+}$	Energy Levels, Wavelengths	Th	199
$\mathbf{O}^{4+}$	Energy Levels, Wavelengths	E/T	213
$\mathbf{O}^{5+}$	Energy Levels, Wavelengths	Éxp	233
$O^{3+-4+}$	Energy Levels, Wavelengths	Exp	234
$^{16}\mathbf{O}^{7+}$	Energy Levels, Wavelengths	E/T	235
$^{18}O^{7+}$	Energy Levels, Wavelengths	É/T	235
$\mathbf{O}^{7+}$	Energy Levels, Wavelengths	$\dot{E/T}$	235
$O^{6+-7+}$	Energy Levels, Wavelengths	Exp	243
$O^{0+-6+}$	Energy Levels, Wavelengths	Th	244
$O^+ - 4^+$	Energy Levels, Wavelengths	Th	244
0-	Energy Levels, Wavelengths	Exp	286
$\mathbf{O}^{5+}$	Energy Levels, Wavelengths	Exp	293
$\mathbf{O}^+$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	346
0	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	362
$^{19}{ m F}^{6+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	125
$^{20}{ m F}^{5+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	161
$F^{3+4+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	234
$\mathbf{F}^{6+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	256
$\mathbf{F}^{2+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	279
$Ne^{8+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	2
$Ne^+$	Energy Levels, Wavelengths	$\mathrm{Th}$	3
$^{19}$ Ne $^{7+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	29
Ne	Energy Levels, Wavelengths	$\operatorname{Exp}$	53
$Ne^{4+}$	Energy Levels, Wavelengths	Exp	64
$Ne^{4+-o+}$	Energy Levels, Wavelengths	Exp	64
Ne <sup>o+</sup>	Energy Levels, Wavelengths	Th	92
Ne	Energy Levels, Wavelengths	Th	97
Ne <sup>+</sup> <sup>3+</sup>	Energy Levels, Wavelengths	Th	105
Ne <sup>+</sup>	Energy Levels, Wavelengths	Exp	106
$1 \text{Ne}^{\circ}$	Energy Levels, Wavelengths	Exp	116
$1Ne^{+} - 2^{+}$	Energy Levels, Wavelengths	Exp	129
<sup>22</sup> Ne <sup>o⊤</sup>	Energy Levels, Wavelengths	Th D/T	161
	Energy Levels, Wavelengths	E/T E	202
INC No <sup>6+</sup>	Energy Levels, Wavelengths	Ľхр ть	209
INC <sup>*</sup> ' N <sub>2</sub> 4+6+	Energy Levels, Wavelengths	1n Fac	215 022
1NC <sup>-</sup> '' No <sup>4+</sup>	Energy Levels, wavelengths	ьхр Б-т	∠33 094
1 <b>NC</b> <sup>9+</sup>	Energy Levels, wavelengths	ьхр ть	234 240
TNG	Energy Levels, wavelengths	<b>T</b> 11	240

$Ne^{8+}$	Energy Levels, Wavelengths	Exp	243
Ne	Energy Levels, Wavelengths	Exp	247
$Ne^{3+-5+}$	Energy Levels, Wavelengths	Exp	252
$Ne^{3+-7+}$	Energy Levels, Wavelengths	Exp	260
$Ne^{3+}$	Energy Levels, Wavelengths	Exp	279
Ne	Energy Levels, Wavelengths	Exp	282
$Ne^{5+-7+}$	Energy Levels, Wavelengths	Exp	293
$Ne^{6+}$	Energy Levels, Wavelengths	Exp	294
Ne	Energy Levels, Wavelengths	Exp	323
$Ne^{8+}$	Energy Levels, Wavelengths	Exp	325
$Ne^{0+-2+}$	Energy Levels, Wavelengths	Exp	328
$Ne^{8+-9+}$	Energy Levels, Wavelengths	Exp	331
$Ne^{8+}$	Energy Levels, Wavelengths	Th	337
$\mathbf{Ne}^+$	Trans. prob., Oscill. Strengths	Exp	358
$^{23}$ Na $^{8+}$	Energy Levels, Wavelengths	Th	29
$Na^{5+-7+}$	Energy Levels, Wavelengths	Exp	64
Na	Energy Levels, Wavelengths	Th	76
Na	Energy Levels, Wavelengths	$\mathrm{Th}$	84
Na	Energy Levels, Wavelengths	$\mathrm{Th}$	105
$Na^{9+}$	Energy Levels, Wavelengths	Exp	243
$Na^{6+-9+}$	Energy Levels, Wavelengths	Exp	293
$Na^{0+-7+}$	Trans. prob., Oscill. Strengths	E/T	340
$Na^{0+-9+}$	Trans. prob., Oscill. Strengths	E/T	340
$^{25}$ Mg	Energy Levels, Wavelengths	$\mathbf{T}_{\mathbf{h}}^{'}$	21
Mg	Energy Levels, Wavelengths	$\mathrm{Th}$	21
$^{25}$ Mg <sup>9+</sup>	Energy Levels, Wavelengths	$\mathrm{Th}$	29
$Mg^{4+8+}$	Energy Levels, Wavelengths	Exp	64
$\widetilde{\mathrm{Mg}^+}$	Energy Levels, Wavelengths	Th	76
$Mg^{0+-+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	84
Mg	Energy Levels, Wavelengths	$\mathrm{Th}$	97
$\widetilde{Mg}^{4+-6+}$	Energy Levels, Wavelengths	Exp	130
$\tilde{\mathbf{Mg}^{0+-+}}$	Energy Levels, Wavelengths	Exp	141
$Mg^{4+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	178
$Mg^{9+-11+}$	Energy Levels, Wavelengths	Exp	243
$Mg^{5+-10+}$	Energy Levels, Wavelengths	Exp	293
$Mg^{0+8+}$	Trans. prob., Oscill. Strengths	E/T	340
$Mg^{0+-10+}$	Trans. prob., Oscill. Strengths	E/T	340
$Mg^{8+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	350
$^{27}$ Al $^{10+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	29
Al	Energy Levels, Wavelengths	Exp	37
$Al^{5+-9+}$	Energy Levels, Wavelengths	Exp	64
$Al^{0+-12+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	73
$\mathbf{Al}^{2+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	76
$\mathbf{Al}^{2+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	84
$Al^{0+-11+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	86
Al	Energy Levels, Wavelengths	Exp	110
$Al^{6+}$	Energy Levels, Wavelengths	Exp	233
$Al^{10+-11+}$	Energy Levels, Wavelengths	Exp	243
$^{27}$ Al	Energy Levels, Wavelengths	$\mathrm{Th}$	274
Al	Energy Levels, Wavelengths	$\mathrm{Th}$	274
$Al^{6+-10+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	293
Al	Energy Levels, Wavelengths	$\operatorname{Exp}$	320
$\mathbf{Al}^+$	Energy Levels, Wavelengths	$\operatorname{Exp}$	328
$^{29}$ Si <sup>11+</sup>	Energy Levels, Wavelengths	$\mathrm{Th}$	29
$\mathbf{Si}^{12+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	55
$\mathbf{Si}^{6+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	64
$Si^{6+-10+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	64

$Si^{8+-10+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	68
${f Si}^{10+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	70
${f Si}^{3+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	76
${f Si}^{2+}$	Energy Levels, Wavelengths	E/T	80
${f Si}^{3+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	84
${f Si}^{2+}$	Energy Levels, Wavelengths	E/T	115
${f Si}^{6+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	130
${f Si}^{6+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	178
$\mathbf{Si}^+$	Energy Levels, Wavelengths	$\operatorname{Exp}$	233
${f Si}^{4+}$	Energy Levels, Wavelengths	Exp	233
${f Si}^{6+-7+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	233
$Si^-$	Energy Levels, Wavelengths	Exp	286
$Si^{5+-12+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	293
$Si^{8+-10+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	354
${f Si}^{10+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	356
$\mathbf{Si}^+$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	369
${f Si}^{2+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	374
$^{31}\mathbf{P}^{12+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	29
$\mathbf{P}^{3+}$	Energy Levels, Wavelengths	E/T	177
$\mathbf{P}^{7+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	290
$\mathbf{P}^{8+}$	Energy Levels, Wavelengths	Exp	290
$\mathbf{P}^{8+}$	Energy Levels, Wavelengths	Exp	293
$\mathbf{S}^{12+}$	Energy Levels, Wavelengths	Exp	1
$^{33}{ m S}^{13+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	29
$\mathbf{S}^{8+}$	Energy Levels, Wavelengths	Exp	64
$S^{8+-12+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	64
$S^{11+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	64
$^{33}S^{15+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	183
$S^{15+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	183
$S^{4+}$	Energy Levels, Wavelengths	E/T	213
$S^{0+-4+}$	Energy Levels, Wavelengths	Exp	233
$\mathbf{S}^{9+}$	Energy Levels, Wavelengths	Exp	233
$S^{-}$	Energy Levels, Wavelengths	Exp	286
$S^{0+-12+}$	Energy Levels, Wavelengths	Exp	293
$^{55}\text{Cl}^{14+}$	Energy Levels, Wavelengths	Th	29
$Cl^{10+}$	Energy Levels, Wavelengths	Exp	58
$CI^{9+-11+}$	Energy Levels, Wavelengths	Exp	64
	Energy Levels, Wavelengths	Th	74
	Energy Levels, Wavelengths	Th	74
	Energy Levels, Wavelengths	Th	112
	Energy Levels, Wavelengths	Th F (Th	178
$Cl^{9+}_{11+}$	Energy Levels, Wavelengths	E/1 E-m	213
$CI^{0+-1+}$	Energy Levels, wavelengths	Exp	290
	Energy Levels, wavelengths	Exp	290
$Cl^{0+}$	Energy Levels, wavelengths	Exp	293
$Cl^{10+-11+}$	Energy Levels, wavelengths	Exp	293
Cl	Energy Levels, wavelengths	Exp	328
$n^{13+}$	France Levels, Wevelengths		308 1
$\Delta r^{16+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp ть	1 9
$\Lambda r^{14+}$	Energy Levels, wavelengths	1 II Th	∠ 6
$\Lambda r^{8+}$	Energy Levels, wavelengths	1 II Fyrn	10
$35 \Delta r^{15+}$	Energy Levels, Wavelengths	њ. Бар	20
$Ar^{0+}-+$	Energy Levels, Wavelengths	Evn	43
Ar	Energy Levels, Wavelengths	Evp	чэ 52
$\mathbf{Ar}^{16+}$	Energy Levels, Wavelengths	Exp	58
$Ar^{13+}$	Energy Levels, Wavelengths	Th	61
		± 11	<u> </u>

$\mathbf{Ar}^{6+}$	Energy Levels, Wavelengths	Exp	64
$Ar^{10+-12+}$	Energy Levels, Wavelengths	Exp	64
${}^{37}$ Ar ${}^{2+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	74
$\mathbf{Ar}^{2+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	74
$\mathbf{Ar}^{13+}$	Energy Levels, Wavelengths	E/T	78
$\mathbf{Ar}^{5+}$	Energy Levels, Wavelengths	Exp	88
Ar	Energy Levels, Wavelengths	Exp	95
$\mathbf{Ar}^+$	Energy Levels, Wavelengths	Exp	95
Ar	Energy Levels, Wavelengths	E/T	98
$Ar^{9+}$	Energy Levels, Wavelengths	Exp	127
$\mathbf{Ar}^{10+}$	Energy Levels, Wavelengths	Exp	127
$Ar^{13+}$	Energy Levels, Wavelengths	Exp	127
$\mathbf{Ar}^{14+}$	Energy Levels, Wavelengths	Exp	127
$Ar^{13+-14+}$	Energy Levels, Wavelengths	E/T	154
$\mathbf{Ar}^{10+}$	Energy Levels, Wavelengths	Th	159
$Ar^{8+}$	Energy Levels, Wavelengths	Exp	165
$Ar^{13+}$	Energy Levels, Wavelengths	Th	201
Ar	Energy Levels, Wavelengths	E/T	202
Ar	Energy Levels, Wavelengths	Exp	207
$Ar^{15+}$	Energy Levels, Wavelengths	Th	211
$\mathbf{A}\mathbf{r}^{6+}$	Energy Levels, Wavelengths	E/T	213
$\Delta r^{13+-14+}$	Energy Levels, Wavelengths	Eyn	210
$\Delta r^{11+}$	Energy Levels, Wavelengths	Exp	224
$\Delta r^{13+-17+}$	Energy Levels, Wavelengths	Exp	200
$\Delta r^{8+}$	Energy Levels, Wavelengths	Exp	241
$\mathbf{Ar}^{5+}$	Energy Levels, Wavelengths	Exp	251
$Ar^{15+}$	Energy Levels, Wavelengths	Exp	252
$\mathbf{Ar}^{16+}$	Energy Levels, Wavelengths	Exp	$\frac{-0}{252}$
$Ar^{13+-14+}$	Energy Levels, Wavelengths	Exp	259
$\mathbf{Ar}^{16+}$	Energy Levels, Wavelengths	Exp	259
$Ar^{8+-10+}$	Energy Levels, Wavelengths	Exp	260
$\mathbf{Ar}^{16+}$	Energy Levels, Wavelengths	Exp	261
$Ar^{15+-16+}$	Energy Levels, Wavelengths	Exp	263
Ar	Energy Levels, Wavelengths	Exp	282
$\mathbf{Ar}^{13+}$	Energy Levels, Wavelengths	Exp	288
$\mathbf{Ar}^{14+}$	Energy Levels, Wavelengths	Exp	288
$Ar^{6+-8+}$	Energy Levels, Wavelengths	Exp	293
$Ar^{10+-12+}$	Energy Levels, Wavelengths	Exp	293
$Ar^{8+}$	Energy Levels, Wavelengths	Exp	310
$Ar^{14+-15+}$	Energy Levels, Wavelengths	Exp	325
$\mathbf{Ar}^{14+}$	Energy Levels, Wavelengths	Th	327
$Ar^{8+}$	Energy Levels, Wavelengths	Exp	332
$Ar^{15+}$	Energy Levels, Wavelengths	Exp	334
$\mathbf{Ar}^{16+}$	Energy Levels, Wavelengths	Exp	334
$\mathbf{Ar}^{16+}$	Energy Levels, Wavelengths	Th	337
$K^{15+}$	Energy Levels, Wavelengths	Exp	1
${}^{39}$ K <sup>16+</sup>	Energy Levels, Wavelengths	Th	$\frac{-}{29}$
$\mathbf{K}^{11+-13+}$	Energy Levels, Wavelengths	Exp	64
K <sup>+</sup>	Energy Levels, Wavelengths	—— E/T	285
$K^{11+-13+}$	Energy Levels. Wavelengths	Exp	$\frac{-00}{290}$
$\mathbf{K}^{12+}$	Energy Levels. Wavelengths	Exp	$\frac{-90}{290}$
$\mathbf{K}^{8+}$	Energy Levels, Wavelengths	Exp	$\frac{-9}{293}$
$K^{10+-12+}$	Energy Levels, Wavelengths	Exp	293
$Ca^{13+-16+}$	Energy Levels, Wavelengths	Exp	1
$^{43}$ Ca	Energy Levels, Wavelengths	Th	21
Ca	Energy Levels. Wavelengths	Th	21
${}^{40}\mathbf{Ca}^{17+}$	Energy Levels, Wavelengths	Th	$29^{-1}$
		± ++	

$\mathbf{Ca}^{8+}$	Energy Levels, Wavelengths	Exp
$Ca^{12+-14+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$\mathbf{Ca}^+$	Energy Levels, Wavelengths	$\mathrm{Th}$
$\mathbf{Ca}^{6+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$\mathbf{Ca}^{12+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
$^{43}\mathbf{Ca}^{19+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
$\mathbf{Ca}^{19+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
$^{43}$ Ca $^+$	Energy Levels, Wavelengths	$\mathrm{Th}$
$\mathbf{Ca}^+$	Energy Levels, Wavelengths	$\mathrm{Th}$
$\mathbf{Ca}^{9+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Ca}^{12+}$	Energy Levels, Wavelengths	Exp
${f Ca-Zr^+}$	Energy Levels, Wavelengths	E/T
$Ca^{6+-9+}$	Energy Levels, Wavelengths	Exp
$Ca^{11+-14+}$	Energy Levels, Wavelengths	Exp
${f Ti}^{3+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
${f Ti}^+$	Energy Levels, Wavelengths	Exp
$Ti^{14+-15+}$	Energy Levels, Wavelengths	Exp
${f Ti}^{5+}$	Energy Levels, Wavelengths	E/T
$\mathbf{Ti}$	Energy Levels, Wavelengths	Exp
${f Ti^+}$	Energy Levels, Wavelengths	Exp
${f Ti}^{19+}$	Energy Levels, Wavelengths	Exp
${f Ti}^{20+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Ti^{11+-12+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Ti^{14+-18+}$	Energy Levels, Wavelengths	Exp
$Ti^{14+-15+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Ti}^+$	Energy Levels, Wavelengths	Exp
$\mathbf{Ti}^{3+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Ti}^{3+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Ti}^{18+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
$\mathbf{V}^{4+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
$^{51}$ V	Energy Levels, Wavelengths	$\mathrm{Th}$
V	Energy Levels, Wavelengths	$\mathrm{Th}$
$V^{4+}$	Trans. prob., Oscill. Strengths	Th
$V^{4+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
$V^{0++}$	Trans. prob., Oscill. Strengths	Exp
$Cr^+$	Energy Levels, Wavelengths	Exp
$Cr^{10+-17+}$	Energy Levels, Wavelengths	Exp
$Cr^{19+}$	Energy Levels, Wavelengths	Exp
$Cr^{12+}$	Energy Levels, Wavelengths	Th
$^{53}$ Cr	Energy Levels, Wavelengths	E/T
Cr	Energy Levels, Wavelengths	E/T
$\operatorname{Cr}^+$	Energy Levels, Wavelengths	Exp
$Cr^{10+}$	Energy Levels, Wavelengths	Th
$^{55}\mathrm{Cr}^{25+}$	Energy Levels, Wavelengths	Th
$\operatorname{Cr}^{23+}$	Energy Levels, Wavelengths	Th
$\mathbf{Cr}^{9+}$	Energy Levels, Wavelengths	Exp
$Cr^{10+}$	Energy Levels, Wavelengths	Exp
$Cr^{9+-10+}$	Energy Levels, Wavelengths	Exp
$Cr^{10+}$	Energy Levels, Wavelengths	Exp
$Cr^{++}$	Energy Levels, Wavelengths	Exp
$\mathbf{Cr}'$	Energy Levels, Wavelengths	Exp
$Cr^{+}$	Energy Levels, Wavelengths	Exp
	Energy Levels, wavelengths	Exp
$\mathbf{Cr}$ $\mathbf{Cr}^{12+}$	Trans. prob., Oscill. Strengths	Exp
ОГ Мр <sup>16+</sup> _23+	Frans. prob., Oscili. Strengths	1 n Th
$M_{n}^{16+18+}$	Energy Levels, wavelengths	1 h E-
	Energy Levels, wavelengths	Exp

 $\begin{array}{c} 76 \\ 130 \end{array}$ 

 $\begin{array}{c} 190 \\ 233 \end{array}$ 

 $\begin{array}{c} 285\\ 293 \end{array}$ 

 $\begin{array}{c} 200 \\ 200 \end{array}$ 

 $\begin{array}{c} 375\\ 44 \end{array}$ 

 $\begin{array}{c} 113 \\ 141 \end{array}$ 

 $\begin{array}{c} 183 \\ 183 \end{array}$ 

 $\begin{array}{c} 290\\ 290 \end{array}$ 

 $\frac{361}{24}$ 

$Mn^{20+}$	Energy Levels, Wavelengths	Exp	64
$\mathbf{Mn}^{12+}$	Energy Levels, Wavelengths	Th	87
$Mn^+$	Energy Levels, Wavelengths	Exp	141
Mn	Energy Levels, Wavelengths	Exp	237
$Mn^{2+}$	Energy Levels, Wavelengths	Exp	284
$Mn^{10+}$	Energy Levels, Wavelengths	Exp	290
$Mn^{11+}$	Energy Levels, Wavelengths	Exp	290
$Mn^{16+-17+}$	Energy Levels, Wavelengths	Exp	293
$Mn^{19+-20+}$	Energy Levels, Wavelengths	Exp	293
$Mn^+$	Energy Levels, Wavelengths	Exp	295
Mn	Energy Levels, Wavelengths	$\mathrm{Th}$	304
Mn	Trans. prob., Oscill. Strengths	Exp	343
$Mn^{12+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	359
$\mathbf{Fe}^{7+}$	Energy Levels, Wavelengths	Exp	1
$Fe^{10+-11+}$	Energy Levels, Wavelengths	Exp	1
$Fe^{14+-17+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	1
$Fe^{22+-23+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	1
$\mathbf{Fe}^{24+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	2
$Fe^{22+-24+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	9
$\mathbf{Fe}^{3+}$	Energy Levels, Wavelengths	$\mathrm{E/T}$	28
$Fe^{23+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	34
${f Fe}^+$	Energy Levels, Wavelengths	$\operatorname{Exp}$	35
$\mathbf{Fe}^{13+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	39
$\mathbf{Fe}^{19+}$	Energy Levels, Wavelengths	Exp	41
${f Fe}^+$	Energy Levels, Wavelengths	Exp	44
$\mathbf{Fe}^{15+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	45
$\mathbf{Fe}^{12+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	46
$Fe^{16+-23+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	49
$Fe^{17+-23+}$	Energy Levels, Wavelengths	E/T	50
$\mathbf{Fe}^{23+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	60
$Fe^{10+-12+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	64
$Fe^{16+-22+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	64
$\mathbf{Fe}^{20+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	64
$\mathbf{Fe}^{22+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	64
$\mathbf{Fe}^{14+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	66
$Fe^{0+-25+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	73
$\mathbf{Fe}^{18+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	77
$Fe^{24+-25+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$	79
${f Fe^+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	117
$\mathbf{Fe}^{6+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	130
$\mathbf{Fe}^{14+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	131
$\mathbf{Fe}^{21+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	132
$Fe^{5+-15+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	133
$Fe^{16+-22+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	134
$\mathbf{Fe}^{8+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	136
$\mathbf{Fe}^{17+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$	137
$\mathbf{Fe}^{21+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	138
$\mathbf{Fe}^{23+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$	139
$\mathbf{Fe}^+$	Energy Levels, Wavelengths	$\operatorname{Exp}$	141
$Fe^{17+-21+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	147
$\mathbf{Fe}^{8+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	148
$Fe^{15+-17+}$	Energy Levels, Wavelengths	E/T	152
$\mathbf{Fe}^{17+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$	152
$Fe^{16+-18+}$	Energy Levels, Wavelengths	Exp	165
$Fe^{23+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	179
$\mathbf{Fe}^{23+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	211
$\mathbf{Fe}^{14+}$	Energy Levels, Wavelengths	Th	212

$Fe^{0+-+}$	Energy Levels, Wavelengths
$\mathbf{Fe}^{10+}$	Energy Levels Wavelengths
$Fe^+ - 2^+$	Energy Levels, Wavelengths
$r_{c}$	Energy Levels, wavelengths
$\mathbf{Fe}^{-17+}$ 23+	Energy Levels, wavelengths
Fe <sup></sup>	Energy Levels, wavelengths
	Energy Levels, Wavelengths
$\mathbf{F}\mathbf{e}^{22+}$	Energy Levels, Wavelengths
$\mathbf{Fe}^{6+-7+}$	Energy Levels, Wavelengths
$Fe^{16+-22+}$	Energy Levels, Wavelengths
$Fe^{9+-16+}$	Energy Levels, Wavelengths
$\mathbf{Fe}^{16+}$	Energy Levels, Wavelengths
$Fe^{19+-24+}$	Energy Levels, Wavelengths
$Fe^{16+-18+}$	Energy Levels, Wavelengths
$\mathbf{Fe}^{12+}$	Trans. prob., Oscill. Strengths
$\mathbf{Fe}^{2+}$	Trans prob Oscill Strengths
$\mathbf{Fe}^{2+}$	Trans prob Oscill Strengths
$Co^{15+}$	Energy Levels Wavelengths
$Co^{15+}$	Energy Levels, Wavelengths
$Co^{12+}$	Energy Levels, Wavelengths
$C_{0}^{-1}$	Energy Levels, wavelengths
$C_{0}^{11}$	Energy Levels, Wavelengths
$C_{0}^{-1}$	Energy Levels, wavelengths
$C0^{11} - 12^{1}$	Energy Levels, Wavelengths
	Energy Levels, Wavelengths
$Ni^{10+}$	Energy Levels, Wavelengths
Ni <sup>18+25+</sup>	Energy Levels, Wavelengths
Ni <sup>10+</sup>	Energy Levels, Wavelengths
$Ni^{18+-25+}$	Energy Levels, Wavelengths
$Ni^{12+-14+}$	Energy Levels, Wavelengths
$Ni^{18+}$	Energy Levels, Wavelengths
$Ni^{20+}$	Energy Levels, Wavelengths
$Ni^{22+}$	Energy Levels, Wavelengths
$Ni^{16+}$	Energy Levels, Wavelengths
Ni	Energy Levels, Wavelengths
$Ni^{13+}$	Energy Levels, Wavelengths
$Ni^{18+}$	Energy Levels, Wavelengths
$Ni^{18+}$	Energy Levels, Wavelengths
$Ni^{18+}$	Energy Levels, Wavelengths
$Ni^{25+}$	Energy Levels, Wavelengths
$Ni^{7+}$	Energy Levels, Wavelengths
$\mathbf{Ni}^{5+}$	Energy Levels, Wavelengths
$Ni^{18+19+}$	Energy Levels, Wavelengths
$Ni^{13+-14+}$	Energy Levels, Wavelengths
$Ni^{18+}$	Energy Levels, Wavelengths
$Ni^{20+}$	Energy Levels, Wavelengths
$Ni^{22+}$	Energy Levels, Wavelengths
$Ni^{26+}$	Energy Levels, Wavelengths
Nj27+	Energy Levels, Wavelengths
NI:10+	Trang prob Oscill Strongths
63 <b>C</b>	Franzy Levels, Waveler aths
65 C	Energy Levels, wavelengths
66 <b>C</b>	Energy Levels, wavelengths
⇔Cu	Energy Levels, Wavelengths
	Energy Levels, Wavelengths
$Cu^{3+}$	Energy Levels, Wavelengths
	Energy Levels, Wavelengths
	Energy Levels, Wavelengths
Cu <sup>+</sup> ' <sup>+</sup>	Energy Levels, Wavelengths
$^{\circ\circ}\mathbf{Cu}$	Energy Levels, Wavelengths

I.	225
Exp	231
Exp	233
Exp	243
Exp	243
Exp	245
Th	281
Exp	293
Exp	293
Th	297
Exp	310
Th	318
Exp	325
Th	344
Th	365
Th	371
Exp	1
Th	66
Exp	121
Exp	290
Evp	290
Exp	200
Exp Evp	295
Exp	295
Exp	1
схр ть	40
111 Th	42
1 II 17	49
схр Б	04 64
схр Б	04 64
схр Б	04 64
ехр ть	04 66
1 II Fum	104
Exp Evr	104
њхр ть	121
1 II Even	150
ьхр Бчю	100
схр ть	100
In	179
$\mathbf{F}/\mathbf{T}$	107
E/T	197
E/T E/T Free	197 198 242
E/T E/T Exp	197 198 243
E/T E/T Exp Exp	197 198 243 293
E/T E/T Exp Exp Exp	197 198 243 293 293
E/T E/T Exp Exp Exp Exp	197 198 243 293 293 293 293
E/T E/T Exp Exp Exp Exp Exp	197 198 243 293 293 293 293 293
E/T E/T Exp Exp Exp Exp Exp Exp	197 198 243 293 293 293 293 293 309 200
E/T E/T Exp Exp Exp Exp Exp Exp Exp	197 198 243 293 293 293 293 293 309 309
E/T E/T Exp Exp Exp Exp Exp Exp Th Th	197 198 243 293 293 293 293 293 309 309 342
E/T E/T Exp Exp Exp Exp Exp Exp Th Th	197 198 243 293 293 293 293 293 293 309 309 342 118
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E/T E/T Exp Exp Exp Exp Exp Exp Th Th Th Th Th Th Th Th	197 198 243 293 293 293 309 309 342 118 118 118 118 118 118 216
E/T E/T Exp Exp Exp Exp Exp Exp Exp Th Th Th Th Th Th Th Th	197 198 243 293 293 293 309 309 342 118 118 118 118 118 118 216 245
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$^{68}$ Cu	Energy Levels,	Wavelengths	E/T	313
$^{70}$ Cu	Energy Levels,	Wavelengths	E/T	313
Cu	Energy Levels,	Wavelengths	E/T	313
$\mathbf{Zn}^{28+}$	Energy Levels,	Wavelengths	Th	2
$\mathbf{Zn}^+$	Energy Levels,	Wavelengths	Th	76
$\mathbf{Zn}^+$	Energy Levels,	Wavelengths	Exp	141
$\mathbf{Zn}^{7+}$	Energy Levels,	Wavelengths	E/T	198
$Ga^{0+-3+}$	Energy Levels,	Wavelengths	E/T	122
$Ga^{0+-6+}$	Energy Levels,	Wavelengths	E/T	122
$Ga^{4+}$	Energy Levels,	Wavelengths	E/T	122
$Ga^{5+-12+}$	Energy Levels,	Wavelengths	E/T	122
$Ga^{12+-25+}$	Energy Levels,	Wavelengths	E/T	122
$Ga^{13+-28+}$	Energy Levels,	Wavelengths	E/T	122
$Ga^{28+-30+}$	Energy Levels,	Wavelengths	E/T	122
$Ga^{29+}$	Energy Levels,	Wavelengths	E/T	122
Ga <sup>30+</sup>	Energy Levels,	Wavelengths	E/T	122
Ga <sup>+</sup>	Energy Levels,	Wavelengths	Th	206
	Energy Levels,	Wavelengths	Th	217
<sup>09</sup> Ga	Energy Levels,	Wavelengths	Th	219
''Ga	Energy Levels,	Wavelengths	Th	219
Ga C +	Energy Levels,	Wavelengths	In E	219
Ga	Energy Levels,	Wavelengths	Exp	295
$73 C_{2} 31 +$	Energy Levels,	Wavelengths	Exp Th	104
$C_{a}^{31+}$	Energy Levels,	Wavelengths	111 Th	100
Ge	Energy Levels,	Wavelengths	111 Fyn	245
$Ge^{30+}$	Energy Levels,	Wavelengths	Th	240
As	Energy Levels	Wavelengths	E/T	285
$Se^{4+}$	Energy Levels, Energy Levels	Wavelengths	Th	16
Se-Mo	Energy Levels,	Wavelengths	E/T	285
Kr <sup>31+-27+</sup>	Energy Levels.	Wavelengths	Th	5
Kr	Energy Levels,	Wavelengths	Exp	15
$\mathbf{Kr}^{6+}$	Energy Levels,	Wavelengths	Th	16
$Kr^{34+}$	Energy Levels,	Wavelengths	Exp	22
Kr	Energy Levels,	Wavelengths	Exp	32
Kr	Energy Levels,	Wavelengths	E/T	83
$\mathbf{Kr}^{5+}$	Energy Levels,	Wavelengths	Exp	93
$\mathbf{Kr}^{6+}$	Energy Levels,	Wavelengths	Exp	93
$^{78}$ Kr	Energy Levels,	Wavelengths	Exp	96
<sup>80</sup> Kr	Energy Levels,	Wavelengths	Exp	96
<sup>82</sup> Kr	Energy Levels,	Wavelengths	Exp	96
<sup>83</sup> Kr	Energy Levels,	Wavelengths	Exp	96
<sup>84</sup> Kr	Energy Levels,	Wavelengths	$\operatorname{Exp}$	96
<sup>86</sup> Kr	Energy Levels,	Wavelengths	Exp	96
Kr	Energy Levels,	Wavelengths	Exp	96
Kr	Energy Levels,	Wavelengths	Exp	99
Kr	Energy Levels,	Wavelengths	E/T	108
<b>Kr</b> ' 84 <b>T</b>	Energy Levels,	Wavelengths	Exp	114
86 <b>1</b> 2	Energy Levels,	Wavelengths	E/I E/T	123
<b>Kr</b> <b>K</b> n <sup>0+</sup> 2+	Energy Levels,	wavelengths Wewelengths	⊡/ 1 Б/Т	123
$K_n^{0+} = 9^+$	Energy Levels,	wavelengths Wevelengths	ப்/ 1 〒/T	12ð 199
$Kr^{3+}-6+$	Energy Levels,	Wavelengths	ц/т Е/Т	120 192
$Kr^{7+8+}$	Energy Levels,	Wavelengths	E/T	123
$Kr^{9+17+}$	Energy Levels,	Wavelengths	E/T	123
$Kr^{10+-16+}$	Energy Levels	Wavelengths	E/T	123
Kr <sup>11+-34+</sup>	Energy Levels	Wavelengths	E/T	123
	LINES LEVELS,		/ 1	140

$Kr^{18+-32+}$	Energy Levels Wavelengths
$Kr^{33+}$	Energy Levels, Wavelengths
$K_{n}^{33+}=35+$	Energy Levels, Wavelengths
<b>N</b> I <sup>-</sup> 84 <b>1</b> <i>z</i> 3+	Energy Levels, wavelengths
86TZ 3+	Energy Levels, wavelengths
	Energy Levels, Wavelengths
$\mathrm{Kr}^{3+}$	Energy Levels, Wavelengths
° <sup>3</sup> Kr	Energy Levels, Wavelengths
$^{84}$ Kr	Energy Levels, Wavelengths
Kr	Energy Levels, Wavelengths
$^{83}$ Kr <sup>0+-+</sup>	Energy Levels, Wavelengths
$Kr^{0++}$	Energy Levels, Wavelengths
<sup>83</sup> Kr	Energy Levels, Wavelengths
Kr	Energy Levels, Wavelengths
$\mathbf{Kr}^{24+}$	Energy Levels, Wavelengths
Kr	Energy Levels Wavelengths
Kr	Energy Levels, Wavelengths
Kr	Energy Levels, Wavelengths
Ki Kn <sup>33+</sup>	Energy Levels, Wavelengths
84 L/ m	Energy Levels, wavelengths
<sup>V</sup> Kr	Energy Levels, wavelengths
8012	Energy Levels, Wavelengths
<sup>20</sup> Kr	Energy Levels, Wavelengths
<sup>62</sup> Kr	Energy Levels, Wavelengths
<sup>83</sup> Kr	Energy Levels, Wavelengths
<sup>84</sup> Kr	Energy Levels, Wavelengths
<sup>80</sup> Kr	Energy Levels, Wavelengths
Kr	Energy Levels, Wavelengths
Kr <sup>+</sup>	Energy Levels, Wavelengths
$Kr^{31+}-33+$	Energy Levels, Wavelengths
$Kr^{23+-27+}$	Energy Levels, Wavelengths
$Kr^{+-2+}$	Energy Levels, Wavelengths
Kr	Energy Levels, Wavelengths
$\mathbf{Kr}^+$	Energy Levels, Wavelengths
Kr	Energy Levels, Wavelengths
$Kr^{24+-27+}$	Energy Levels, Wavelengths
Rb	Energy Levels, Wavelengths
$^{87}$ Sr	Energy Levels, Wavelengths
Sr	Energy Levels, Wavelengths
$^{87}$ Sr <sup>+</sup>	Energy Levels, Wavelengths
$\mathbf{Sr}^+$	Energy Levels, Wavelengths
$\mathbf{Sr}^+$	Energy Levels, Wavelengths
$\mathbf{Y}^{2+}$	Energy Levels, Wavelengths
$\mathbf{Y}^{2+}$	Energy Levels, Wavelengths
$\mathbf{Zr}^{38+}$	Energy Levels, Wavelengths
$Nb-Tc^+$	Energy Levels, Wavelengths
$\mathbf{Nb}^{4+}$	Energy Levels, Wavelengths
$\mathbf{Nb}^{4+}$	Energy Levels, Wavelengths
${ m Mo}^{5+}$	Energy Levels, Wavelengths
$Mo^{33+}$	Energy Levels, Wavelengths
$Mo^{33+}$	Energy Levels, Wavelengths
$Mo^{30+-33+}$	Energy Levels, Wavelengths
Тс	Energy Levels, Wavelengths
Bu-Sb	Energy Levels, Wavelengths
Ru <sup>+</sup>	Energy Levels, Wavelengths
$Bu^{16+}$	Trans, prob Oscill Strengths
$\mathbf{B}\mathbf{h}^{40+}$	Energy Levels Wavelengths
Bh-Pd <sup>+</sup>	Energy Levels Wavelengths
Δσ	Energy Levels, Wavelengths
4 <b>1</b> 5	LINCISY LEVELS, WAVELENGUIS

E/T	
	123
<b>n</b> ′/ <b>m</b>	100
E/T	123
E/T	123
L/1	120
Exp	169
Evn	169
птр	105
Exp	169
F/T	170
E/1	170
E/T	170
	170
E/T	170
E/T	170
12/1 12/1	110
E/T	170
Evn	180
птр	105
Exp	189
Th	106
111	190
E/T	202
E.m	207
схр	207
Exp	208
r m	011
Th	211
Exp	218
Блр	210
Exp	218
Evn	238
ыхр	200
Exp	238
Erm	000
схр	230
Exp	238
r	000
$\operatorname{Exp}$	238
Exp	238
<u>п</u>	
$\operatorname{Exp}$	248
Exp	258
Блр	200
Exp	267
$\mathbf{T}\mathbf{h}$	275
	210
E/T	277
Evn	278
птр	210
-	.,
Exp	202
Exp Exp	202
	$\frac{282}{334}$
Exp Exp E/T	202 334 303
Exp Exp E/T Th	282 334 303 21
$\begin{array}{l} \text{Exp} \\ \text{Exp} \\ \text{E/T} \\ \text{Th} \end{array}$	<ul> <li>282</li> <li>334</li> <li>303</li> <li>21</li> </ul>
Exp Exp E/T Th Th	282 334 303 21 21
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$\begin{array}{c} \text{Exp} \\ \text{Exp} \\ \text{E/T} \\ \text{Th} \\ \text{Th} \\ \text{Th} \\ \text{Th} \end{array}$	<ul> <li>282</li> <li>334</li> <li>303</li> <li>21</li> <li>21</li> <li>190</li> </ul>
Exp Exp E/T Th Th Th Th	282 334 303 21 21 190 190
Exp Exp E/T Th Th Th Th Th E/T	282 334 303 21 21 190 190
Exp Exp E/T Th Th Th Th E/T	<ul> <li>282</li> <li>334</li> <li>303</li> <li>21</li> <li>21</li> <li>190</li> <li>190</li> <li>303</li> </ul>
Exp Exp E/T Th Th Th Th E/T Exp	282 334 303 21 21 190 190 303 129
Exp Exp E/T Th Th Th Th E/T Exp E/T	282 334 303 21 21 190 190 303 129 303
Exp Exp E/T Th Th Th Th E/T Exp E/T	282 334 303 21 21 190 190 303 129 303
$\begin{array}{c} \text{Exp} \\ \text{Exp} \\ \text{E/T} \\ \text{Th} \\ \text{Th} \\ \text{Th} \\ \text{Th} \\ \text{E/T} \\ \text{Exp} \\ \text{E/T} \\ \text{Th} \end{array}$	282 334 303 21 190 190 303 129 303 2
Exp Exp E/T Th Th Th Th E/T Exp E/T Th E/T	282 334 303 21 21 190 190 303 129 303 2 285
Exp Exp E/T Th Th Th Th E/T E/T E/T Th E/T	282 334 303 21 21 190 190 303 129 303 2 285
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Exp Exp E/T Th Th Th Th E/T E/T Th E/T E/T E/T	282 334 303 21 190 190 303 129 303 2 285 301 303
$\begin{array}{c} \text{Exp} \\ \text{Exp} \\ \text{E/T} \\ \text{Th} \\ \text{Th} \\ \text{Th} \\ \text{Th} \\ \text{Th} \\ \text{E/T} \\ \text{E/T} \\ \text{E/T} \\ \text{E/T} \\ \text{E/T} \\ \text{E/T} \end{array}$	282 334 303 21 190 190 303 2 285 301 303
Exp Exp E/T Th Th Th Th E/T E/T E/T E/T Th	282 334 303 21 190 190 303 129 303 2 285 301 303 194
Exp Exp E/T Th Th Th Th E/T E/T E/T E/T Th E/T Th Th	282 334 303 21 21 190 190 303 129 303 2 285 301 303 194 268
$\begin{array}{c} \text{Exp} \\ \text{Exp} \\ \text{E/T} \\ \text{Th} \\ \text{Th} \\ \text{Th} \\ \text{Th} \\ \text{Th} \\ \text{E/T} \\ \text{E/T} \\ \text{E/T} \\ \text{E/T} \\ \text{E/T} \\ \text{Th} \\ \text{Th} \\ \text{Th} \end{array}$	2022 334 303 21 21 190 303 129 303 2 285 301 303 194 268
Exp Exp E/T Th Th Th Th E/T E/T E/T Th E/T Th Th Th Th	282 334 303 21 21 190 303 129 303 2 285 301 303 194 268 315
Exp Exp E/T Th Th Th Th E/T E/T E/T Th E/T Th Th Th Th Th	282 334 303 21 190 190 303 2 285 301 303 285 301 303 194 268 315
$\begin{array}{c} \mathrm{Exp} \\ \mathrm{Exp} \\ \mathrm{E/T} \\ \mathrm{Th} \\ \mathrm{Th} \\ \mathrm{Th} \\ \mathrm{Th} \\ \mathrm{E/T} \\ \mathrm{E/T} \\ \mathrm{E/T} \\ \mathrm{E/T} \\ \mathrm{E/T} \\ \mathrm{Th} \end{array}$	282 334 303 21 190 190 303 129 303 2 285 301 303 194 268 315 334
Exp Exp E/T Th Th Th Th E/T E/T E/T E/T Th Th Th Th Exp E/T	2022 334 303 21 21 190 303 129 303 2 285 301 303 194 268 315 334 285
Exp Exp E/T Th Th Th Th Th E/T E/T Th E/T E/T Th Th Th Exp E/T Th E/T	2022 334 303 21 21 190 303 129 303 2 285 301 303 194 268 315 334 285
Exp Exp E/T Th Th Th Th E/T E/T Th E/T Th Th E/T Th E/T Th E/T Th	282 334 303 21 190 190 303 129 303 2 285 301 303 194 268 315 334 285 285
Exp Exp E/T Th Th Th Th E/T E/T Th E/T E/T Th Th Exp E/T E/T E/T E/T	282 334 303 21 190 190 303 129 303 2 285 301 303 194 268 315 334 285 285 285 285
Exp Exp E/T Th Th Th Th Th E/T E/T Th E/T Th Th E/T E/T E/T E/T Th	2022 334 303 21 190 190 303 129 303 2 285 301 303 194 268 315 334 285 285 285 285
Exp Exp E/T Th Th Th Th Th E/T E/T Th E/T E/T Th Th E/T E/T E/T Th Th	2022 334 303 21 21 190 303 129 303 2 285 301 303 194 268 315 334 285 285 285 285 370
Exp Exp E/T Th Th Th Th E/T E/T Th E/T Th E/T Th Th E/T Th Th Th Th Th Th Th Th Th Th Th Th Th	282 334 303 21 21 190 303 2 285 301 303 2285 301 303 194 268 315 334 285 285 285 370 223
Exp Exp E/T Th Th Th Th E/T E/T Th E/T Th E/T Th E/T Th Th E/T Th Th E/T Th Th Th Th Th Th Th Th Th Th Th Th Th	282 334 303 21 190 303 129 303 2 285 301 303 194 268 315 334 285 285 285 285 285 370 223
Exp Exp E/T Th Th Th Th E/T E/T Th E/T E/T Th Th E/T E/T Th Th E/T Th Th E/T	2022 334 303 21 190 303 129 303 2 285 301 303 194 268 315 334 285 285 370 223 285
Exp Exp E/T Th Th Th Th Th E/T E/T Th Th E/T Th Th E/T Th Th E/T Th Th E/T Th Th Th Th Th Th Th Th Th Th Th Th Th	2022 334 303 21 190 190 303 129 303 2 285 301 303 194 268 315 334 285 285 285 285 370 223 285 19

$^{107}$ Ag	Energy Levels, Wavelengths	Th	118
$^{108}$ Ag	Energy Levels, Wavelengths	$\mathrm{Th}$	118
$^{109}$ Ag	Energy Levels, Wavelengths	$\mathrm{Th}$	118
$^{110}$ Ag	Energy Levels, Wavelengths	$\mathrm{Th}$	118
Ag	Energy Levels, Wavelengths	$\mathrm{Th}$	118
$Ag-Sb^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{Sn}^{48+}$	Energy Levels, Wavelengths	$\mathbf{T}_{\mathbf{h}}^{'}$	2
$\mathbf{Sn}^{22+}$	Trans. prob., Oscill, Strengths	Th	370
Te	Energy Levels, Wavelengths	 E/T	285
$Te^+$	Energy Levels, Wavelengths		$\frac{-00}{285}$
I-Po	Energy Levels, Wavelengths		$\frac{-00}{285}$
I-Ba <sup>+</sup>	Energy Levels, Wavelengths	E/T	285
$\mathbf{X}\mathbf{e}^{44+}$	Energy Levels, Wavelengths	Th	7
$Xe^{26+-27+}$	Energy Levels, Wavelengths	E/T	8
$\mathbf{X}\mathbf{e}^{24+}$	Energy Levels, Wavelengths	Th	16
$\mathbf{X}\mathbf{e}^{9+}$	Energy Levels, Wavelengths	Exp	31
$Xe^{16+-18+}$	Energy Levels, Wavelengths	Exp	31
$Xe^{23+}$	Energy Levels, Wavelengths	Exp	31
$Xe^{24+-29+}$	Energy Levels, Wavelengths	E/T	47
Xe	Energy Levels, Wavelengths	E/T	51
$\mathbf{X}\mathbf{e}^{26+}$	Energy Levels, Wavelengths	L/ T Th	63
Xe <sup>+</sup>	Energy Levels, Wavelengths	Evn	75
$Xe^{0+-7+}$	Energy Levels, Wavelengths	Th	01
$Xe^{6+9+}$	Energy Levels, Wavelengths	111 Evn	04
$Xe^{23+-26+}$	Energy Levels, Wavelengths	Exp	94 04
$Xe^{35+-43+}$	Energy Levels, Wavelengths	Exp	94 04
$Xe^{+-2+}$	Energy Levels, Wavelengths	Exp	114
$\mathbf{X}\mathbf{e}^{8+}$	Energy Levels, Wavelengths	E/T	150
$129 Xe^{53+}$	Energy Levels, Wavelengths	Th	183
$^{131}$ <b>Xe</b> <sup>53+</sup>	Energy Levels, Wavelengths	Th	183
$\mathbf{Xe}^{53+}$	Energy Levels, Wavelengths	Th	183
$\mathbf{X}\mathbf{e}^{9+}$	Energy Levels, Wavelengths	Exp	184
$Xe^{31+}$	Energy Levels, Wavelengths	Exp	184
$Xe^{4+6+}$	Energy Levels, Wavelengths	E/T	188
$\mathbf{X}\mathbf{e}^{26+}$	Energy Levels, Wavelengths	Exp	191
Xe	Energy Levels, Wavelengths	E/T	202
Xe	Energy Levels, Wavelengths	E/T	202
Xe	Energy Levels, Wavelengths	Exp	201
$Xe^{39+-45+}$	Energy Levels, Wavelengths	E/T	214
$Xe^{35+}$	Energy Levels, Wavelengths	Exp	221
$Xe^{43+-45+}$	Energy Levels, Wavelengths	E/T	226
$Xe^{2+-10+}$	Energy Levels, Wavelengths	E/T	239
$Xe^{7+}$	Energy Levels Wavelengths	E/T	255
$Xe^{8+-10+}$	Energy Levels, Wavelengths	Exp	260
$Xe^{12+-13+}$	Energy Levels, Wavelengths	Exp	260
$\mathbf{X}\mathbf{e}^{15+}$	Energy Levels, Wavelengths	Exp	260
$\mathbf{X}\mathbf{e}^{24+}$	Energy Levels, Wavelengths	Th	264
$\mathbf{X}\mathbf{e}^{3+}$	Energy Levels, Wavelengths	Exp	266
Xe	Energy Levels, Wavelengths	Exp	$\frac{-00}{282}$
Xe	Energy Levels, Wavelengths	Exp	283
Xe	Energy Levels, Wavelengths	$E^{AP}$	299
$\bar{\mathbf{Xe}}^{52+}$	Energy Levels, Wavelengths	Th	326
$\mathbf{X}\mathbf{e}^{9+}$	Energy Levels, Wavelengths	Exp	329
$\mathbf{X}\mathbf{e}^{31+}$	Energy Levels, Wavelengths	Exp	329
$^{129}$ <b>Xe</b> <sup>0+-+</sup>	Energy Levels, Wavelengths	Exp	333
$^{131}$ <b>Xe</b> <sup>0+-+</sup>	Energy Levels. Wavelengths	Exp	333
$Xe^{0+-+}$	Energy Levels, Wavelengths	Exp	333

22.1			
$Xe^{26+}$	Trans. prob., Oscill. Strengths	$\operatorname{Exp}$	349
$Xe^{6+9+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	360
$\mathbf{Xe}^{6+7+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	364
$Xe^{26+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	370
$^{137}$ Ba <sup>+</sup>	Energy Levels, Wavelengths	$\mathrm{Th}$	190
$\operatorname{Ba}^+$	Energy Levels, Wavelengths	$\mathrm{Th}$	190
$\mathbf{Ba}^{28+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$	191
$\operatorname{Ba}^+$	Energy Levels, Wavelengths	$\operatorname{Exp}$	295
$\mathbf{Ba}^{28+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	370
$\mathrm{La}^{27+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
${f La}^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{Ce}^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{Pr} extsf{-}\mathbf{Sm}^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{Nd}^{58+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	2
$\mathbf{Nd}^{30+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
${ m Nd}^{59+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	240
$\mathrm{Eu}^{33+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
$\mathbf{Eu}^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{E}\mathbf{u}^{35+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	370
$\mathbf{Gd}^{34+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
$\mathbf{Gd}\text{-}\mathbf{Ho}^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{Dy}^{36+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
Dy	Energy Levels, Wavelengths	$\mathrm{Th}$	19
$\mathbf{Dy}^{64+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	326
Но	Energy Levels, Wavelengths	Th	19
$\mathbf{Er}^{38+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
$\mathbf{Er}^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{Tm}^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{Y}\mathbf{b}^{68+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	2
$\mathbf{Y}\mathbf{b}^{24+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	11
$\mathbf{Y}\mathbf{b}^{40+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
$\mathbf{Y}\mathbf{b}^{41+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
$Yb^{+-2+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	19
$^{173}\mathbf{Yb}^+$	Energy Levels, Wavelengths	$\mathrm{Th}$	190
$\mathbf{Yb}^+$	Energy Levels, Wavelengths	$\mathrm{Th}$	190
$\mathbf{Yb}^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{Y}\mathbf{b}^{42+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	370
$Lu-Hf^+$	Energy Levels, Wavelengths	E/T	285
$Hf^{59+61+}$	Energy Levels, Wavelengths	Exp	33
$Hf^{40+-46+}$	Energy Levels, Wavelengths	E/T	289
$Ta^{60+62+}$	Energy Levels, Wavelengths	Exp	33
$^{180}$ Ta	Energy Levels, Wavelengths	E/T	172
$^{181}$ Ta	Energy Levels, Wavelengths	E/T	172
Та	Energy Levels, Wavelengths	E/T	172
$\mathbf{Ta}^{45+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	257
$Ta^{41+-46+}$	Energy Levels, Wavelengths	E/T	289
$\mathbf{Ta}^{45+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	370
$\mathbf{W}^{64+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	7
$\mathbf{W}^{13+}$	Energy Levels, Wavelengths	Exp	12
$\mathbf{W}^{13+}$	Energy Levels, Wavelengths	E/T	13
$\mathbf{W}^{45+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
$W^{58+-71+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	25
$W^{54+63+}$	Energy Levels, Wavelengths	Exp	33
$W^{39+-47+}$	Energy Levels, Wavelengths	Exp	107
$\mathbf{W}^{46+}$	Energy Levels, Wavelengths	E/T	120
$W^{25+-45+}$	Energy Levels, Wavelengths	E/T	128
$W^{28+-45+}$	Energy Levels, Wavelengths	E/T	128

$\mathbf{W}^{45+}$	Energy Levels, Wavelengths	Th 166
$\mathbf{W}^{45+}$	Energy Levels, Wavelengths	E/T 173
$\mathbf{W}^{46+}$	Energy Levels, Wavelengths	E/T 173
$\mathbf{W}^{70+}$	Energy Levels, Wavelengths	Th 281
$\mathbf{W}^+$	Energy Levels, Wavelengths	E/T 285
$W^{39+-45+}$	Energy Levels, Wavelengths	E/T 289
$W^{40+-50+}$	Energy Levels, Wavelengths	Exp = 308
$\mathbf{W}^{72+}$	Energy Levels, Wavelengths	Th 326
$\mathbf{W}^{46+}$	Trans. prob., Oscill. Strengths	Th $370$
$\mathbf{W}^{46+}$	Trans. prob., Oscill. Strengths	Th $372$
$Re^{43+-48+}$	Energy Levels, Wavelengths	E/T 289
$Os^{46+}$	Energy Levels, Wavelengths	Th 16
$Os^{47+}$	Energy Levels, Wavelengths	Th 16
$Os^{46+}$	Energy Levels, Wavelengths	Th $264$
$\mathbf{Os}^{48+}$	Trans. prob., Oscill. Strengths	Th $370$
$Pt^{-}$	Energy Levels, Wavelengths	Th 27
$Pt-Bi^+$	Energy Levels, Wavelengths	E/T 285
$\mathbf{Pt}^+$	Energy Levels, Wavelengths	Exp 295
$Pt^{0+-+}$	Energy Levels, Wavelengths	Exp 328
$Au^{18+}$	Energy Levels, Wavelengths	E/T 13
$Au^{49+}$	Energy Levels, Wavelengths	Th 16
$Au^{50+}$	Energy Levels, Wavelengths	Th 16
Au	Energy Levels, Wavelengths	Th 19
Au	Energy Levels, Wavelengths	Th 26
Au <sup>-</sup>	Energy Levels, Wavelengths	Th $27$
$Au^{00+}-^{08+}$	Energy Levels, Wavelengths	Exp 33
<sup>195</sup> Au	Energy Levels, Wavelengths	Th 118
<sup>197</sup> Au	Energy Levels, Wavelengths	Th 118
<sup>199</sup> Au	Energy Levels, Wavelengths	Th 118
Au	Energy Levels, Wavelengths	Th 118
$Au^{11+}$	Energy Levels, Wavelengths	Th 151
Au <sup>30+</sup>	Energy Levels, Wavelengths	Th 166
<sup>15</sup> Au	Energy Levels, Wavelengths	Th 190
Au $76\pm$	Energy Levels, Wavelengths	Th 190
$Au^{10+}$	Energy Levels, Wavelengths	Th 211
$Au^{\pm 5+}$	Energy Levels, Wavelengths	Th 264
Au <sup>31</sup>	Energy Levels, Wavelengths	In 287
Au <sup>78+</sup>	Energy Levels, Wavelengths	E/1 289
Au <sup>47+</sup> _52+	Energy Levels, wavelengths	Exp 292
Au	Trans. prob., Oscill. Strengths	Th 307
$Au^{78+}$	Frans. prob., Oscili. Strengths	
пg Ца <sup>34+</sup>	Energy Levels, Wavelengths	Th 11
Hg <sup>+</sup>	Energy Levels, Wavelengths	Th 10
201 <b>H</b> <sub>c</sub> +	Energy Levels, Wavelengths	Th 100
Hg <sup>+</sup>	Energy Levels, Wavelengths	Th 100
$Hg^{77+}$	Energy Levels, Wavelengths	Th 911
$Hg^{0+}-+$	Energy Levels, Wavelengths	Fyp 205
$Pb^{21+}$	Energy Levels, Wavelengths	Exp 295 Exp 12
207 <b>D</b> L <sup>+</sup>	Energy Levels, Wavelengths	$\begin{array}{ccc} \text{Exp} & 12 \\ \text{Th} & 74 \end{array}$
Ph <sup>+</sup>	Energy Levels, wavelengths Energy Levels, Wavelengths	$\frac{111}{\text{Th}} = \frac{14}{74}$
207 <b>Pb</b> 81+	Energy Levels, Wavelengths Energy Levels, Wavelengths	111 (4 Th 74
$Pb^{81+}$	Energy Levels, Wavelengths	$\frac{111}{\text{Th}} = \frac{14}{74}$
Ph <sup>53+</sup>	Energy Levels, Wavelengths	Th 166
$^{207}$ Ph <sup>81+</sup>	Energy Levels, Wavelengths	$\frac{11}{100}$
$Ph^{81+}$	Energy Levels, Wavelengths	$\frac{111}{\text{Th}} = \frac{103}{183}$
<b>Ph</b> <sup>54+</sup>	Trans prob Oscill Strengths	Th 270
1.0	rano. proo., osoni. outenguis	III 010

$^{209}$ Bi $^{80+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	74
$\mathbf{Bi}^{80+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	74
$\mathbf{Bi}^{82+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	74
$^{209}{ m Bi}^{82+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	183
$\mathbf{Bi}^{82+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	183
$\mathbf{Bi}^{80+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	211
$\mathbf{Bi}^{80+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	253
$\mathbf{Bi}^{81+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	326
$\mathbf{Bi}^{55+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	370
$\mathbf{At}^{80+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	223
Rn-Ra	Energy Levels, Wavelengths	E/T	285
$\mathbf{Ra}\text{-}\mathbf{Es}^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{Ra}^+$	Energy Levels, Wavelengths	E/T	285
Ac	Energy Levels, Wavelengths	E/T	285
$\mathbf{Ac}^+$	Energy Levels, Wavelengths	E/T	285
$\mathbf{Th}^{44+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	11
${f Th}^{60+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
$\mathbf{Th}^{61+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	16
$Th^{0+-2+}$	Energy Levels, Wavelengths	Exp	43
$\mathbf{Th}^{61+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	166
$\mathbf{Th}^{87+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	253
${f Th}^{60+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	264
$\mathbf{Th}^{0+-+}$	Energy Levels, Wavelengths	E/T	285
${f Th}^{62+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	370
$^{231}$ Pa $^{40+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	74
$\mathbf{Pa}^{40+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	74
$^{231}$ Pa <sup>88+</sup>	Energy Levels, Wavelengths	$\mathrm{Th}$	74
$\mathbf{Pa}^{88+}$	Energy Levels, Wavelengths	Th	74
Pa	Energy Levels, Wavelengths	E/T	285
$U^{90+}$	Energy Levels, Wavelengths	$\mathrm{Th}$	2
238U91+	Energy Levels, Wavelengths	Th	2
$\bigcup_{j=1}^{j=1+1}$	Energy Levels, Wavelengths	Th	2
	Energy Levels, Wavelengths	Th	7
	Energy Levels, Wavelengths	'I'h E (T	11
$U^{31+}$	Energy Levels, Wavelengths	E/T	13
	Energy Levels, Wavelengths	Th	16
	Energy Levels, Wavelengths	Th	16
$U^{35+}$	Energy Levels, Wavelengths	Th	100
<b>1 1 1 1 1 1 1 1 1 1</b>	Energy Levels, Wavelengths		183
	Energy Levels, Wavelengths		183
	Energy Levels, wavelengths	In Th	211
U <sup>11</sup> T <sup>162+</sup>	Energy Levels, Wavelengths	1 fi Th	200
U Cm	Energy Levels, Wavelengths	тп Б/Т	204
	Energy Levels, Wavelengths	Б/ I Б/Т	200
U <sup>+</sup> I179+ <u>81+</u>	Energy Levels, Wavelengths	L/I Th	200
U 1 189+	Energy Levels, Wavelengths	111 Th	330
U 1164+	Trans prob Oscill Strengths	Th	370
Du <sup>+</sup>	Energy Levels Wavelengths	E/T	285
Rk	Energy Levels, Wavelengths	E/T	285
Cf	Energy Levels Wavelengths	E/T	285
$\widetilde{\mathbf{C}}\mathbf{f}^+$	Energy Levels Wavelengths	E/T	285
Es	Energy Levels, Wavelengths	E/T	285
 Es <sup>+</sup>	Energy Levels, Wavelengths	E/T	285
D	Energy Levels, Wavelengths	-7 Th	149
D	Energy Levels, Wavelengths	Th	232
D	Energy Levels, Wavelengths	E/T	235
		'	

D	Energy Levels, Wa	avelengths	Th	254
D	Energy Levels, Wa	avelengths	Th	265
D	Energy Levels, Wa	avelengths	Th	300
Т	Energy Levels, Wa	avelengths	Th	149
Т	Energy Levels, Wa	avelengths	Th	232
Т	Energy Levels, Wa	avelengths	E/T	235
Т	Energy Levels, Wa	avelengths	Th	265
H Z= 10-100	Energy Levels, Wa	avelengths	Th	193
H Z= 1-30	Energy Levels, Wa	avelengths	Th	262
H Z= 1-108	Energy Levels, Wa	avelengths	Th	311
H Z= 54-94	Energy Levels, Wa	avelengths	Th	324
He Z= 2-29	Energy Levels, Wa	avelengths	E/T	4
He Z= 2-5	Energy Levels, Wa	avelengths	Th	38
He Z= 3-29	Energy Levels, Wa	avelengths	Th	62
He Z= 2-10	Energy Levels, Wa	avelengths	Th	228
He Z= 2-100	Energy Levels, Wa	avelengths	Th	250
He Z= 2-12	Energy Levels, Wa	avelengths	Th	269
He Z= 54-94	Energy Levels, Wa	avelengths	$\mathrm{Th}$	324
Li Z= 3-29	Energy Levels, Wa	avelengths	E/T	4
Li Z= 10-20	Energy Levels, Wa	avelengths	$\mathrm{Th}$	29
Li Z= 11-20	Energy Levels, Wa	avelengths	Th	36
Li Z= 3-92	Energy Levels, Wa	avelengths	$\mathrm{Th}$	89
Li Z= 3-9	Energy Levels, Wa	avelengths	$\mathrm{Th}$	125
Li Z= 10-100	Energy Levels, Wa	avelengths	Th	193
Li Z= 15-92	Energy Levels, Wa	avelengths	Th	211
Li Z= 37-82	Energy Levels, Wa	avelengths	Th	227
Li Z= 5-9	Energy Levels, Wa	avelengths	Exp	242
Li Z = 12-100	Energy Levels, Wa	avelengths	Th	253
Li Z= 4-6	Energy Levels, Wa	avelengths	Exp	256
Li Z = 3-8	Energy Levels, Wa	avelengths	Th	273
Li Z = 3-109	Energy Levels, Wa	avelengths	Th	306
$L_1 Z = 7-10$	Energy Levels, Wa	avelengths	Th F/T	307
L1 Z = 5-9	Energy Levels, Wa	avelengths	E/I	314
L1 Z = 21-30 L: 7 = 54.04	Energy Levels, Wa	avelengths	1 fl Th	317
L1 Z = 54-94 L: 7 = 10.02	Energy Levels, wa	welengths	111 Th	324 220
LI Z = 10-92 Bo Z = 10.14	Energy Levels, Wa	welengths	111 Fyn	550 64
$B_{0} Z = 7 10$	Energy Levels, Wa	welengths	њар Тъ	161
Be $Z = 4-7$	Energy Levels, Wa	welengths	тп F/T	177
Be Z = 4-7 Be Z = 4-95	Energy Levels, Wa	avelengths	D/ I Th	202
Be $Z = \frac{1}{4}$ 37-82	Energy Levels, Wa	avelengths	Th	220
Be $Z = 4-10$	Energy Levels, Wa	avelengths	Th	276
Be $Z = 4-109$	Energy Levels, Wa	avelengths	Th	306
B Z = 10-16	Energy Levels, Wa	avelengths	Exp	64
B Z = 24-26	Energy Levels, Wa	avelengths	Exp	64
B Z= 14-54	Energy Levels, Wa	avelengths	Exp	145
B Z= 37-82	Energy Levels, Wa	avelengths	Th	227
B Z= 5-109	Energy Levels, Wa	avelengths	Th	306
B Z= 12-16 step 2	Trans. prob., Oscil	ll. Strengths	Th	367
C Z= 12-14	Energy Levels, Wa	avelengths	Exp	64
C Z= 16-18	Energy Levels, Wa	avelengths	Exp	64
C Z= 37-82	Energy Levels, Wa	avelengths	Th	227
C Z= 6-109	Energy Levels, Wa	avelengths	Th	306
N Z= 13-14	Energy Levels, Wa	avelengths	Exp	64
N Z= 16-20	Energy Levels, Wa	avelengths	Exp	64
N Z= 24-26	Energy Levels, Wa	avelengths	Exp	64
N Z= 37-82	Energy Levels, Wa	avelengths	Th	227

N Z= 7-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
O Z= 18-20	Energy Levels, Wavelengths	Exp	64
O Z= 24-26	Energy Levels, Wavelengths	Exp	64
O Z= 37-82	Energy Levels, Wavelengths	$\mathrm{Th}$	227
O Z= 8-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
F Z= 24-27	Energy Levels, Wavelengths	Exp	64
F Z= 37-82	Energy Levels, Wavelengths	$\mathrm{Th}$	227
F Z= 9-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Ne Z= 10-105	Energy Levels, Wavelengths	$\mathrm{Th}$	223
Ne $Z= 37-82$	Energy Levels, Wavelengths	$\mathrm{Th}$	227
Ne Z= 10-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Na Z= 11-26	Energy Levels, Wavelengths	$\mathrm{Th}$	158
Na Z= 27-36	Energy Levels, Wavelengths	$\mathrm{Th}$	160
Na Z= 20-100	Energy Levels, Wavelengths	$\mathrm{Th}$	193
Na Z= 11-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Mg $Z = 12-26$	Energy Levels, Wavelengths	$\mathrm{Th}$	158
Mg Z= 53-58	Energy Levels, Wavelengths	$\mathrm{Th}$	195
Mg Z= 60-62	Energy Levels, Wavelengths	$\mathrm{Th}$	220
Mg $Z = 12-95$	Energy Levels, Wavelengths	$\mathrm{Th}$	223
Mg $Z = 12-109$	Energy Levels, Wavelengths	Th	306
Mg Z = 26-28	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	352
Al $Z = 26-31$	Energy Levels, Wavelengths	Th	14
Al $Z= 24-32$ step 2	Energy Levels, Wavelengths	Th	142
Al $Z = 13-26$	Energy Levels, Wavelengths	Th	158
Al $Z = 13-109$	Energy Levels, Wavelengths	Th	306
Si $Z = 23-29$	Energy Levels, Wavelengths	Exp	156
$S_1 Z = 25-29$	Energy Levels, Wavelengths	Exp	156
$S_1 Z = 14-26$	Energy Levels, Wavelengths	Th	158
$S_1 Z = 14-109$	Energy Levels, wavelengths	In	300
P Z = 15-20 P Z = 15,100	Energy Levels, wavelengths		108
$P \ L = 15 - 109$ $S \ 7 - 16 \ 26$	Energy Levels, wavelengths	1 fi Th	300
S Z = 10-20 S Z = 16 100	Energy Levels, Wavelengths	111 Th	206
S = 10-109 Cl Z = 17-26	Energy Levels, Wavelengths	TH Th	158
Cl Z = 17-20 Cl Z = 17-109	Energy Levels, Wavelengths	Th	306
$\Delta r Z = 18-26$	Energy Levels, Wavelengths	Th	158
Ar Z = 18-20	Energy Levels, Wavelengths	Th	223
Ar Z = 18-109	Energy Levels, Wavelengths	Th	306
K Z = 22-42	Energy Levels, Wavelengths	Th	23
K Z = 19-109	Energy Levels, Wavelengths	Th	306
Ca Z = 20-109	Energy Levels, Wavelengths	Th	306
Sc $Z = 21-109$	Energy Levels, Wavelengths	Th	306
Ti Z = 22-109	Energy Levels, Wavelengths	Th	306
V Z= 23-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Cr Z= 24-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Mn Z= 25-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Fe Z= 26-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Co Z= 27-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Ni Z= 34-67	Energy Levels, Wavelengths	$\mathrm{Th}$	17
Ni Z= 36-92	Energy Levels, Wavelengths	$\mathrm{Th}$	162
Ni Z= 28-100	Energy Levels, Wavelengths	$\mathrm{Th}$	205
Ni Z= 28-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Ni Z= 72-74	Energy Levels, Wavelengths	Exp	338
Ni Z= 34-100	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	370
Ni Z= 36-42	Trans. prob., Oscill. Strengths	Th	370
Ni Z= 46-48	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	370
Cu Z= 82-83	Energy Levels, Wavelengths	$\mathrm{Th}$	16

Cu Z= 70-92	Energy Levels, Wavelengths	Th	67
Cu Z= 70-92	Energy Levels, Wavelengths	$\mathrm{Th}$	174
Cu Z= 40-100	Energy Levels, Wavelengths	$\mathrm{Th}$	193
Cu Z= 29-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Cu Z= 42-44	Energy Levels, Wavelengths	$\mathrm{Th}$	316
Cu Z= 70-92	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	353
Zn Z= 41-42	Energy Levels, Wavelengths	$\mathrm{Th}$	16
Zn Z= 44-50	Energy Levels, Wavelengths	$\mathrm{Th}$	16
Zn Z= 51-55	Energy Levels, Wavelengths	$\mathrm{Th}$	16
Zn Z= 82-83	Energy Levels, Wavelengths	$\mathrm{Th}$	16
Zn Z= 70-92	Energy Levels, Wavelengths	$\mathrm{Th}$	65
Zn Z= 30-92	Energy Levels, Wavelengths	$\mathrm{Th}$	103
Zn Z= 30-47	Energy Levels, Wavelengths	$\mathrm{Th}$	210
Zn Z= 70-92	Energy Levels, Wavelengths	$\mathrm{Th}$	230
Zn Z= 56-57	Energy Levels, Wavelengths	$\mathrm{Th}$	264
Zn Z= 60-70 step 2	Energy Levels, Wavelengths	$\mathrm{Th}$	264
Zn Z= 73-74	Energy Levels, Wavelengths	$\mathrm{Th}$	264
Zn Z= 82-83	Energy Levels, Wavelengths	$\mathrm{Th}$	264
Zn Z= 30-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Zn Z= 70-92	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	351
Ga Z= 70-92	Energy Levels, Wavelengths	$\mathrm{Th}$	71
Ga Z= 31-92	Energy Levels, Wavelengths	$\mathrm{Th}$	143
Ga Z= 31-98	Energy Levels, Wavelengths	$\mathrm{Th}$	143
Ga Z= 31-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Ge Z= 70-92	Energy Levels, Wavelengths	$\mathrm{Th}$	69
Ge Z= 32-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Ge Z= 70-92	Trans. prob., Oscill. Strengths	$\mathrm{Th}$	355
As Z= 33-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Se Z= 34-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Br Z= 35-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Kr Z= 36-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Rb Z= 37-39	Energy Levels, Wavelengths	E/T	301
Rb Z= 37-87	Energy Levels, Wavelengths	E/T	301
Rb $Z = 37-87$	Energy Levels, Wavelengths	E/T	303
Rb $Z = 37-109$	Energy Levels, Wavelengths	Th	306
Sr Z = 38-109	Energy Levels, Wavelengths	Th	306
Y Z= 39-109	Energy Levels, Wavelengths	Th	306
Zr Z = 40-109	Energy Levels, Wavelengths	Th	306
Nb $Z = 41-109$	Energy Levels, Wavelengths	Th	306
Mo $Z = 42-109$	Energy Levels, Wavelengths	Th	306
Tc Z = 43-109	Energy Levels, Wavelengths	Th	306
Ru $Z = 44-109$	Energy Levels, Wavelengths	Th	306
Rh Z= 55-85 step 5	Energy Levels, Wavelengths	Th	54
Rh $Z = 45-109$	Energy Levels, Wavelengths	Th	306
Pd Z = 54-59	Energy Levels, Wavelengths	Th	
Pd Z = 60-83	Energy Levels, Wavelengths	Th	54
Pd $Z = 46-109$	Energy Levels, Wavelengths	Th	306
Ag $Z = 52-86$	Energy Levels, Wavelengths	Th	54
Ag $Z = 47-109$	Energy Levels, Wavelengths	Th	306
Cd Z = 48-109	Energy Levels, Wavelengths	Th	306
In $Z = 49-109$	Energy Levels, Wavelengths	Th	306
Sn Z = 50-109	Energy Levels, Wavelengths	Th	306
50 Z = 51-109	Energy Levels, Wavelengths	Th	306
1e Z = 52-109	Energy Levels, Wavelengths	Th	306
$1 \Delta = 53-109$	Energy Levels, Wavelengths	Th	306
Ae Z = 54-109	Energy Levels, Wavelengths	Th	306
$\cup$ s Z= 55-109	Energy Levels, Wavelengths	Th	306

Ba Z= 56-109	Energy Levels, Wavelengths	Th	306
La Z= 57-109	Energy Levels, Wavelengths	Th	306
Ce Z= 58-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Pr Z= 59-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Nd Z= 60-109	Energy Levels, Wavelengths	Th	306
Pm Z= 74-92	Energy Levels, Wavelengths	E/T	13
Pm Z= 61-109	Energy Levels, Wavelengths	Th	306
Sm Z= 62-109	Energy Levels, Wavelengths	Th	306
Eu Z= 63-109	Energy Levels, Wavelengths	Th	306
Gd Z= 64-109	Energy Levels, Wavelengths	Th	306
Tb Z= 65-109	Energy Levels, Wavelengths	Th	306
Dy Z= 66-109	Energy Levels, Wavelengths	Th	306
Ho Z= 67-109	Energy Levels, Wavelengths	Th	306
Er Z= 68-109	Energy Levels, Wavelengths	Th	306
Tm Z= 69-109	Energy Levels, Wavelengths	Th	306
Yb Z= 70-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Lu Z= 71-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Hf Z= 72-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Ta Z= 73-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
W Z= 74-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Re Z= 75-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Os Z= 76-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Ir Z= 77-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Pt Z= 78-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Au Z= 79-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Hg Z= 80-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Tl Z= 81-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Pb Z= 82-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Bi Z= 83-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Po Z= 84-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
At Z= 85-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Rn Z= 86-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Fr Z= 87-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Ra Z= 88-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Ac Z= 89-109	Energy Levels, Wavelengths	$\mathrm{Th}$	306
Th Z= 90-109	Energy Levels, Wavelengths	Th	306
Pa Z= 91-109	Energy Levels, Wavelengths	Th	306
U Z= 92-109	Energy Levels, Wavelengths	Th	306

### 2.2 Atomic and Molecular Collisions

#### 2.2.1 Photon Collisions

$h\nu + Na$	Fluorescence	2.1  eV	Exp	376
$h\nu + He$	Photoionization	2-20  keV	$\mathrm{Th}$	377
$h\nu + He$	Photoionization	91.45  eV	Exp	378
$h\nu + He$	Photoionization	45  eV	$\mathrm{Th}$	379
$h\nu + Ar$	Photoionization	90-330  eV	Exp	380
$h\nu + He$	Photoexcitation		$\mathrm{Th}$	381
$\mathbf{h}\nu + \mathbf{H}_2$	Photoexcitation		$\mathrm{Th}$	381
$\mathbf{h} u + \mathbf{D}_2$	Photoexcitation		$\mathrm{Th}$	381
$h\nu + He$	Photoionization		$\mathrm{Th}$	381
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization		$\mathrm{Th}$	381
$\mathbf{h} u + \mathbf{D}_2$	Photoionization		$\mathrm{Th}$	381
$h\nu + Li^+$	Photoexcitation	200  eV	$\mathrm{Th}$	382

$h\nu + Li^+$	Photoionization	200  eV	$\mathrm{Th}$	382
$h\nu + Li$	Photoionization	200-400  eV	$\mathrm{Th}$	383
$h\nu + Be$	Photoionization	$200-400 {\rm ~eV}$	$\mathrm{Th}$	383
$\mathbf{h}\nu + \mathbf{D}_3^+$	Photodissociation		$\mathrm{Th}$	384
$h\nu + D_{13}^+$	Photodissociation		$\mathrm{Th}$	384
$h\nu + H_{13}^+$	Photodissociation		$\mathrm{Th}$	384
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	800  nm	$\mathrm{Th}$	385
$h\nu + He$	Photoionization	13  eV	$\operatorname{Exp}$	386
$\mathbf{h}\nu + \mathbf{H}\mathbf{e}$	Photoionization	13  eV	$\mathrm{Th}$	387
$h\nu + CO$	Photodissociation	780  nm	$\operatorname{Exp}$	388
$h\nu + CO$	Photoionization	780  nm	$\operatorname{Exp}$	388
$h\nu + SiCl_4$	Photoexcitation	100-225  eV	$\operatorname{Exp}$	389
$h\nu + Rb$	Photoionization	61  eV	$\mathrm{Th}$	390
$h\nu + C^-$	Photodetachment	0-11  eV	$\mathrm{Th}$	391
$\mathbf{h}\nu + \mathbf{I}^{-}$	Photodetachment	0-30  eV	Th	392
$h\nu + Xe$	Photoionization	0-30 eV	Th	392
$\mathbf{h}\nu + \mathbf{N}_2$	Fluorescence	$2 - 4x10^{14} \text{ W/cm}^2$	Th	393
$\mathbf{h}\nu + \mathbf{O}_2$	Fluorescence	$2 - 4x10^{14}$ W/cm <sup>2</sup>	Th	393
$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	$2 - 4x10^{14} \text{ W/}cm^2$	Th	393
$\mathbf{h}\nu + \mathbf{O}_2$	Photoionization	$2 - 4x10^{14}$ W/cm <sup>2</sup>	Th Th	393
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photodissociation	$10^{14} \text{ W/cm}^2$	E/T	394
$\mathbf{h}\nu + \mathbf{D}_2^+$	Photodissociation	$10^{14} \text{ W/cm}^2$	E/T	394
$h\nu + Cl^-$	Photodetachment	38-85 eV	Exp	395
$h\nu + Cl^{-}$	Photoionization	38-85 eV	Exp	395
$\mathbf{h}\nu + \mathbf{O}_2$	Photodissociation	550-1800 nm	Exp	396
$\mathbf{n}\nu + \mathbf{O}_2$	Photoionization	550-1800 nm	Exp	390
$n\nu + Ne$	Photoionization	800 nm	Exp E	397
$n\nu + Ar$	Photoconization		Exp	397
$\mathbf{n}\nu + \mathbf{C}\mathbf{H}_{3}\mathbf{F}$	Photoexcitation	200.0-001.0 eV	Exp E-m	390
$\mathbf{n}\nu + \mathbf{C}\mathbf{n}_3\mathbf{r}$	Photoionization	200.0-007.0 eV	Exp F/T	200
$h\nu + Sr$ $h\nu \pm Ar$	Photoionization	250, 253, oV	E/1 F/T	
$h\nu + H_0$	Photodissociation	200-200 EV 70.1 oV	Ш/ 1 Тh	400
$h\nu + He$	Photoevcitation	79.1 eV	Th	401
$h\nu + He$ $h\nu + CO_{2}$	Photoionization	540 5-546 5 eV	Evn	401
$h\nu + Ee^{15+}$	Photoionization	1-37 keV	$\frac{\mathrm{D}_{\mathrm{A}}\mathrm{p}}{\mathrm{Th}}$	403
$h\nu + IC$ $h\nu + II^{81+}$	Photoionization	1-37 keV	Th	403
$h\nu + C$ $h\nu + Kr$	Photoionization	1850 eV	Exp	404
$\mathbf{h}\nu + \mathbf{H}_2$	Photodissociation	266 nm	Th	405
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photodissociation	266 nm	Th	405
$h\nu + S^-$	Photodetachment	150-240  eV	Exp	406
$h\nu + S^-$	Photoionization	150-240  eV	Exp	406
$h\nu + I$	Photoionization	50-200  eV	E/T	407
$h\nu + I^+$	Photoionization	50-200  eV	$\dot{\mathrm{E}/\mathrm{T}}$	407
$h\nu + Xe^+$	Photoionization	50-200  eV	$\dot{\mathrm{E}/\mathrm{T}}$	407
$h\nu + He$	Photoionization	$0.1-1 \mathrm{keV}$	$\dot{E/T}$	408
$h\nu + Ne$	Photoexcitation	near-threshold	$\mathrm{Th}$	409
$h\nu + Ne$	Photoionization	near-threshold	$\mathrm{Th}$	409
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photodissociation	785 nm	Exp	410
$\mathbf{h}\nu + \mathbf{D}_2^+$	Photodissociation	785  nm	Exp	410
$\mathbf{h}\nu + \mathbf{S}^{11+}$	Photoexcitation		$\mathrm{Th}$	411
$\mathbf{h}\nu + \mathbf{S}^{12+}$	Photoexcitation		$\mathrm{Th}$	411
$\mathbf{h}\nu + \mathbf{Cl}^{12+}$	Photoexcitation		$\mathrm{Th}$	411
$\mathbf{h}\nu + \mathbf{Cl}^{13+}$	Photoexcitation		$\mathrm{Th}$	411
$\mathbf{h}\nu + \mathbf{Ar}^{13+}$	Photoexcitation		$\mathrm{Th}$	411
$\mathbf{h}\nu + \mathbf{Ar}^{14+}$	Photoexcitation		$\mathrm{Th}$	411
$h\nu + K^{14+}$	Photoexcitation		$\mathrm{Th}$	411

$\mathbf{h}\nu + \mathbf{K}^{15+}$	Photoexcitation		Th	411
$\mathbf{h} u$ + $\mathbf{Ti}^{17+}$	Photoexcitation		Th	411
$\mathbf{h} u$ + $\mathbf{Ti}^{18+}$	Photoexcitation		$\mathrm{Th}$	411
$h\nu + Fe^{9+}$	Photoexcitation		Exp	412
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{10+}$	Photoexcitation		Exp	412
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{13+}$	Photoexcitation		Exp	412
$h\nu + He$	Photoionization	390 nm	$\mathrm{Th}$	413
$h\nu + Na$	Photoionization	8-10 eV	$\mathrm{Th}$	414
$\mathbf{h}\nu + \mathbf{N}\mathbf{a}^*$	Photoionization	8-10 eV	$\mathrm{Th}$	414
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	15.47-15.75  eV	Exp	415
$h\nu + He$	Photoionization	$69-76   {\rm eV}$	$\mathrm{Th}$	416
$\mathbf{h}\nu + \mathbf{H}\mathbf{e}^*$	Photoionization	$69-76~{\rm eV}$	$\mathrm{Th}$	416
$h\nu + Ne$	Photoexcitation	870  eV	E/T	417
$h\nu + Ne$	Photoionization	870  eV	E/T	417
$h\nu + H$	Photoionization	6.5-22  eV	$\mathrm{Th}$	418
$h\nu + He$	Photoionization	6.5-22  eV	$\mathrm{Th}$	418
$h\nu + Ne$	Photoionization	870  eV	$\mathrm{Th}$	419
$\mathbf{h}\nu + \mathbf{H}_2$	Photodissociation	30-10,000  eV	$\mathrm{Th}$	420
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	30-10,000  eV	$\mathrm{Th}$	420
$h\nu + H^-$	Photoionization		$\mathrm{Th}$	421
$h\nu + He$	Photoionization		$\mathrm{Th}$	421
$h\nu + Li^+$	Photoionization		$\mathrm{Th}$	421
$h\nu + He^+$	Fluorescence	1.75  eV	$\operatorname{Exp}$	422
$\mathbf{h}\nu + \mathbf{H}_2$	Photoexcitation	800 nm	$\mathrm{Th}$	423
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	800 nm	Th	423
$\mathbf{h}\nu + \mathbf{F}^{-}$	Photodetachment	20-62  eV	E/T	424
$\mathbf{h} u + \mathbf{F}^{-}$	Photoionization	20-62 eV	E/T	424
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photodissociation	$2x10^{14} \text{ W/cm}^2$	Exp	425
$h\nu + H$	Photoionization	$10^{13} - 10^{15} \text{ W/cm}^2$	Th	426
$h\nu + He$	Photoionization	$10^{13} - 10^{13}$ W/cm <sup>2</sup>	Th	426
$h\nu + Ne$	Photoionization	$10^{13} - 10^{15} \text{ W/cm}^2$	Th	426
$h\nu + Ne^+$	Photoionization	$10^{13} - 10^{15} \text{ W/} cm^2$	Th	426
$h\nu + Ar$	Photoionization	$10^{13} - 10^{16} \text{ W}/cm^2$	Th	426
$n\nu + Ar$	Photoionization	$10^{10} - 10^{10} \text{ W}/cm^2$	In Th	420
$n\nu + Rb$	Photoionization Db st size i setion	$10^{10} - 10^{10} \text{ W}/cm^2$		420
$\mathbf{n}\nu + \mathbf{n}_2$	Fluenescones	$10^{-2} - 10^{-2}$ W/Cm <sup>2</sup>	1 II Euro	420
$h\nu + he$	Photocycitation		Exp Evr	427
$h\nu + he$	Photodiagonistion	20 5 24 5 oV	Exp Evr	421
$h\nu + CO^+$	Photoionization	20.5-34.5 eV	Exp Evp	420
$h\nu + CO$ $h\nu + H_{c}^{+}$	Photoionization	1  CoV/m	ть	420
$h\nu + H_2$ $h\nu \perp Ne$	Photoionization	803-816 eV	E/T	420
$h\nu + H_{0}$	Photodissociation	27-38 eV	E/T	431
$h\nu + H_2$	Fluorescence	27-38 eV	E/T	431
$h\nu + Gd$	Photoionization	59.54 keV	Exp	432
$h\nu + Dv$	Photoionization	59.54 keV	Exp	432
$h\nu + Er$	Photoionization	59.54 keV	Exp	432
$h\nu + Yb$	Photoionization	59.54  keV	Exp	432
$h\nu + Hf$	Photoionization	59.54  keV	Exp	432
$h\nu + Ta$	Photoionization	59.54  keV	Exp	432
$h\nu + Te$	Photoexcitation	50-130  eV	$\dot{E}/\dot{T}$	433
$h\nu + Te^+$	Photoexcitation	50-130  eV	$\dot{\mathrm{E}/\mathrm{T}}$	433
$h\nu + Te^{2+}$	Photoexcitation	50-130  eV	É/T	433
$h\nu + Te^{3+}$	Photoexcitation	50-130  eV	E/T	433
$\mathbf{h}\nu + \mathbf{Al}^+$	Photoionization	20-160  eV	E/T	434
$h\nu + CO_2$	Photodissociation	$540-580 \ eV$	E/T	435
$h\nu + CO_2$	Photoionization	$540\text{-}580~\mathrm{eV}$	E/T	435

$h\nu + He$	Total Absorption, Scattering	400-850 nm	E/T	436
$h\nu + Na$	Total Absorption, Scattering	400-850 nm	$\dot{E/T}$	436
$h\nu + K$	Total Absorption, Scattering	400-850 nm	$\dot{E/T}$	436
$h\nu + Kr^+$	Photoexcitation	82-92 nm	$\dot{E/T}$	437
$h\nu + Kr^+$	Photoionization	82-92 nm	E/T	437
$h\nu + Sc$	Photoionization	29-41  eV	E/T	438
$h\nu + Ar$	Fluorescence	806 nm	Exp	439
$h\nu + Arn$	Fluorescence	806 nm	$\operatorname{Exp}$	439
$h\nu + Arn(H_2O)m$	Fluorescence	806 nm	$\operatorname{Exp}$	439
$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	800 nm	$\operatorname{Exp}$	440
$h\nu + NO$	Photoionization	800 nm	$\operatorname{Exp}$	440
$h\nu + O_2$	Photoionization	800 nm	$\operatorname{Exp}$	440
$h\nu + Xe$	Photoionization	64-71  eV	E/T	441
$h\nu + N_2$	Photodissociation	406-412  eV	Exp	442
$h\nu + Ne$	Photoionization	$867 \ \mathrm{eV}$	E/T	443
$h\nu + Ne^*$	Photoionization	$867 \ \mathrm{eV}$	E/T	443
$h\nu + CO$	Photoexcitation	$60,000-96,000 \ cm^{-1}$	$\operatorname{Exp}$	444
$h\nu + Kr^+$	Photoexcitation		$\mathrm{Th}$	445
$h\nu + Kr^{2+}$	Photoexcitation		$\mathrm{Th}$	445
$h\nu + Kr^+$	Photoionization		$\mathrm{Th}$	445
$h\nu + Kr^{2+}$	Photoionization		$\mathrm{Th}$	445
$h\nu + OCS$	Photoionization	200  eV	$\operatorname{Exp}$	446
$h\nu + Kr$	Photoionization	$93.7\text{-}783\;\mathrm{eV}$	$\operatorname{Exp}$	447
$h\nu + Xe$	Photoionization	$93.7\text{-}783\;\mathrm{eV}$	$\operatorname{Exp}$	447
$h\nu + He$	Photoionization	810 nm	E/T	448
$h\nu + H$	Photoionization	1.93  eV	$\mathrm{Th}$	449
$h\nu + Xe$	Photoionization	1.93  eV	$\mathrm{Th}$	449
$h\nu + He$	Photoionization	11.2-49.50  eV	$\mathrm{Th}$	450
$h\nu + He^*$	Photoionization	11.2-49.50  eV	$\mathrm{Th}$	450
$h\nu + He$	Photoionization	2-30  eV	$\mathrm{Th}$	451
$h\nu + H_2$	Photoionization	2-30  eV	$\mathrm{Th}$	451
$h\nu + Kr$	Fluorescence	91-92.8  eV	$\operatorname{Exp}$	452
$h\nu + Kr$	Photoexcitation	91-92.8  eV	$\operatorname{Exp}$	452
$h\nu + Kr$	Photoionization	91-92.8  eV	$\operatorname{Exp}$	452
$h\nu + Sn^+$	Total Absorption, Scattering	30-65  eV	E/T	453
$h\nu + Sn^{3+}$	Total Absorption, Scattering	30-65  eV	E/T	453
$h\nu + C_{60}^{+}$	Photoionization	7-50  eV	$\mathrm{Th}$	454
$h\nu + Na$	Photoionization	420-630 K	E/T	455
$h\nu + Na^*$	Photoionization	420-630 K	E/T	455
$h\nu + H_2$	Photoexcitation	$100,000 \ cm^{-1}$	$\mathrm{Th}$	456
$h\nu + HD$	Photoexcitation	$100,000 \ cm^{-1}$	$\mathrm{Th}$	456
$h\nu + Cr^+$	Photoexcitation	4850-2050 Å	$\operatorname{Exp}$	457
$h\nu + Fe^{23+}$	Photoexcitation	$0-1.4x10^7 \ cm^{-1}$	$\mathrm{Th}$	458
$h\nu + Hf^+$	Photoexcitation	3000 Å	$\operatorname{Exp}$	459
$h\nu + Pd$	Photoexcitation	400 Å	E/T	460
$h\nu + Fe^+$	Photoexcitation	9000 Å	$\mathrm{Th}$	461
$h\nu + Ni^+$	Photoexcitation	$1317 \text{ \AA}$	$\operatorname{Exp}$	462
$h\nu + Fe^+$	Photoexcitation	$2.0~\mu$ m	$\mathrm{Th}$	463
$h\nu + Fe^{5+}$	Photoexcitation	16 Å	$\mathrm{Th}$	464
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{6+}$	Photoexcitation	$16 \text{ \AA}$	$\mathrm{Th}$	464
$h\nu + Fe^{7+}$	Photoexcitation	$16 \text{ \AA}$	$\mathrm{Th}$	464
$h\nu + Fe^{8+}$	Photoexcitation	$16 \text{ \AA}$	$\mathrm{Th}$	464
$h\nu + Fe^{9+}$	Photoexcitation	$16 \text{ \AA}$	$\mathrm{Th}$	464
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{10+}$	Photoexcitation	$16 \text{ \AA}$	$\mathrm{Th}$	464
$h\nu + Fe^{11+}$	Photoexcitation	$16 \text{ \AA}$	$\mathrm{Th}$	464
$h\nu + Fe^{12+}$	Photoexcitation	$16 \text{ \AA}$	$\mathrm{Th}$	464

$h\nu + Fe^{13+}$	Photoexcitation	$16 \text{ \AA}$	Th	464
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{14+}$	Photoexcitation	16 Å	$\mathrm{Th}$	464
$\mathbf{h} u$ + $\mathbf{Fe}^{15+}$	Photoexcitation	16 Å	$\mathrm{Th}$	464
$h\nu + Na$	Photoionization	355  nm	$\mathrm{Th}$	465
$\mathbf{h}\nu + \mathbf{Na}^*$	Photoionization	355 nm	$\mathrm{Th}$	465
$\mathbf{h}\nu + \mathbf{N}_2$	Photoexcitation	99.5-93.5 nm	$\mathrm{Th}$	466
$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	430  eV	E/T	467
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{21+}$	Photoexcitation	5.0  keV	Th	468
$h\nu + NH_3$	Photoexcitation	140-220 nm	Exp	469
$h\nu + ND_3$	Photoexcitation	140-220 nm	Exp	469
$h\nu + NH_2D$	Photoexcitation	140-220 nm	Exp	469
$h\nu + NHD_2$	Photoexcitation	140-220 nm	Exp	469
$h\nu + CO$	Photoexcitation	1000 Å	Exp	470
$h\nu + He$	Photoionization	0-60 eV	Exp	471
$h\nu + Li$	Photoionization	0-60 eV	Exp	471
$h\nu + Be$	Photoionization	0-60 eV	Exp	471
$h\nu + Na$	Photoionization	0-60 eV	Exp	471
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	0-60 eV	Exp	471
$h\nu$ + Ta	Elastic Scattering	24-136 keV	$\mathrm{Th}$	472
$h\nu + Hg$	Elastic Scattering	24-136 keV	$\mathrm{Th}$	472
$h\nu + Pb$	Elastic Scattering	24-136 keV	$\mathrm{Th}$	472
$h\nu + C$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Al$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Si$	Elastic Scattering	17.5  keV	$\operatorname{Exp}$	473
$h\nu + S$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Ti$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + V$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Co$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Ni$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Cu$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Zn$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + As$	Elastic Scattering	17.5 KeV	Exp	473
$n\nu + Se$	Elastic Scattering	17.5 KeV	Exp	473
$n\nu + Rb$	Elastic Scattering	17.5 KeV	Exp E	473
$n\nu + Sr$	Elastic Scattering	17.5 KeV	схр Бир	473
$h\nu + hu$	Elastic Scattering	17.5 keV	Exp Evp	473
$h\nu + Ag$ $h\nu \pm Cd$	Elastic Scattering	17.5  keV	Exp Evn	473
$h\nu + Cu$ $h\nu \pm In$	Elastic Scattering	17.5 keV	Evn	473
$h\nu + m$ $h\nu + Sn$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Sh$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Ba$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Nd$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Eu$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Gd$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Dv$	Elastic Scattering	17.5 keV	Exp	473
$h\nu + Ho$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Tm$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Yb$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Lu$	Elastic Scattering	17.5  keV	Exp	473
$h\nu$ + Ta	Elastic Scattering	17.5  keV	Exp	473
$h\nu + W$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Ir$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Pt$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Au$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Hg$	Elastic Scattering	17.5  keV	Exp	473
$h\nu + Tl$	Elastic Scattering	17.5  keV	Exp	473

$h\nu + Pb$	Elastic Scattering	17.5  keV	$\operatorname{Exp}$	473
$h\nu + Bi$	Elastic Scattering	17.5  keV	$\operatorname{Exp}$	473
$h\nu + Th$	Elastic Scattering	17.5  keV	$\operatorname{Exp}$	473
$h\nu + Tb$	Photoionization	124  keV	$\operatorname{Exp}$	474
$h\nu + Dy$	Photoionization	124  keV	$\operatorname{Exp}$	474
$h\nu + Ho$	Photoionization	124  keV	$\operatorname{Exp}$	474
$h\nu + Er$	Photoionization	124  keV	Exp	474
$h\nu + Tm$	Photoionization	124  keV	Exp	474
$h\nu + Yb$	Photoionization	124  keV	Exp	474
$h\nu + Lu$	Photoionization	124  keV	Exp	474
$h\nu + Hf$	Photoionization	124  keV	Exp	474
$h\nu$ + Ta	Photoionization	124  keV	Exp	474
$h\nu + W$	Photoionization	124  keV	Exp	474
$h\nu + Re$	Photoionization	124  keV	$\operatorname{Exp}$	474
$h\nu + Os$	Photoionization	124  keV	$\operatorname{Exp}$	474
$h\nu + Ir$	Photoionization	124  keV	Exp	474
$h\nu + Pt$	Photoionization	124  keV	$\operatorname{Exp}$	474
$h\nu + Au$	Photoionization	124  keV	$\operatorname{Exp}$	474
$h\nu + Hg$	Photoionization	124  keV	$\operatorname{Exp}$	474
$h\nu + Tl$	Photoionization	124  keV	Exp	474
$h\nu + Pb$	Photoionization	124  keV	Exp	474
$h\nu + Bi$	Photoionization	124  keV	Exp	474
$h\nu + Th$	Photoionization	124  keV	Exp	474
$h\nu + U$	Photoionization	124  keV	Exp	474
$h\nu + He$	Photoexcitation	$78  \mathrm{eV}$	Exp	475
$h\nu + He$	Photoionization	$78  \mathrm{eV}$	Exp	475
$\mathbf{h}\nu + \mathbf{H}_2$	Photodissociation	$76  \mathrm{eV}$	Exp	476
$h\nu + H_2$	Photoionization	$76  \mathrm{eV}$	Exp	476
$h\nu + N_2$	Photoexcitation	$0.5 \ cm^{-1}$	$\mathrm{Th}$	477
$h\nu + O_2$	Photoexcitation	0-20  eV	$\mathrm{Th}$	478
$h\nu + H^-$	Photodetachment	0.9-51  eV; 1000-25,000  K	$\mathrm{Th}$	479
$h\nu + He$	Photoionization	0.9-51  eV; 1000-25,000  K	$\mathrm{Th}$	479
$h\nu + Ne$	Photoionization	351-364 nm	Exp	480
$h\nu + Ne^*$	Photoionization	351-364 nm	Exp	480
$h\nu + HBr$	Photodissociation	69-74  eV	Exp	481
$h\nu + HBr$	Photoexcitation	69-74  eV	Exp	481
$h\nu + HBr$	Photoionization	69-74  eV	Exp	481
$h\nu + Ne$	Photoionization	$880\text{-}950~\mathrm{eV}$	$\mathrm{Th}$	482
$h\nu + NeC_{60}^{-}$	Photoionization	$880\text{-}950~\mathrm{eV}$	$\mathrm{Th}$	482
$h\nu + NeC_{60}$	Photoionization	$880\text{-}950~\mathrm{eV}$	$\mathrm{Th}$	482
$h\nu + NeC_{60}^{2+}$	Photoionization	$880\text{-}950~\mathrm{eV}$	$\mathrm{Th}$	482
$h\nu + NeC_{60}^{5+}$	Photoionization	$880\text{-}950~\mathrm{eV}$	$\mathrm{Th}$	482
$h\nu + NeC_{60}^{10+}$	Photoionization	$880\text{-}950~\mathrm{eV}$	$\mathrm{Th}$	482
$h\nu + Xe$	Photoionization	700-1600  nm	$\operatorname{Exp}$	483
$h\nu + Fe^{4+}$	Photoionization	59-140  eV	Exp	484
$h\nu + He$	Photoionization	$75  \mathrm{eV}$	Th	485
$h\nu + Be$	Photoionization	$75  \mathrm{eV}$	Th	485
$h\nu + Ne$	Photoionization	$75  \mathrm{eV}$	Th	485
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	$75  \mathrm{eV}$	Th	485
$\mathbf{h}\nu + \mathbf{Na}_{11}^+$	Photoexcitation	$2x10^{10} - 2x10^{11} \text{ W}/cm^2$	Exp	486
$h\nu + He$	Photoionization	400 nm	$\operatorname{Exp}$	487
$h\nu + Li$	Photoexcitation		$\mathrm{Th}$	488
$h\nu + Na$	Photoexcitation		$\mathrm{Th}$	488
$h\nu + K$	Photoexcitation		$\mathrm{Th}$	488
$h\nu + Rb$	Photoexcitation		$\mathrm{Th}$	488
$h\nu + Cs$	Photoexcitation		$\mathrm{Th}$	488
$h\nu + H_2$	Photoexcitation	202 nm	Exp	489

$h\nu + HD$	Photoexcitation	202 nm	Exp	489
$\mathbf{h}\nu + \mathbf{D}_2$	Photoexcitation	202 nm	Exp	489
$h\nu + Ag$	Photoionization	50-90  keV	E/T	490
$h\nu + Ne$	Photoexcitation		Exp	491
$h\nu + Ne$	Photoionization		Exp	491
$h\nu + O^-$	Photodetachment	1-7  eV	$\mathrm{Th}$	492
$\mathbf{h} u + \mathbf{X}\mathbf{e}^{3+}$	Photoionization	160  eV	Exp	493
$h\nu + Xe^{4+}$	Photoionization	160  eV	Exp	493
$\mathbf{h} u + \mathbf{X}\mathbf{e}^{5+}$	Photoionization	160  eV	Exp	493
$\mathbf{h} u + \mathbf{X}\mathbf{e}^{6+}$	Photoionization	160  eV	Exp	493
$h\nu + K$	Photoexcitation	340-400  eV	E/T	494
$h\nu + K$	Photoionization	340-400  eV	E/T	494
$h\nu + He$	Photoionization	$75  \mathrm{eV}$	Th	495
$h\nu + He$	Photoionization	91.6  eV	Th	496
$h\nu + He$	Total Absorption, Scattering	248.6 nm	Th	497
$h\nu + He$	Photoexcitation	248.6 nm	$\mathrm{Th}$	497
$h\nu + He$	Photoionization	248.6 nm	$\mathrm{Th}$	497
$\mathbf{h}\nu + \mathbf{L}\mathbf{i}_2$	Elastic Scattering	$12,500 \ cm^{-1}$	E/T	498
$\mathbf{h} u + \mathbf{L}\mathbf{i}_2$	Fluorescence	$12,500 \ cm^{-1}$	E/T	498
$\mathbf{h}\nu + \mathbf{L}\mathbf{i}_2$	Photoexcitation	$12,500 \ cm^{-1}$	E/T	498
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photoionization	800 nm	$\mathrm{Th}$	499
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photoexcitation		$\mathrm{Th}$	500
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photoionization		$\mathrm{Th}$	500
$h\nu + He$	Photoionization	248.6-390 nm	$\mathrm{Th}$	501
$h\nu + Ne$	Photoionization	248.6-390 nm	$\mathrm{Th}$	501
$h\nu + Ar$	Photoionization	248.6-390 nm	$\mathrm{Th}$	501
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photodissociation	400 nm	$\mathrm{Th}$	502
$h\nu + D_2^+$	Photodissociation	400 nm	$\mathrm{Th}$	502
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photoexcitation		$\mathrm{Th}$	503
$h\nu + Ba$	Photoexcitation	50-70 GHz	$\operatorname{Exp}$	504
$h\nu + Ba$	Photoionization	50-70 GHz	$\operatorname{Exp}$	504
$h\nu + Hf$	Total Absorption, Scattering	40-140  eV	$\operatorname{Exp}$	505
$h\nu + Ta$	Total Absorption, Scattering	40-140  eV	$\operatorname{Exp}$	505
$h\nu + Au$	Total Absorption, Scattering	40-140  eV	$\operatorname{Exp}$	505
$h\nu + Pb$	Total Absorption, Scattering	40-140  eV	$\operatorname{Exp}$	505
$h\nu + Hf$	Photoionization	40-140  eV	$\operatorname{Exp}$	505
$h\nu + Ta$	Photoionization	40-140  eV	Exp	505
$h\nu + Au$	Photoionization	40-140  eV	Exp	505
$h\nu + Pb$	Photoionization	40-140 eV	Exp	505
$h\nu + Xe^{4+}$	Photoionization	90-110 eV	E/T	506
$h\nu + Xe^{3+}$	Photoionization	90-110 eV	E/T	506
$h\nu + Xe^{0+}$	Photoionization	90-110 eV	E/T	506
$\mathbf{h}\nu + \mathbf{O}_2$	Photoionization	110 MeV	Exp	507
$h\nu + He^-$	Photodetachment	38.5-40.5 eV	Exp	508
$h\nu + He^{-}$	Photoionization	38.5-40.5 eV	Exp	508
$h\nu + Ar$	Photoexcitation	2500 eV	E/T	509
$h\nu + HeNe$	Elastic Scattering	95-295 K	Th	510
$\mathbf{h}\nu + \mathbf{N}_2$	Photodissociation	790 nm	Exp	511
$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	790 nm	Exp	511
$\mathbf{n}\nu + \mathbf{H}_2$	Photodissociation	758 nm	Th	512
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photodissociation	758 nm	Th	512
$\mathbf{n}\nu + \mathbf{H}_2$	Photoionization	758 nm	Th	512
$\mathbf{n}\nu + \mathbf{H}_2$	Photoionization	(58 nm	Th	512
$n\nu + H^{-}$	Photodetachment	0.75-1.05 eV	Th	513
$\mathbf{n}\nu + \mathbf{N}_2$	Photodissociation	400-1200 nm	Exp	514
$\mathbf{n}\nu + \mathbf{N}_2$	Photoionization	400-1200 nm	Exp	514
$n\nu + C^{-}$	Photodetachment	281.3-282.3 eV	Exp	515

$h\nu + He$	Photoexcitation		$\mathrm{Th}$	516
$h\nu + Be$	Photoionization	126.5-128  eV	$\operatorname{Exp}$	517
$h\nu + Ar$	Photoionization	+2  eV	$\mathrm{Th}$	518
$h\nu + Kr$	Photoionization	+2  eV	$\mathrm{Th}$	518
$h\nu + K$	Photoionization	$3.6-3.62 \mathrm{keV}$	$\operatorname{Exp}$	519
$h\nu + Xe$	Photoexcitation	0-4 a.u.	$\mathrm{Th}$	520
$h\nu + Cs$	Photoexcitation	0-4 a.u.	$\mathrm{Th}$	520
$h\nu + Ba$	Photoexcitation	0-4 a.u.	$\mathrm{Th}$	520
$h\nu + He^-$	Photoionization		$\mathrm{Th}$	521
$h\nu + Cs$	Photoexcitation	16-25  eV	Exp	522
$h\nu + Kr^{5+}$	Photoionization	$74-175 { m ~eV}$	E/T	523
$h\nu + K$	Photoionization	60  eV	Exp	524
$h\nu + H_2S$	Photoionization	180-240  eV	Exp	525
$h\nu + CO_2^{3+}$	Photodissociation	200  eV	Exp	526
$h\nu + CO_2^{3+}$	Photoionization	200  eV	Exp	526
$h\nu + He$	Photoionization	500 nm	Exp	527
$h\nu + H^-$	Photodetachment	$0-500 \ cm^{-1}$	$\mathrm{Th}$	528
$h\nu + H_2$	Fluorescence	800 nm	$\mathrm{Th}$	529
$h\nu + D_2$	Fluorescence	800 nm	$\mathrm{Th}$	529
$\mathbf{h}\nu + \mathbf{N}_2$	Fluorescence	800 nm	$\mathrm{Th}$	529
$h\nu + O_2$	Fluorescence	800 nm	$\mathrm{Th}$	529
$h\nu + H_2$	Photoexcitation	800 nm	$\mathrm{Th}$	529
$h\nu + D_2$	Photoexcitation	800 nm	$\mathrm{Th}$	529
$h\nu + N_2$	Photoexcitation	800 nm	$\mathrm{Th}$	529
$h\nu + O_2$	Photoexcitation	800 nm	$\mathrm{Th}$	529
$h\nu + H_2$	Photoionization	800 nm	$\mathrm{Th}$	529
$h\nu + D_2$	Photoionization	800 nm	$\mathrm{Th}$	529
$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	800 nm	$\mathrm{Th}$	529
$h\nu + O_2$	Photoionization	800 nm	$\mathrm{Th}$	529
$h\nu + H$	Photoionization	800 nm	$\mathrm{Th}$	530
$h\nu + Mg$	Photoionization	$3  \mathrm{eV}$	$\mathrm{Th}$	531
$h\nu + Ar$	Photoionization	800 nm	$\mathrm{Th}$	532
$h\nu + H$	Photoexcitation	$10^{8} \text{ V/m}$	$\mathrm{Th}$	533
$h\nu + H^-$	Photodetachment	2.3 nm	$\mathrm{Th}$	534
$h\nu + Na$	Photoionization	36.5-170  eV	$\operatorname{Exp}$	535
$h\nu + K$	Photoionization	36.5-170  eV	Exp	535
$h\nu + He$	Photoionization	85-90 eV	Th	536
$h\nu + Li$	Photoionization	148-161 eV	Exp	537
$h\nu + H_2O$	Total Absorption, Scattering	28-539 eV	Th —-	538
$h\nu + CO$	Total Absorption, Scattering	28-539 eV	Th	538
$h\nu + C_6H_6$	Total Absorption, Scattering	28-539 eV	Th	538
$h\nu + C_4H_4N$	Total Absorption, Scattering	28-539  eV	Th	538
$h\nu + Kr$	Photoionization	800  nm	Th	539
$h\nu + HI$	Photodissociation	$10^{13} \text{ W}/cm^2$	Th	540
$h\nu + CO_2^+$	Photodissociation	$3x10^{13} - 6x10^{16} \text{ W/cm}^2$	Exp	541
$h\nu + CO_2^+$	Photoionization	$3x10^{13} - 6x10^{16} \text{ W/cm}^2$	Exp	541
$h\nu + CH_3I$	Photodissociation	$10^{12} - 10^{13} \text{ W/cm}^2$	Exp	542
$h\nu + CH_3Cl$	Photodissociation	$10^{12} - 10^{13} \text{ W/cm}^2$	Exp	542
$h\nu + CH_3Br$	Photodissociation	$10^{12} - 10^{13} \text{ W/} cm^2$	Exp	542
$h\nu + CH_3F$	Photodissociation	$10^{12} - 10^{13} \text{ W/} cm^2$	Exp	542
$h\nu + CH_3I$	Photoionization	$10^{12} - 10^{13} \text{ W/} cm^2$	Exp	542
$n\nu + CH_3Cl$	Photoionization	$10^{12} - 10^{10} \text{ W/cm}^2$ $10^{12} - 10^{13} \text{ W}^2/2^2$	Exp	542
$n\nu + CH_3Br$	Photoionization	$10^{12} - 10^{10} \text{ W/cm}^2$ $10^{12} - 10^{13} \text{ W}^2/2$	Exp	542
$n\nu + CH_3F$	Photoionization	$10^{12} - 10^{10} \text{ W}/cm^2$	Exp	542
$\mathbf{n}\nu + \mathbf{n}_2$ '	Photodissociation	(90 nm 700 nm	E/T E/T	543
$\mathbf{n}\nu + \mathbf{n}_2$ '	Photoionization	(90  nm) $10^{14} \text{ m}/\dots^2$	E/T TU	543
$\mathbf{n}\nu + \mathbf{n}_2$	r notoiomzation	$10 vv/cm^{-}$	тn	544
$h\nu + H$	Photoionization		$\mathrm{Th}$	545
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$h\nu + Na_2$	Photoionization	$2.5-7.5, 10^{11} \text{ W/}cm^2$	$\mathrm{Th}$	546
$h\nu + He$	Photoionization	$77.5-78.3 { m eV}$	E/T	547
$\mathbf{h}\nu + \mathbf{H}\mathbf{e}^*$	Photoionization	77.5-78.3  eV	E/T	547
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photoionization	100  eV	$\mathrm{Th}$	548
$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	500  eV	Exp	549
$h\nu + He$	Photoionization	450  eV	$\mathrm{Th}$	550
$\mathbf{h}\nu + \mathbf{H}_2$	Fluorescence	20-55  eV	Exp	551
$h\nu + K$	Photoionization	0-8 Ry	$\mathrm{Th}$	552
$h\nu + Sc$	Photoionization	0-8 Ry	$\mathrm{Th}$	552
$h\nu + Mn$	Photoionization	0-8 Ry	$\mathrm{Th}$	552
$h\nu + In$	Photoionization	0-8 Ry	$\mathrm{Th}$	552
$h\nu + Au$	Photoionization	0-8 Ry	$\mathrm{Th}$	552
$h\nu + Tl$	Photoionization	0-8 Ry	$\mathrm{Th}$	552
$\mathbf{h}\nu + \mathbf{N}_2$	Fluorescence	135-190 nm	Exp	553
$h\nu + Ba^{3+}$	Total Absorption, Scattering	$75-85  \mathrm{eV}$	$\operatorname{Exp}$	554
$\mathbf{h} u + \mathbf{B}\mathbf{a}^{4+}$	Total Absorption, Scattering	75-85  eV	$\operatorname{Exp}$	554
$\mathbf{h} u$ + $\mathbf{B}\mathbf{a}^{5+}$	Total Absorption, Scattering	$75-85  \mathrm{eV}$	$\operatorname{Exp}$	554
$\mathbf{h} u$ + $\mathbf{B}\mathbf{a}^{3+}$	Photoexcitation	$75-85  {\rm eV}$	$\operatorname{Exp}$	554
$h\nu + Ba^{4+}$	Photoexcitation	75-85  eV	$\operatorname{Exp}$	554
$\mathbf{h} u$ + $\mathbf{B}\mathbf{a}^{5+}$	Photoexcitation	75-85  eV	$\operatorname{Exp}$	554
$\mathbf{h} u$ + $\mathbf{N}_2$	Photoionization	410-450  eV	E/T	555
$h\nu + Ca$	Photoexcitation	10-25 eV	$\mathrm{Th}$	556
$h\nu + Nd^{48+}$	Photoexcitation	$10^{-1} - 10$ a.u.	$\mathrm{Th}$	557
$h\nu + Pm^{49+}$	Photoexcitation	$10^{-1} - 10$ a.u.	Th	557
$h\nu + Sm^{50+}$	Photoexcitation	$10^{-1} - 10$ a.u.	Th	557
$h\nu + H_2O$	Photoexcitation	$10^{-2} - 10^{-1}$ a.u.	Th	558
$h\nu + Fe$	Fluorescence	8.0-10.5 keV	E/T	559
$h\nu + Co$	Fluorescence	8.0-10.5 keV	E/T	559
$h\nu + Fe$	Photoexcitation	8.0-10.5 keV	E/T	559
$h\nu + Co$	Photoexcitation	8.0-10.5 keV	E/T	559
$h\nu + Ne$	Photoionization	871.7 eV	Th	560
$h\nu + He$	Photoionization	79.1-80.1 eV	Th E	561
$n\nu + Xe$	Photoionization	674-792 eV	Exp E	562
$n\nu + Cs$	Photodomization Deste diagonistics	074-792 eV	Exp E-m	002 562
$\mathbf{n}\nu + \mathbf{n}_2$	Photodissociation Dhatadiana sistian	41.7 eV	Exp E-m	000 E69
$\mathbf{n}\nu + \mathbf{D}_2$	Photoionization	41.7 eV	Exp Evr	562
$\mathbf{n}\nu + \mathbf{n}_2$	Photoionization	41.7 eV	Exp Evr	562
$\mathbf{h}\nu + \mathbf{D}_2$	Photoionization	41.7 EV 41.85 51 15 oV	Exp Th	564
$h\nu + H_{e}$	Photoionization	800 nm	TH Fyn	565
$h\nu + H_2$ $h\nu \pm N_2$	Photodissociation	400 403 oV	Exp Evn	566
$\mathbf{h}\nu + \mathbf{N}_2$ $\mathbf{h}\nu + \mathbf{N}_2$	Fluorescence	400-403 eV	Exp	566
$h\nu + N_2$ $h\nu + N_2$	Photoionization	400-403 eV	Exp	566
$h\nu + N_2$ $h\nu + N_2$	Fluorescence	28-49 eV	Exp	567
$h\nu + N_2$ $h\nu + N_2$	Photoexcitation	28-49 eV	Exp	567
$h\nu + Ne$	Photoionization	869 eV	Exp	568
$h\nu + Ne^*$	Photoionization	869 eV	Exp	568
$h\nu + Kr$	Photoionization	1660-1780 eV	Exp	569
$h\nu + C^-$	Photodetachment	281-284  eV	Th	570
$h\nu + S^-$	Photodetachment	614.6-577.1 nm	Exp	571
$h\nu + K$	Photoionization	42  eV	$\dot{E/T}$	572
$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	0-8 eV	Е́/Т	573
$h\nu + Sr$	Photoionization	355-410 nm	́е/Т	574
$h\nu + Sr^*$	Photoionization	355-410 nm	É/T	574
$h\nu + He$	Photoionization	$40-50 \mathrm{eV}$	$\mathrm{Th}$	575
$h\nu + NO$	Photodissociation	405-420  eV	$\mathrm{Th}$	576

$h\nu + H^-$	Photodetachment	1  eV	$\mathrm{Th}$	577
$h\nu + Li$	Photoionization	300  eV	$\mathrm{Th}$	578
$h\nu + Ne$	Photoionization		Exp	579
$h\nu + Ne$	Total Absorption, Scattering	$900-940 \ eV$	Exp	580
$h\nu + Cu^{19+}$	Photoexcitation	$5  \mathrm{eV}$	$\mathrm{Th}$	581
$h\nu + Cu^{27+}$	Photoexcitation	5  eV	$\mathrm{Th}$	581
$h\nu + Be$	Photoexcitation	0.3-0.5 a.u.	$\mathrm{Th}$	582
$h\nu + Be$	Photoionization	0.3-0.5 a.u.	$\mathrm{Th}$	582
$h\nu + Ar$	Photoexcitation	$10^{-7} - 10^{-1}$ a.u.	$\mathrm{Th}$	583
$h\nu + C$	Photoexcitation	$10^{-17} - 10^{-1}$ a.u.	$\mathrm{Th}$	584
$h\nu + Ti^{3+}$	Photoexcitation	$10^{-4} - 1$ a.u.	$\mathrm{Th}$	585
$h\nu + Ne$	Photoexcitation	$10^{-6} - 10^{-3}$ a.u.	Exp	586
$h\nu + Ne$	Photoionization	$10^{-6} - 10^{-3}$ a.u.	Exp	586
$h\nu + N_2$	Photoionization	440-550  eV	Exp	587
$h\nu + OCS$	Photodissociation	135-160  eV	Exp	588
$h\nu + A$	Photoexcitation		Th	589
$h\nu + Na_2$	Fluorescence	4900-6300 Å	Exp	590
$h\nu + N_2$	Photoionization	10-2000 eV	Th	591
$h\nu + Ca$	Photoionization	374-323 nm	E/T	592
$h\nu + Au$	Photoionization	13-15  keV	Eyr Exp	593
$h\nu + Ar$	Photoexcitation	32 5-33 0 eV	E/T	594
$h\nu + He$	Photoionization	73 5-75 6 eV	$\frac{D}{Th}$	595
$h\nu + Hc$ $h\nu + S$	Photoexcitation	$83\ 000-830\ cm^{-1}$	Th	596
$h\nu + \Sigma$ $h\nu + Li$	Photoionization	0-10 eV	Е/Т	597
$h\nu + Sc$	Total Absorption Scattering	30-90 eV	E/T	598
$h\nu + 5c$ $h\nu + Ti$	Total Absorption, Scattering	30-90 eV	E/T	598
$h\nu + V$	Total Absorption, Scattering	30-90 eV	E/T	598
$h\nu + Cr$	Total Absorption, Scattering	30-90 eV	E/T	598
$h\nu + Mn$	Total Absorption, Scattering	30-90 eV	E/T	598
$h\nu + Fe$	Total Absorption, Scattering	30-90 eV	E/T	598
$h\nu + Co$	Total Absorption, Scattering	30-90 eV	E/T	598
$h\nu + Ni$	Total Absorption, Scattering	30-90 eV	E/T	598
$h\nu + Cu$	Total Absorption, Scattering	30-90 eV	E/T	598
$h\nu + Sc$	Photoionization	30-90 eV	_/ = Е/Т	598
$h\nu + Ti$	Photoionization	30-90 eV	E/T	598
$h\nu + V$	Photoionization	30-90 eV	E/T	598
$h\nu + Cr$	Photoionization	30-90 eV	E/T	598
$h\nu + Mn$	Photoionization	30-90 eV	E/T	598
$h\nu + Fe$	Photoionization	30-90 eV	E/T	598
$h\nu + Co$	Photoionization	30-90 eV	_/ = Е/Т	598
$h\nu + Ni$	Photoionization	30-90 eV	_/ = Е/Т	598
$h\nu + Cu$	Photoionization	30-90 eV	_/ = Е/Т	598
$h\nu + H_2O$	Photodissociation	532-542  eV	Exp	599
$h\nu + H_2O$	Fluorescence	532-542  eV	Exp	599
$h\nu + F$	Photoionization	20-24 eV	E/T	600
$h\nu + Ba$	Photodetachment	0-10 ev: 0-2.5 eV	_/ - Е/Т	601
$h\nu + Ne$	Photoionization	795 nm	Exp	602
$h\nu + Ar$	Photoionization	795 nm	Exp	602
$h\nu + Kr$	Photoionization	815 nm	Exp	603
$h\nu + H_2$	Photoionization	800 nm	$\mathrm{Th}^{\mathbf{r}}$	604
$h\nu + He$	Photoionization	1.42-2.1 a.u.	$\mathrm{Th}$	605
$h\nu + H_2$	Photodissociation	800 nm	Exp	606
$h\nu + D_2$	Photodissociation	800 nm	Exp	606
$\mathbf{h}\nu + \mathbf{C}_{2}\mathbf{H}_{2}$	Photodissociation	800 nm	Exp	606
$h\nu + H_2$	Photoionization	800 nm	Exp	606
$h\nu + D_2$	Photoionization	800 nm	Exp	606
$\mathbf{h}\nu + \mathbf{C}_2\mathbf{H}_2$	Photoionization	800 nm	Exp	606
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$\mathbf{h} u$ + $\mathbf{H}_2$	Photodissociation	795  nm	Exp	607
$\mathbf{h} u + \mathbf{D}_2$	Photodissociation	795 nm	Exp	607
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	795 nm	Exp	607
$\mathbf{h}\nu + \mathbf{D}_2$	Photoionization	795 nm	Exp	607
$\mathbf{h} u$ + $\mathbf{H}_2$	Photodissociation	810 nm	Exp	608
$\mathbf{h} u + \mathbf{D}_2$	Photodissociation	810 nm	Exp	608
$h\nu + SO_2$	Photodissociation	810 nm	Exp	608
$\mathbf{h} u$ + $\mathbf{H}_2$	Photoionization	810 nm	Exp	608
$\mathbf{h} u + \mathbf{D}_2$	Photoionization	810 nm	Exp	608
$h\nu + SO_2$	Photoionization	810 nm	Exp	608
$h\nu + CH_3OH$	Photodissociation	800 nm	Exp	609
$h\nu + CH_3OD$	Photodissociation	800 nm	Exp	609
$h\nu + CD_3OH$	Photodissociation	800 nm	Exp	609
$h\nu + CH_3OH$	Photoionization	800 nm	Exp	609
$h\nu + CH_3OD$	Photoionization	800 nm	Exp	609
$h\nu + CD_3OH$	Photoionization	800 nm	Exp	609
$h\nu + H$	Photoexcitation		Th	610
$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	38  eV	Exp	611
$\mathbf{h}\nu + \mathbf{H}_2$	Photodissociation	0.5 a.u.	Th	612
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photodissociation	0.5 a.u.	Th	612
$\mathbf{h} u$ + $\mathbf{H}_2$	Photoionization	0.5 a.u.	$\mathrm{Th}$	612
$\mathbf{h} u$ + $\mathbf{H}_2^+$	Photoionization	0.5 a.u.	Th	612
$h\nu + CO_2$	Photoionization	$300\text{-}340~\mathrm{eV}$	E/T	613
$h\nu + Ne$	Photoionization		$\mathrm{Th}$	614
$h\nu + Ne$	Elastic Scattering	4  eV	E/T	615
$h\nu + Ne^*$	Elastic Scattering	4  eV	E/T	615
$h\nu + Ne$	Photoionization	4  eV	E/T	615
$\mathbf{h}\nu + \mathbf{Ne}^*$	Photoionization	4  eV	E/T	615
$h\nu + Ne$	Photoionization	400-800 nm	$\operatorname{Exp}$	616
$h\nu + Ar$	Photoionization	400-800 nm	$\operatorname{Exp}$	616
$h\nu + Ne$	Photoionization	950  eV	Exp	617
$h\nu + N_2$	Photodissociation	43-46 eV	Exp	618
$h\nu + N_2$	Photoionization	43-46 eV	Exp	618
$h\nu + CO_2$	Photoionization	550-570 eV	Exp	619
$h\nu + Kr^+$	Photoexcitation	350-720 nm	Exp	620
$h\nu + H_2$	Photoionization	$4.3-8.0 \ 10^{13} \ W/cm^2$	Th	621 co1
$\mathbf{h}\nu + \mathbf{H}_{2}$	Photoionization	$4.3-8.0\ 10^{10}\ W/cm^2$	Th	621 C01
$h\nu + CO_2$	Photoionization	$4.3-8.0\ 10^{10}\ W/cm^2$	Th	621 C01
$h\nu + CO_2$	Photoionization	$4.3-8.0 \ 10^{13} \ W/cm^{-2}$	1 n Th	621 691
$\mathbf{n}\nu + \mathbf{N}_2$	Photoionization	$4.3-8.0 \ 10^{-5} \ \text{W}/cm^{-1}$	1 fl Th	021 691
$\mathbf{n}\nu + \mathbf{N}_2$	Photodinzation Dhotodiggeniction	4.3-8.0 10 <sup>-5</sup> W/ <i>Cm</i> <sup>-</sup>	1 fi Fun	021 699
$h\nu + NO$	Photoionization	800 nm	Exp Evp	022 622
$h\nu + NO$	Photoionization	140 180 oV	Exp Evp	622
$\mathbf{h}\nu + \mathbf{E}\mathbf{h}^{4+}$	Photoionization	140-100 eV 70 120 eV	цхр ть	624
$h\nu + Fe$	Photoionization	0.120  eV	111 Тh	625
$\mathbf{h}\nu + \mathbf{h}$	Photoionization	0.120  eV	TH Th	625
$h\nu + I$ $h\nu \pm Cr$	Photoionization	0.120  eV	TH Th	625
$h\nu + Cr^*$	Photoionization	0.120  eV	Th	625
$h\nu + Mn$	Photoionization	0-120 eV	Th	625
$h\nu + E\mu$	Photoionization	0-120 eV	Th	625
$h\nu + Ne$	Photoexcitation	908-1080 eV	Exp	626
$h\nu + Ne$	Photoionization	908-1080 eV	Exp	626
$h\nu + Ba$	Fluorescence	5 6-30 keV	Exp	627
$h\nu + Ba$	Photoionization	5 6-30 keV	Exp	627
$h\nu + H_0$	Photoionization	15 65-15 68 eV	Exp	628
$h\nu + D_2$	Photoionization	15 65-15 68 eV	Exp	628
1 2		10.00 10.00 01	P	0-0

$h\nu + N_2$	Photoionization	400-1600  eV	E/T	629
$h\nu + He$	Fluorescence	72.5-73.0  eV	E/T	630
$h\nu + He$	Photoionization	72.5-73.0  eV	$\dot{E/T}$	630
$h\nu + H_2$	Photodissociation	24-60  eV	$\dot{E/T}$	631
$h\nu + D_2$	Photodissociation	24-60  eV	$\dot{E/T}$	631
$h\nu + H$	Photoionization	$1-2 \text{ a.u.; } 1 \ \mu \text{ m}$	Th	632
$h\nu + Li$	Photoionization	0-3 eV	Exp	633
$h\nu + He$	Photoionization	30-320  eV	$\mathrm{Th}$	634
$h\nu + Li^+$	Photoionization	30-320  eV	$\mathrm{Th}$	634
$h\nu + Be^{2+}$	Photoionization	30-320  eV	$\mathrm{Th}$	634
$h\nu + B^{3+}$	Photoionization	30-320  eV	$\mathrm{Th}$	634
$h\nu + O^{6+}$	Photoionization	30-320  eV	$\mathrm{Th}$	634
$h\nu + Ar$	Photoionization	$1.6-90 \ eV$	$\mathrm{Th}$	635
$h\nu + Zr^+$	Photoexcitation	5400-2500 Å	$\operatorname{Exp}$	636
$h\nu + Fe^{17+}$	Photoexcitation	0-60 Ry	$\mathrm{Th}$	637
$h\nu + Fe^{17+}$	Photoexcitation	$7 \log T[K]$	$\mathrm{Th}$	638
$h\nu + Fe^{8+}$	Photoexcitation	0-7.0 Ry	$\mathrm{Th}$	639
$h\nu + Ni^{18+}$	Photoexcitation	0-100 Ry	$\mathrm{Th}$	640
$h\nu + Mg$	Photoexcitation	5180-2700 Å	$\operatorname{Exp}$	641
$h\nu + Fe^{15+}$	Photoexcitation	0-60 Ry	$\mathrm{Th}$	642
$h\nu + N_2$	Photodissociation	800 nm	$\operatorname{Exp}$	643
$h\nu + O_2$	Photodissociation	800 nm	$\operatorname{Exp}$	643
$h\nu + N_2$	Photoionization	800 nm	Exp	643
$h\nu + O_2$	Photoionization	800 nm	$\operatorname{Exp}$	643
$h\nu + H$	Photoionization	243 nm	E/T	644
$h\nu + H_2$	Photodissociation	$75  \mathrm{eV}$	E/T	645
$h\nu + H_2$	Photoionization	$75  \mathrm{eV}$	E/T	645
$h\nu + Li$	Photoionization	317-1457 nm	E/T	646
$h\nu + Li^*$	Photoionization	317-1457 nm	E/T	646
$h\nu + Ca^-$	Photodetachment	0-4  eV	E/T	647
$h\nu + H^-$	Photodetachment	$0.0043$ - $0.0253 \ \omega(a.u.)$	E/T	648
$h\nu + F^-$	Photodetachment	$0.0043$ - $0.0253 \ \omega(a.u.)$	E/T	648
$h\nu + H$	Photoionization	$0.675 \; \omega(a.\mathrm{u.})$	$\mathrm{Th}$	649
$h\nu + Ar + H_2$	Total Absorption, Scattering	195 K	$\mathrm{Th}$	650
$h\nu + ArH_2$	Total Absorption, Scattering	195 K	$\mathrm{Th}$	650
$h\nu + H$	Photoionization	$0-60,000 \ cm^{-1}$	$\mathrm{Th}$	651
$h\nu + P^+$	Photoexcitation	1154 Å	$\operatorname{Exp}$	652
$h\nu + Ge_2H_6$	Photoexcitation	$500-4500 \ cm^{-1}$	$\operatorname{Exp}$	653
$h\nu + Ge_2H_2$	Photoexcitation	$500-4500 \ cm^{-1}$	$\operatorname{Exp}$	653
$h\nu + Ge_2H_3$	Photoexcitation	$500-4500 \ cm^{-1}$	$\operatorname{Exp}$	653
$h\nu + Ge_2H_4$	Photoexcitation	$500-4500 \ cm^{-1}$	$\operatorname{Exp}$	653
$h\nu + Ge_2H_5$	Photoexcitation	$500-4500 \ cm^{-1}$	Exp	653
$h\nu + Ni^{18+}$	Photoexcitation	15.0-9.0 A	E/T	654
$h\nu + Ni^{19+}$	Photoexcitation	15.0-9.0 Å	E/T	654
$h\nu + Ni^{20+}$	Photoexcitation	15.0-9.0 Å	E/T	654
$h\nu + Ni^{21+}$	Photoexcitation	15.0-9.0 Å	E/T	654
$h\nu + Ni^{22+}$	Photoexcitation	15.0-9.0 Å	E/T	654
$h\nu + Ni^{23+}$	Photoexcitation	15.0-9.0 Å	E/T	654
$h\nu + Ni^{24+}$	Photoexcitation	15.0-9.0 Å	E/T	654
$h\nu + Ni^{25+}$	Photoexcitation	15.0- $9.0$ Å	E/T	654
$h\nu + He$	Photoionization	1 eV excess	$\mathrm{Th}$	655
$h\nu + Li$	Photoionization	532-266 nm	Exp	656
$h\nu + Li^*$	Photoionization	532-266 nm	Exp	656
$h\nu + CF_4$	Photoionization	0-50  eV	E/T	657
$\mathbf{h}\nu + \mathbf{C}_2$	Photoexcitation	1.0 Å	$\mathrm{Th}$	658
$h\nu + H_2$	Photoionization	15.3-17.2  eV	Exp	659

$\mathbf{h}\nu + \mathbf{H}_2$	Photoexcitation	15.3-17.2  eV	Exp	660
$h\nu + S$	Photoionization	10-30  eV	Exp	661
$\mathbf{h}\nu + \mathbf{C}_4$	Photoionization	10  eV	$\mathrm{Th}$	662
$h\nu + Kr$	Photoionization	$64\text{-}95~\mathrm{eV}$	E/T	663
$h\nu + He^-$	Photodetachment	8-295  eV	E/T	664
$h\nu + Li^-$	Photodetachment	8-295  eV	E/T	664
$h\nu + B^-$	Photodetachment	8-295  eV	E/T	664
$\mathbf{h} u$ + $\mathbf{C}^{-}$	Photodetachment	8-295  eV	E/T	664
$\mathbf{h} u$ + $\mathbf{N}\mathbf{a}^-$	Photodetachment	8-295  eV	E/T	664
$\mathbf{h} u + \mathbf{Cl}^-$	Photodetachment	8-295  eV	E/T	664
$h\nu + V^-$	Photodetachment	8-295  eV	E/T	664
$h\nu + Cr^-$	Photodetachment	8-295  eV	E/T	664
$h\nu + Co^-$	Photodetachment	8-295  eV	E/T	664
$h\nu + Ni^-$	Photodetachment	8-295  eV	E/T	664
$h\nu + Te^-$	Photodetachment	8-295  eV	E/T	664
$h\nu + I^-$	Photodetachment	8-295  eV	E/T	664
$h\nu + I^-$	Photoexcitation	8-295  eV	E/T	664
$h\nu + I^+$	Photoexcitation	8-295  eV	E/T	664
$\mathbf{h} u + \mathbf{I}^{2+}$	Photoexcitation	8-295  eV	E/T	664
$h\nu + Xe$	Photoexcitation	8-295  eV	E/T	664
$h\nu + Xe^+$	Photoexcitation	8-295  eV	E/T	664
$h\nu + Xe^{2+}$	Photoexcitation	8-295  eV	E/T	664
$h\nu + Xe^{3+}$	Photoexcitation	8-295  eV	E/T	664
$h\nu + Xe^{4+}$	Photoexcitation	8-295  eV	E/T	664
$h\nu + Xe^{5+}$	Photoexcitation	8-295 eV	E/T	664
$h\nu + Xe^{0+}$	Photoexcitation	8-295 eV	E/T	664
$h\nu + Cs^+$	Photoexcitation	8-295 eV	E/T	664
$h\nu + Ba^+$	Photoexcitation	8-295 eV	E/T	664
$h\nu + Ba^{2+}$	Photoexcitation	8-295 eV	E/T	664
$h\nu + Ba^{3+}$	Photoexcitation	8-295 eV	E/T	664
$h\nu + La^{+}$	Photoexcitation	8-295 eV	E/T	664
$h\nu + La^{+}$	Photoexcitation	8-295 eV	E/T	664 664
$h\nu + Ce^{\pm 1}$	Photoexcitation	8-295 eV	E/T E/T	664 CC4
$n\nu + He$	Photoionization	8-295 eV	E/I E/T	004 664
$n\nu + He^{-1}$	Photoionization Distaination	8-295 eV	E/I E/T	004
$n\nu + Li$	Photoionization Distaination	8-295 eV	E/I E/T	004
$\mathbf{n}\nu + \mathbf{B}^{+}$	Photoionization	8 205 aV	Ľ/ I Б/Т	664
$h\nu + C^{2+}$	Photoionization	8 205 aV	Ľ/ I Б/Т	664
$h\nu + C$	Photoionization	8 205 oV	E/T	664
$h\nu + N^+$	Photoionization	8-295 eV	E/T	664
$\mathbf{h}\nu + \mathbf{N}^{2+}$	Photoionization	8 205 oV	E/T	664
$h\nu + N^{3+}$	Photoionization	8-295 eV	E/T	664
$h\nu + \Omega$	Photoionization	8-295 eV	E/T	664
$h\nu + O^+$	Photoionization	8-295 eV	E/T	664
$h\nu + O^{2+}$	Photoionization	8-295 eV	E/T	664
$h\nu + 0^{3+}$	Photoionization	8-295 eV	E/T	664
$h\nu + O^{4+}$	Photoionization	8-295 eV	E/T	664
$h\nu + F^{2+}$	Photoionization	8-295 eV	E/T	664
$h\nu + F^{3+}$	Photoionization	8-295 eV	E/T	664
$h\nu + F^{4+}$	Photoionization	8-295 eV	E/T	664
$h\nu + Ne$	Photoionization	8-295 eV	E/T	664
$h\nu + Ne^+$	Photoionization	8-295 eV	E/T	664
$h\nu + Ne^{3+}$	Photoionization	8-295 eV	E/T	664
$h\nu + Ne^{4+}$	Photoionization	8-295 eV	E/T	664
$h\nu + Na$	Photoionization	8-295  eV	$\dot{\mathrm{E/T}}$	664
$h\nu + Mg^+$	Photoionization	8-295  eV	É/T	664

$h\nu + Al^+$	Photoionization	8-295  eV	E/T 664
$\mathbf{h}\nu + \mathbf{Al}^{2+}$	Photoionization	8-295  eV	E/T 664
$\mathbf{h}\nu + \mathbf{Si}^{2+}$	Photoionization	8-295  eV	Е/Т 664
$h\nu + S^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Ar$	Photoionization	8-295  eV	E/T 664
$h\nu + K^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Ca^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Ca^{2+}$	Photoionization	8-295  eV	E/T 664
$h\nu + Sc^+$	Photoionization	8-295  eV	E/T 664
$\mathbf{h}\nu + \mathbf{Sc}^{2+}$	Photoionization	8-295  eV	E/T 664
$h\nu + Ti^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Ti^{3+}$	Photoionization	8-295  eV	E/T 664
$h\nu + V^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Cr^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Mn^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Fe^+$	Photoionization	8-295  eV	E/T 664
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{4+}$	Photoionization	8-295  eV	E/T 664
$h\nu + Co^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Ni^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Zn^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Ga^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Kr$	Photoionization	8-295  eV	E/T 664
$h\nu + Sr^+$	Photoionization	8-295  eV	E/T 664
$\mathbf{h}\nu + \mathbf{I}^+$	Photoionization	8-295  eV	E/T 664
$\mathbf{h}\nu + \mathbf{I}^{2+}$	Photoionization	8-295  eV	E/T 664
$h\nu + Xe$	Photoionization	8-295  eV	E/T 664
$h\nu + Xe^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Xe^{2+}$	Photoionization	8-295  eV	E/T 664
$\mathbf{h}\nu + \mathbf{X}\mathbf{e}^{3+}$	Photoionization	8-295  eV	E/T 664
$\mathbf{h}\nu + \mathbf{X}\mathbf{e}^{4+}$	Photoionization	8-295  eV	E/T 664
$\mathbf{h}\nu + \mathbf{X}\mathbf{e}^{5+}$	Photoionization	8-295  eV	E/T 664
$\mathbf{h}\nu + \mathbf{X}\mathbf{e}^{6+}$	Photoionization	8-295  eV	E/T 664
$h\nu + Cs$	Photoionization	8-295  eV	E/T 664
$h\nu + Cs^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Ba$	Photoionization	8-295  eV	E/T 664
$h\nu + Ba^+$	Photoionization	8-295  eV	E/T 664
$h\nu + Ba^{2+}$	Photoionization	8-295  eV	E/T 664
$h\nu + Ba^{3+}$	Photoionization	8-295  eV	E/T 664
$h\nu + La^+$	Photoionization	8-295  eV	E/T 664
$h\nu + La^{3+}$	Photoionization	8-295  eV	E/T 664
$h\nu + Ce^{4+}$	Photoionization	8-295  eV	E/T 664
$h\nu + Xe^+$	Photoionization	30-140  eV	Th $665$
$h\nu + O^+$	Photoexcitation	$0.1-40   \mathrm{eV}$	Th 666
$h\nu + F^-$	Photodetachment	$0-900   \mathrm{eV}$	Th $667$
$h\nu + H$	Photoionization	$0-900   \mathrm{eV}$	Th $667$
$h\nu + Xe$	Photoionization	320-550  eV	E/T 668
$h\nu + Ag$	Photoexcitation	661  nm	Exp 669
$\mathbf{h}\nu + \mathbf{H}_2$	Photoexcitation	202-355  nm	Exp 670
$h\nu + HD$	Photoexcitation	202-355  nm	Exp 670
$h\nu + D_2$	Photoexcitation	$202\text{-}355~\mathrm{nm}$	Exp 670
$h\nu + Kr^{3+}$	Photoionization	$39\text{-}179~\mathrm{eV}$	Exp 671
$h\nu + Rb$	Photoexcitation	200  eV	Exp 672
$h\nu + Rb$	Photoionization	200  eV	Exp 672
$h\nu + CO$	Photoionization	510-533 $eV$	Exp 673
$h\nu + H^-$	Photoionization	11-250  eV	Th 674
$h\nu + He$	Photoionization	11-250  eV	Th 674
$h\nu + He$	Photoionization	13  eV	Th 675

$h\nu + H_2^+$	Photodissociation	80 nm	$\mathrm{Th}$	676
$h\nu + Au$	Photoionization	5.96  keV	Exp	677
$h\nu + Hg$	Photoionization	5.96  keV	Exp	677
$h\nu + Tl$	Photoionization	$5.96 \mathrm{keV}$	Exp	677
$h\nu + Pb$	Photoionization	5.96  keV	Exp	677
$h\nu + Bi$	Photoionization	5.96  keV	Exp	677
$h\nu + Th$	Photoionization	5.96  keV	Exp	677
$h\nu + U$	Photoionization	5.96  keV	Exp	677
$\mathbf{h}\nu + \mathbf{H}_2$	Photodissociation	25  eV	$\mathrm{Th}$	678
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	25  eV	$\mathrm{Th}$	678
$h\nu + Ar$	Photoionization		$\mathrm{Th}$	679
$\mathbf{h}\nu + \mathbf{H}\mathbf{e}$	Photoionization	3.6-8  MeV/u; 1-100  eV; 2  keV	E/T	680
$h\nu + Ne$	Photoionization	3.6-8  MeV/u; 1-100  eV; 2  keV	E/T	680
$h\nu + Ar$	Photoionization	3.6-8  MeV/u; 1-100  eV; 2  keV	E/T	680
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	3.6-8  MeV/u; 1-100  eV; 2  keV	E/T	680
$\mathbf{h}\nu + \mathbf{D}_2$	Photoionization	3.6-8  MeV/u; 1-100  eV; 2  keV	E/T	680
$h\nu + He^-$	Photodetachment	57-65  eV	$\operatorname{Exp}$	681
$h\nu + Li^-$	Photodetachment	57-65  eV	Exp	681
$h\nu + B^-$	Photodetachment	57-65  eV	$\operatorname{Exp}$	681
$\mathbf{h}\nu + \mathbf{N}^{2+}$	Photoionization	24-100 eV	E/T	682
$h\nu + O^{3+}$	Photoionization	24-100  eV	E/T	682
$h\nu + He^+$	Photoionization	30-40  eV	E/T	683
$h\nu + Ar^+$	Photoionization	30-40  eV	E/T	683
$h\nu + Xe$	Photoionization		Exp	684
$h\nu + CO_2$	Photodissociation	290-292 eV	Exp	685
$h\nu + CO_2$	Photoionization	290-292 eV	Exp	685
$h\nu + NH_3$	Photodissociation	100-400 eV	Exp	686
$h\nu + NH_3$	Photoionization	100-400 eV	Exp	686
$h\nu + Xe$	Photoionization	1.55 eV	Exp	687
$n\nu + He$	Photoionization	(8-79 eV	Exp E/T	088
$n\nu + N$	Photoionization	0.42  eV	Е/ 1 Б/Т	689
$h\nu + 0$	Photoionization	0-42  ev	Ľ/ 1 Тh	600
$h\nu + H_0$	Photoionization	$10^{13} \text{ W}/cm^2$	Th	601
$h\nu + H_{c}$	Photoionization	$2x10^{14} W/cm^2$	Th	602
$h\nu + H_2$ $h\nu + D_2$	Photoionization	$2x10^{-10} W/cm^2$	Th	692
$h\nu + E_2$ $h\nu + Kr$	Photoionization	60-88 eV	Exp	693
$h\nu + NO$	Photodissociation	$5r10^{13} - 6r10^{14} \text{ W/cm}^2$	Exp	694
$h\nu + NO$	Photoionization	$5x10^{13} - 6x10^{14} \text{ W/cm}^2$	Exp	694
$h\nu + He$	Photoionization	80 eV	Th	695
$h\nu + Mn$	Photoionization	10-14 eV	Th	696
$h\nu + Li$	Total Absorption. Scattering	500-3000 K	Th	697
$h\nu + Fe^{7+}$	Photoexcitation	10-70 Ry	$\mathrm{Th}$	698
$h\nu + H$	Photoionization	100-5000 eV	$\mathrm{Th}$	699
$h\nu + He$	Photoionization	100-5000  eV	$\mathrm{Th}$	699
$h\nu + Li$	Photoionization	100-5000  eV	$\mathrm{Th}$	699
$h\nu + Be$	Photoionization	100-5000  eV	$\mathrm{Th}$	699
$h\nu + B$	Photoionization	100-5000  eV	$\mathrm{Th}$	699
$h\nu + C$	Photoionization	100-5000  eV	$\mathrm{Th}$	699
$h\nu + N$	Photoionization	100-5000  eV	$\mathrm{Th}$	699
$h\nu + O$	Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$	699
$h\nu + F$	Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$	699
$h\nu + Ne$	Photoionization	100-5000  eV	$\mathrm{Th}$	699
$h\nu + Na$	Photoionization	100-5000  eV	$\mathrm{Th}$	699
$h\nu + Mg$	Photoionization	100-5000  eV	$\mathrm{Th}$	699
$h\nu + Al$	Photoionization	100-5000  eV	$\mathrm{Th}$	699
$h\nu + Si$	Photoionization	100-5000  eV	$\mathrm{Th}$	699

$h\nu + P$	Photoionization	100-5000  eV	Th $69$
$h\nu + S$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th $69$
$h\nu + Cl$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th $69$
$h\nu + Ar$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th $69$
$h\nu + K$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th $69$
$h\nu + Ca$	Photoionization	100-5000  eV	Th $69$
$h\nu + Sc$	Photoionization	100-5000  eV	Th $69$
$h\nu + Ti$	Photoionization	100-5000  eV	Th $69$
$h\nu + V$	Photoionization	100-5000  eV	Th $69$
$h\nu + Cr$	Photoionization	100-5000  eV	Th $69$
$h\nu + Mn$	Photoionization	100-5000  eV	Th $69$
$h\nu + Fe$	Photoionization	100-5000  eV	Th $69$
$h\nu + Co$	Photoionization	100-5000  eV	Th $69$
$h\nu + Ni$	Photoionization	100-5000  eV	Th $69$
$h\nu + Cu$	Photoionization	100-5000  eV	Th $69$
$h\nu + Zn$	Photoionization	100-5000  eV	Th $69$
$h\nu + Ga$	Photoionization	100-5000  eV	Th $69$
$h\nu + Ge$	Photoionization	100-5000  eV	Th $69$
$h\nu + As$	Photoionization	100-5000  eV	Th 69
$h\nu + Se$	Photoionization	100-5000  eV	Th $69$
$h\nu + Br$	Photoionization	100-5000  eV	Th $69$
$h\nu + Kr$	Photoionization	100-5000  eV	Th 69
$h\nu + Rb$	Photoionization	100-5000  eV	Th 69
$h\nu + Sr$	Photoionization	100-5000  eV	Th $69$
$h\nu + Y$	Photoionization	100-5000  eV	Th 69
$h\nu + Zr$	Photoionization	100-5000  eV	Th $69$
$h\nu + Nb$	Photoionization	100-5000  eV	Th $69$
$h\nu + Mo$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th $69$
$h\nu + Tc$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th $69$
$h\nu + Ru$	Photoionization	100-5000  eV	Th $69$
$h\nu + Rh$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th $69$
$h\nu + Pd$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th 69
$h\nu + Ag$	Photoionization	100-5000  eV	Th 69
$h\nu + Cd$	Photoionization	100-5000  eV	Th $69$
$h\nu + In$	Photoionization	100-5000  eV	Th $69$
$h\nu + Sn$	Photoionization	100-5000  eV	Th $69$
$h\nu + Sb$	Photoionization	100-5000  eV	Th 69
$h\nu + Te$	Photoionization	100-5000  eV	Th $69$
$h\nu + I$	Photoionization	100-5000  eV	Th $69$
$h\nu + Xe$	Photoionization	100-5000  eV	Th $69$
$h\nu + Cl$	Photoexcitation		Th $70$
$h\nu + Cl^+$	Photoexcitation		Th 70
$h\nu + Cl^{2+}$	Photoexcitation		Th $70$
$h\nu + Cl^{3+}$	Photoexcitation		Th $70$
$h\nu + Cl^{4+}$	Photoexcitation		Th $70$
$h\nu + Cl^{5+}$	Photoexcitation		Th $70$
$h\nu + Cl^{6+}$	Photoexcitation		Th $70$
$h\nu + Cl^{\gamma+}$	Photoexcitation		Th $70$
$h\nu + Cl^{8+}$	Photoexcitation		Th 70
$h\nu + Cl^{9+}$	Photoexcitation		Th $70$
$h\nu + Cl^{10+}$	Photoexcitation		Th 70
$h\nu + Cl^{11+}$	Photoexcitation		Th 70
$h\nu + Cl^{12+}$	Photoexcitation		Th 70
$h\nu + Cl^{13+}$	Photoexcitation		Th 70
$h\nu + Cl^{14+}$	Photoexcitation		Th 70
$h\nu + Cl^{15+}$	Photoexcitation		Th $70$
$h\nu + Cl^{16+}$	Photoexcitation		Th 70

$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{10+}$	Photoexcitation	1-75 Ry	Th	701
$h\nu + Ne$	Photoionization	100-5000  eV	Th	702
$h\nu + Xe$	Photoionization	100-5000  eV	Th	702
$h\nu + Ba$	Photoionization	100-5000  eV	Th	702
$h\nu + La$	Photoionization	100-5000  eV	Th	702
$h\nu + Ce$	Photoionization	100-5000  eV	Th	702
$h\nu + Pr$	Photoionization	100-5000  eV	Th	702
$h\nu + Nd$	Photoionization	100-5000  eV	Th	702
$h\nu + Pm$	Photoionization	100-5000  eV	Th	702
$h\nu + Sm$	Photoionization	100-5000  eV	Th	702
$h\nu + Eu$	Photoionization	100-5000  eV	Th	702
$h\nu + Gd$	Photoionization	100-5000  eV	Th	702
$h\nu + Tb$	Photoionization	$100-5000 {\rm ~eV}$	Th	702
$h\nu + Dy$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th	702
$h\nu + Ho$	Photoionization	100-5000  eV	Th	702
$h\nu + Er$	Photoionization	100-5000  eV	Th	702
$h\nu + Tm$	Photoionization	100-5000  eV	Th	702
$h\nu + Yb$	Photoionization	100-5000  eV	Th	702
$h\nu + Lu$	Photoionization	100-5000  eV	Th	702
$h\nu + Hf$	Photoionization	100-5000  eV	Th	702
$h\nu$ + Ta	Photoionization	100-5000  eV	$\mathrm{Th}$	702
$h\nu + W$	Photoionization	100-5000  eV	$\mathrm{Th}$	702
$h\nu + Re$	Photoionization	100-5000  eV	$\mathrm{Th}$	702
$h\nu + Os$	Photoionization	100-5000  eV	Th	702
$h\nu + Ir$	Photoionization	100-5000  eV	Th	702
$h\nu + Pt$	Photoionization	100-5000 eV	Th	702
$h\nu + Au$	Photoionization	100-5000 eV	Th	702
$h\nu + Hg$	Photoionization	100-5000 eV	Th	702
$h\nu + Tl$	Photoionization	100-5000 eV	Th	702
$n\nu + Pb$	Photoionization	100-5000 eV		702
$n\nu + Bi$	Photoionization	100-5000 eV	1 n Th	702
$n\nu + Po$	Photoionization	100-5000 eV	111 Th	702
$\mathbf{n}\mathbf{\nu} + \mathbf{A}\mathbf{t}$	Photoionization	100-5000 eV	тн Тh	702
$h\nu + Rh$	Photoionization	100-5000  eV 100-5000  eV	Th Th	702
$h\nu + Pr$	Photoionization	100-5000 eV	Th	702
$h\nu + Ac$	Photoionization	100-5000 eV	Th	702
$h\nu + Th$	Photoionization	100-5000 eV	Th	702
$h\nu + Pa$	Photoionization	100-5000 eV	Th	702
$h\nu + Iu$ $h\nu + U$	Photoionization	100-5000 eV	Th	702
$h\nu + \Theta$ $h\nu + Pu$	Photoionization	100-5000  eV	Th	702
$h\nu + Am$	Photoionization	100-5000  eV	Th	702
$h\nu + Cm$	Photoionization	100-5000  eV	Th	702
$h\nu + Bk$	Photoionization	$100-5000 {\rm ~eV}$	Th	702
$h\nu + Cf$	Photoionization	$100-5000 {\rm ~eV}$	Th	702
$h\nu + Es$	Photoionization	100-5000  eV	Th	702
$h\nu + Fm$	Photoionization	100-5000  eV	Th	702
$h\nu + Si^{6+}$	Photoexcitation	0-10,000 Ry	Th	703
$h\nu + P^{7+}$	Photoexcitation	0-10,000 Ry	Th	703
$\mathbf{h}\nu + \mathbf{S}^{8+}$	Photoexcitation	$0-10,000 \mathrm{~Ry}$	$\mathrm{Th}$	703
$\mathbf{h}\nu + \mathbf{Cl}^{9+}$	Photoexcitation	$0\text{-}10,000 \mathrm{\ Ry}$	$\mathrm{Th}$	703
$\mathbf{h}\nu + \mathbf{Ar}^{10+}$	Photoexcitation	$0\text{-}10,000 \mathrm{\ Ry}$	$\mathrm{Th}$	703
$\mathbf{h}\nu + \mathbf{K}^{11+}$	Photoexcitation	$0\text{-}10,000 \mathrm{~Ry}$	$\mathrm{Th}$	703
$h\nu + Ca^{12+}$	Photoexcitation	$0\text{-}10,000 \mathrm{~Ry}$	$\mathrm{Th}$	703
$h\nu + Sc^{13+}$	Photoexcitation	$0\text{-}10,000 \mathrm{~Ry}$	$\mathrm{Th}$	703
$h\nu + Ti^{14+}$	Photoexcitation	$0\text{-}10,000 \mathrm{~Ry}$	$\mathrm{Th}$	703
$\mathbf{h} u + \mathbf{V}^{15+}$	Photoexcitation	$0\text{-}10,000 \mathrm{~Ry}$	Th	703

$h\nu + Cr^{16+}$	Photoexcitation	$0-10,000 { m ~Ry}$	Th	703
$\mathbf{h} u + \mathbf{Mn}^{17+}$	Photoexcitation	0-10,000 Ry	Th	703
$h\nu + Fe^{18+}$	Photoexcitation	0-10,000 Ry	Th	703
$h\nu + Co^{19+}$	Photoexcitation	0-10,000 Ry	Th	703
$\mathbf{h} u$ + $\mathbf{Ni}^{20+}$	Photoexcitation	0-10,000 Ry	Th	703
$h\nu + Cu^{21+}$	Photoexcitation	0-10,000 Ry	Th	703
$h\nu + Zn^{22+}$	Photoexcitation	0-10,000 Ry	Th	703
$h\nu + Ga^{23+}$	Photoexcitation	0-10,000 Ry	Th	703
$h\nu + Ge^{24+}$	Photoexcitation	0-10.000 Ry	$\mathrm{Th}$	703
$h\nu + As^{25+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Se^{26+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Br^{27+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Kr^{28+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Rb^{29+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Sr^{30+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Y^{31+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Zr^{32+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Nb^{33+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Mo^{34+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Tc^{35+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Ru^{36+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Rh^{37+}$	Photoexcitation	0-10.000 By	Th '	703
$h\nu + Pd^{38+}$	Photoexcitation	0-10,000 By	Th '	703
$h\nu + Ag^{39+}$	Photoexcitation	0-10,000 Ry	Th '	703
$h\nu + Gd^{40+}$	Photoexcitation	0-10,000 Ry	Th '	703
$h\nu + 0.0$ $h\nu + In^{41+}$	Photoexcitation	0-10,000 Ry	Th '	703
$h\nu + Sn^{42+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Sb^{43+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Te^{44+}$	Photoexcitation	0-10,000 Ry	Th '	703
$h\nu + I^{45+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Xe^{46+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Cs^{47+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Ba^{48+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + La^{49+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Ce^{50+}$	Photoexcitation	0-10.000 Ry	Th	703
$h\nu + Pr^{51+}$	Photoexcitation	0-10.000 By	Th '	703
$h\nu + Nd^{52+}$	Photoexcitation	0-10.000 By	Th '	703
$h\nu + Pm^{53+}$	Photoexcitation	0-10.000 By	Th '	703
$h\nu + Sm^{54+}$	Photoexcitation	0-10.000 By	Th '	703
$h\nu + Eu^{55+}$	Photoexcitation	0-10.000 By	Th '	703
$h\nu + Gd^{56+}$	Photoexcitation	0-10,000 Ry	Th '	703
$h\nu + Tb^{57+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Dv^{58+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Ho^{59+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Er^{60+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Tm^{61+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Yb^{62+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Lu^{63+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Hf^{64+}$	Photoexcitation	0-10.000 Ry	Th '	703
$h\nu + Ta^{65+}$	Photoexcitation	0-10.000 Rv	Th '	703
$h\nu + W^{66+}$	Photoexcitation	0-10.000 Rv	Th '	703
$\mathbf{h}\nu + \mathbf{Re}^{67+}$	Photoexcitation	0-10.000 Rv	Th '	703
$h\nu + Os^{68+}$	Photoexcitation	0-10,000 Rv	Th '	703
$h\nu + Ir^{69+}$	Photoexcitation	0-10,000 Rv	Th '	703
$h\nu + Pt^{70+}$	Photoexcitation	0-10,000 Rv	Th '	703
$h\nu + Au^{71+}$	Photoexcitation	0-10,000 Rv	Th	703
$\mathbf{h}\nu + \mathbf{H}\mathbf{g}^{72+}$	Photoexcitation	0-10,000 Ry	Th	703
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$\mathbf{h} u + \mathbf{Tl}^{73+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$h\nu + Pb^{74+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$\mathbf{h} u$ + $\mathbf{Bi}^{75+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$h\nu + Po^{76+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$\mathbf{h} u$ + $\mathbf{At}^{77+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$\mathbf{h} u$ + $\mathbf{Rn}^{78+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$\mathbf{h} u$ + $\mathbf{Fr}^{79+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$\mathbf{h} u$ + $\mathbf{Ra}^{80+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$\mathbf{h}\nu + \mathbf{A}\mathbf{c}^{81+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$\mathbf{h} u$ + $\mathbf{Th}^{82+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$h\nu + Pa^{81+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$\mathbf{h} u$ + $\mathbf{U}^{82+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$	703
$\mathbf{h} u$ + $\mathbf{Ni}^{20+}$	Photoexcitation	85-425 Ry	$\mathrm{Th}$	704
$\mathbf{h}\nu + \mathbf{N}\mathbf{e}^{2+}$	Photoexcitation	5-45 Ry	$\mathrm{Th}$	705
$h\nu + P^{2+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h} u + \mathbf{S}^{3+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h} u + \mathbf{Cl}^{4+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h} u$ + $\mathbf{A}\mathbf{r}^{5+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h} u$ + $\mathbf{K}^{6+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h} u$ + $\mathbf{Ca}^{7+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h} u + \mathbf{Sc}^{8+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h} u$ + $\mathbf{T}\mathbf{i}^{9+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h} u + \mathbf{V}^{10+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h} u + \mathbf{C}\mathbf{r}^{11+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h}\nu + \mathbf{Mn}^{12+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$h\nu + Fe^{13+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$h\nu + Co^{14+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$\mathbf{h}\nu + \mathbf{Ni}^{15+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$h\nu + Cu^{16+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$h\nu + Zn^{17+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$	706
$h\nu + Ga^{18+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th	706
$h\nu + Ge^{19+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th	706
$h\nu + As^{20+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th	706
$h\nu + Se^{21+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th	706
$h\nu + Br^{22+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th	706
$h\nu + Kr^{23+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th	706
$h\nu + Rb^{2+1}$	Photoexcitation	$10^{-4} - 10^{-6}$	Th	706
$h\nu + Sr^{26+}$	Photoexcitation	$10^{-4} - 10^{-6}$	Th	706
$h\nu + Y^{20+}$	Photoexcitation	$10^{-1} - 10^{\circ}$	Th	706
$h\nu + Zr^{-1}$	Photoexcitation	$10^{-4} - 10^{\circ}$		700
$h\nu + 1Nb^{-2+}$	Photoexcitation	$10^{-4} - 10^{\circ}$		700
$\mathbf{h}\nu + \mathbf{M}0^{-30+}$	Photoexcitation	$10^{-4} - 10^{\circ}$	In Th	700
$n\nu + 1c^{\circ\circ}$	Photoexcitation	$10^{-1} - 10^{\circ}$ $10^{-4} - 10^{\circ}$	In Th	700
$n\nu + Ru^{37+}$	Photoexcitation	$10^{-1} - 10^{\circ}$ $10^{-4} - 10^{\circ}$	In Th	700
$n\nu + Rn^{32+}$	Photoexcitation	$10^{-1} - 10^{\circ}$ $10^{-4} - 10^{\circ}$	In Th	700
$n\nu + Pa^{36+}$	Photoexcitation	$10^{-1} - 10^{\circ}$ $10^{-4} - 10^{\circ}$	In Th	700
$n\nu + Ag^{31+}$	Photoexcitation	$10^{-4} - 10^{\circ}$	In Th	700
$\mathbf{n}\nu + \mathbf{U}\mathbf{a}^{\circ\circ}$	r notoexcitation	$10^{-} - 10^{-}$ $10^{-4} - 10^{0}$	1 fl Th	706
$n\nu + m^{37+}$	r notoexcitation	$10 - 10^{-1}$ $10^{-4} - 10^{0}$	111 Th	706
$h\nu + 5h^{38+}$	Photoexcitation	10 - 10 $10^{-4} 10^{0}$	111 ТЪ	100 706
$n\nu + 50^{-1}$	r notoexcitation Photoexcitation	$10 - 10^{-1}$ $10^{-4} 10^{0}$	111 Th	100 706
$h\nu + Ie$ $h\nu \perp I^{40+}$	Photoexcitation	10 - 10 $10^{-4} - 10^{0}$	тн ТЪ	700 706
$\mathbf{h}\nu \mathbf{+} \mathbf{I}$ $\mathbf{h}\nu \mathbf{+} \mathbf{X} \mathbf{o}^{41+}$	Photoevcitation	$10^{-4} - 10^{0}$	тн Тh	706
$h\nu + Ce^{42+}$	Photoexcitation	$10^{-4} - 10^{0}$	тн Тh	706
$\mathbf{h}\nu + \mathbf{Ba}^{43+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th	706
$h\nu + La^{44+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th	706
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$h\nu + Ce^{45+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$\mathbf{h} u + \mathbf{Pr}^{46+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Nd^{47+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Pm^{48+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Sm^{49+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Eu^{50+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Gd^{51+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Tb^{52+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Dv^{53+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Ho^{54+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Er^{55+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Tm^{56+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Yh^{57+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Lu^{58+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Hf^{59+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 700
$h\nu + Ta^{60+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 700
$h\nu + W^{61+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 700
$h\nu + Re^{62+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 700
$h\nu + \Omega e^{63+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 700
$h\nu + 0s$ $h\mu + Ir^{64+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 700
$\mathbf{h}\nu + \mathbf{n}$ $\mathbf{h}\nu + \mathbf{P} \mathbf{t}^{65+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 700
$h\nu + 10$	Photoexcitation	$10^{-4}$ $10^{0}$	Th 700
$n\nu + Au$	Photoexcitation	10 - 10 $10^{-4} - 10^{0}$	Th 700
$n\nu + ng^{*+}$	Photoexcitation	$10 - 10^{4}$ $10^{-4}$ $10^{0}$	Th 700
$n\nu + 11^{-69+}$	Photoexcitation	$10 - 10^{4}$	Th 700
$n\nu + Pb^{\circ\circ+}$	Photoexcitation	$10^{-4} - 10^{\circ}$	1 n 700 Th 706
$II\nu + DI^{+}$	Photoexcitation	$10 - 10^{4}$	Th 700
$n\nu + P0^{-1}$	Photoexcitation Distance:	$10^{-4} - 10^{-6}$	In (00 Th 700
$n\nu + At^{-2}$	Photoexcitation	$10^{-4} - 10^{\circ}$	In 706
$n\nu + Rn^{74+}$	Photoexcitation	$10^{-4} - 10^{\circ}$	In 706
$\mathbf{h}\nu + \mathbf{Fr}^{++}$	Photoexcitation	$10^{-1} - 10^{\circ}$	Th 706
$h\nu + Ra^{10+}$	Photoexcitation	$10^{-4} - 10^{-6}$	Th 706
$h\nu + Ac^{70+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Th^{\prime\prime+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Pa^{ro+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + U^{19+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Np^{00+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Pu^{\circ 1+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Am^{\circ 2+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Cm^{83+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Bk^{84+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Cf^{s_{0+}}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Es^{86+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Fm^{87+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 706
$h\nu + Cl^{5+}$	Photoexcitation	ned	Th $707$
$h\nu + Fe^{16+}$	Photoexcitation	$58.5-425 \mathrm{~Ry}$	Th $708$
$h\nu + S^{8+}$	Photoexcitation	$25-125 \mathrm{Ry}$	Th $709$
$\mathrm{h} u$ + $\mathrm{Si}^{7+}$	Photoexcitation	20-80 Ry	Th $710$
$h\nu + C^+$	Photoexcitation	0-10	Th $711$
$h\nu + C^{3+}$	Photoexcitation	0-10	Th 711
$\mathbf{h} u$ + $\mathbf{N}^{2+}$	Photoexcitation	0-10	Th 711
$\mathbf{h}\nu + \mathbf{Ar}^{12+}$	Photoexcitation	$10^5 - 10^7 { m K}$	Th 712
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{13+}$	Photoexcitation	$10^{-9} - 10^{0}$	Th 713
$\mathbf{h} u$ + $\mathbf{Ni}^{15+}$	Photoexcitation	$10^{-9} - 10^{0}$	Th 713
$\mathbf{h} u + \mathbf{S}^{9+}$	Photoexcitation	$10^{-5} - 10^{0}$	Th 714
$h\nu + Ta^{45+}$	Photoexcitation	4-600 Ry	Th 715
$\mathbf{h}\nu + \mathbf{Ar}^{11+}$	Photoexcitation	$35\text{-}175 \mathrm{Ry}$	Th 716
$\mathbf{h}\nu + \mathbf{N}\mathbf{e}^{2+}$	Photoexcitation	5.2-25 Ry	Th 717

$\mathbf{h} u + \mathbf{C}\mathbf{a}^{13+}$	Photoexcitation	45-255 Ry	$\mathrm{Th}$	718
$\mathbf{h} u + \mathbf{N}\mathbf{d}^{32+}$	Photoexcitation	5-20,000  eV	$\mathrm{Th}$	719
$h\nu + Sm^{34+}$	Photoexcitation	5-20,000  eV	$\mathrm{Th}$	719
$\mathbf{h} u + \mathbf{E}\mathbf{u}^{35+}$	Photoexcitation	5-20,000  eV	$\mathrm{Th}$	719
$\mathbf{h} u$ + $\mathbf{Gd}^{36+}$	Photoexcitation	5-20,000  eV	$\mathrm{Th}$	719
$h\nu + Ta^{45+}$	Photoexcitation	5-20,000  eV	$\mathrm{Th}$	719
$\mathbf{h} u$ + $\mathbf{W}^{46+}$	Photoexcitation	5-20,000  eV	$\mathrm{Th}$	719
$\mathbf{h} u$ + $\mathbf{Mg}^{4+}$	Photoexcitation	10-50 Ry	$\mathrm{Th}$	720
$\mathbf{h} u$ + $\mathbf{N}^{3+}$	Photoexcitation	$10^{-2} - 10^{-1}$	$\mathrm{Th}$	721
$h\nu + O^{4+}$	Photoexcitation	$10^{-2} - 10^{-1}$	$\mathrm{Th}$	721
$\mathbf{h} u + \mathbf{F}^{5+}$	Photoexcitation	$10^{-2} - 10^{-1}$	$\mathrm{Th}$	721
$\mathbf{h} u$ + $\mathbf{Ne}^{6+}$	Photoexcitation	$10^{-2} - 10^{-1}$	$\mathrm{Th}$	721
$\mathbf{h} u + \mathbf{Co}^{16+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$	722
$h\nu + Ni^{17+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$	722
$h\nu + Cu^{18+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$	722
$\mathbf{h} u + \mathbf{Zn}^{19+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$	722
$\mathrm{h} u$ + $\mathrm{Ga}^{20+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$	722
$\mathbf{h} u$ + $\mathbf{G}\mathbf{e}^{21+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$	722
$h\nu + As^{22+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$	722
$\mathbf{h} u + \mathbf{S}\mathbf{e}^{23+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$	722
$\mathbf{h} u$ + $\mathbf{Br}^{24+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$	722
$\mathbf{h} u + \mathbf{K}\mathbf{r}^{25+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$	722
$h\nu + H$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + He$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + Li$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + Be$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + B$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + C$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + N$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + O$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + F$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + Ne$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + Na$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + Mg$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + Al$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + Si$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + P$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + S$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + Cl$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + Ar$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + K$	Photoionization	1-10  keV	$\mathrm{Th}$	723
$h\nu + Ca$	Photoionization	1-10  keV	Th	723
$h\nu + Sc$	Photoionization	1-10 keV	Th	723
$h\nu + Ti$	Photoionization	1-10 keV	Th	723
$h\nu + V$	Photoionization	1-10 keV	Th	723
$h\nu + Cr$	Photoionization	1-10 keV	Th	723
$h\nu + Mn$	Photoionization	1-10  keV	Th	723
$h\nu + Fe$	Photoionization	1-10 keV	Th	723
$h\nu + Co$	Photoionization	1-10 keV	Th	723
$h\nu + Ni$	Photoionization	1-10 keV	Th	723
$h\nu + Cu$	Photoionization	1-10 keV	Th	723
$h\nu + Zn$	Photoionization	1-10 keV	Th	723
$h\nu + Ga$	Photoionization	1-10 keV	Th	723
$h\nu + Ge$	Photoionization	1-10 keV	Th	723
$h\nu + As$	Photoionization	1-10 keV	Th	723
$h\nu + Se$	Photoionization	1-10 keV	Th	723
$h\nu + Br$	Photoionization	1-10  keV	$\mathrm{Th}$	723

$h\nu$ +	- Kr	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu +$	- Rb	Photoionization	1-10 keV	Th	723
$h\nu +$	- Sr	Photoionization	1-10 keV	Th	723
$h\nu$ +	- Y	Photoionization	1-10 keV	Th	723
$h\nu +$	- Zr	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Nb	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Mo	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Tc	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Ru	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Rh	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Pd	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Ag	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Cd	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- In	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Sn	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Sb	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Te	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	· I	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Xe	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Cs	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Ba	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- La	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Ce	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Pr	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Nd	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Pm	Photoionization	1-10 keV	Th	723
$h\nu$ +	- Sm	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Eu	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	· Gd	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Tb	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Dy	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Ho	Photoionization	1-10 keV	$\mathrm{Th}$	723
$h\nu$ +	- Er	Photoionization	1-10 keV	Th	723
$h\nu +$	- Tm	Photoionization	1-10 keV	Th	723
$h\nu +$	· Yb	Photoionization	1-10 keV	Th	723
$h\nu +$	- Lu	Photoionization	1-10 keV	Th	723
$h\nu +$	• Hf	Photoionization	1-10 keV	Th	723
$h\nu +$	- 'I'a	Photoionization	1-10 keV	Th	723
$h\nu +$	- W	Photoionization	1-10 keV	Th	723
$n\nu +$	- Re	Photoionization	1-10 keV	Th	723
$n\nu +$	- Us	Photoionization	1-10 KeV	In	723
$n\nu + h\nu + h\nu$	- Ir D+	Photoionization	1-10 KeV	1 n Th	(23
$n\nu + b\nu + b$	- Pt	Photoionization	1-10 KeV	1 fi Th	123
$n\nu + h\nu +$	- Au Ug	Photoionization	1-10 KeV	111 Th	120
$\mathbf{n}\nu + \mathbf{h}\nu + \mathbf{h}\nu$	- ng	Photoionization	1-10 KeV	111 Th	120
$\mathbf{n}\nu + \mathbf{h}\nu + \mathbf{h}\nu$	- II Dh	Photoionization	1 - 10  keV	111 Th	120
$\mathbf{n}\nu + \mathbf{h}\nu + \mathbf{h}\nu$	- FD B:	Photoionization	1 - 10  keV	111 Th	120
$\mathbf{h}\nu + \mathbf{h}\nu$	- DI	Photoionization	1 10  keV	111 Th	723
$\mathbf{h}\nu + \mathbf{h}\nu \perp$	- Δt	Photoionization	1-10 keV	Th	140 792
$\mathbf{h}\nu \perp$	- Rn	Photoionization	1-10 keV	Th	140 792
$\mathbf{h}\nu \perp$	- Fr	Photoionization	1-10 keV	Th	120 792
$\mathbf{h}\nu \perp$	- Ra	Photoionization	1-10 keV	Th	723
$h\nu \perp$	- Ac	Photoionization	1-10 keV	Th	723
$h\nu$ +	- Pa	Photoionization	1-10 keV	Th	723
$h\nu$ +	- U	Photoionization	1-10 keV	Th	723
$h\nu$ +	- Np	Photoionization	1-10 keV	Th	723
	1				

$ \begin{split} \mathbf{h} \mathbf{\nu} + \mathbf{Am} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Bk} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Cf} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Cf} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Fm} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Ar}^{10+} & \text{Photoexcitation} & 30-150 \text{ Ry} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{La}^{29+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Mg} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Mg}^{+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Mg}^{+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Al}^{1+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Al}^{1+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Al}^{1+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Si}^{1+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Si}^{1+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Si}^{2+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Si}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{Si}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{P}^{2+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{P}^{2+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ \mathbf{h} \mathbf{\nu} + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0$	Th 723	1-10  keV	Photoionization	$h\nu + Pu$
$ \begin{split} & \mathbf{h} \nu + \mathbf{Cn} & \mathbf{Photoionization} & 1-10 \ \text{keV} & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Bk} & \mathbf{Photoionization} & 1-10 \ \text{keV} & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Cf} & \mathbf{Photoionization} & 1-10 \ \text{keV} & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Es} & \mathbf{Photoionization} & 1-10 \ \text{keV} & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Ar}^{10+} & \mathbf{Photoionization} & 1-10 \ \text{keV} & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Ar}^{10+} & \mathbf{Photoionization} & 10-10 \ \text{keV} & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Ar}^{10+} & \mathbf{Photoionization} & 10-10 \ \text{keV} & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Ar}^{10+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Mg} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Mg} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{AI} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{AI}^{1+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Si} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Si}^{1+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Si}^{1+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Si}^{1+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{Si}^{1+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{P}^{1+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{P}^{2+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{P}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{P}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{S}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{S}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{S}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{S}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{S}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{S}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{S}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{S}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & \mathbf{Th} \\ & \mathbf{h} \nu + \mathbf{S}^{3+} & \mathbf{Photoexcitation} & 10^{-4} - 10^9 & T$	Th 723	1-10  keV	Photoionization	$h\nu + Ar$
$ \begin{split} & \mathbf{h} \nu + \mathbf{Bk} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ & \mathbf{h} \nu + \mathbf{Cf} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ & \mathbf{h} \nu + \mathbf{Fm} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ & \mathbf{h} \nu + \mathbf{Fm} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ & \mathbf{h} \nu + \mathbf{La}^{29+} & \text{Photoexcitation} & 30-150 \text{ Ry} & \text{Th} \\ & \mathbf{h} \nu + \mathbf{La}^{29+} & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{Mg} & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{Mg}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{Mg}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{A1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{A1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{A1}^{2+} & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{P1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{P2}^{+} & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{P2}^{+} & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{P3}^{+} & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & \text{Photoexcitation} & 10^{-4} - 10^9 & \text{Th} \\ & \mathbf{h} \nu + \mathbf{S1}^* & Phot$	Th 723	1-10  keV	Photoionization	$h\nu + Cn$
$ \begin{split} & h\nu + \mathbf{Cf} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ & h\nu + \mathbf{Fm} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ & h\nu + \mathbf{Ar}^{10+} & \text{Photoionization} & 1-10 \text{ keV} & \text{Th} \\ & h\nu + \mathbf{Ar}^{10+} & \text{Photoexcitation} & 30-150 \text{ Ry} & \text{Th} \\ & h\nu + \mathbf{Ma}^{20+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{Mg} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{Mg}^{4} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{AI}^{1} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{AI}^{1+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{AI}^{1+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{Si} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{Si}^{1+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{Si}^{2+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{Si}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{Si}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{Si}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{P}^{2+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{P}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{P}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{X}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^{0} & \text{Th} \\ & h\nu + \mathbf{X}^{3+} & \text{Photoexcitation} & 10^{-4} -$	Th 723	1-10  keV	Photoionization	$h\nu + Bk$
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Th 723	1-10  keV	Photoionization	$h\nu + Cf$
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Th 723	1-10  keV	Photoionization	$h\nu + Es$
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Th 723	1-10  keV	Photoionization	$h\nu + Fn$
$\begin{array}{lll} h\nu + \ln^{29+} & \mbox{Photoexcitation} & 10-10,000 \ eV & Th \\ h\nu + Na & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + Mg & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + Alg & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + Al^1 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + Al^2 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + Si & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + Si^3 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + Si^3 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + Si^3 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + Si^3 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + P & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + P^3 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + P^3 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + P^3 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + P^3 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + P^3 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + S^4 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + S^4 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + S^3 & \mbox{Photoexcitation} & 10^{-4} - 10^0 & Th \\ h\nu + S^4 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + S^4 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + S^4 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + S^4 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + S^4 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + Cl^4 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + Cl^4 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + Cl^4 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + Cl^4 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + Ar^3 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + Ar^3 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + Ar^3 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + Ar^3 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + Ar^3 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + Ar^3 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + K^4 & \mbotoexcitation & 10^{-4} - 10^0 & Th \\ h\nu + K^4 & \mbotoexcitation & $	Th 724	30-150 Ry	<sup>10+</sup> Photoexcitation	$h\nu + Ar$
$ \begin{split} & h\nu + Na & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Mg & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Al & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Al^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Al^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Al^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Si & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Si^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Si^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Si^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Si^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + P^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + P^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + P^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + P^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + S^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + A^{-1} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + A^{-1} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Ar^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Ar^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Ar^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Ar^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Ar^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Ar^{+} & Photoexcitation & 10^{-4} - 10^{0} & Th \\ & h\nu + Ar^{+} & Photoexcitation & 10^{-4} - 10^$	V Th 725	10-10,000 e	<sup>9+</sup> Photoexcitation	$h\nu + La$
$ \begin{split} & h\nu + Mg & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Mg^+ & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Al & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Al^{2+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si^{2+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{2+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{-1} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + K^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + K^{3+} & Photoexcitation &$	Th 726	$10^{-4} - 10^{0}$	Photoexcitation	$h\nu + Na$
$ \begin{split} & h\nu + Mg^+ & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Al & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Al^{1+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Al^{2+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^+ & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^+ & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl + & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{4+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + K^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + K^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + K^{3+} & Photoexcitation$	Th 726	$10^{-4} - 10^{0}$	Photoexcitation	$h\nu + Mg$
$h\nu + AI$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + AI^+$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + AI^+$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + Si$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + Si^{2+}$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + Si^{3+}$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + Si^{3+}$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + P$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + P^{2+}$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + P^{3+}$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + S^{3}$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + S^{3+}$ Photoexcitation $10^{-4} - 10^0$ Th	Th 726	$10^{-4} - 10^{0}$	+ Photoexcitation	$h\nu + Mg$
$ \begin{split} & h\nu + Al^+ & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Al^{2+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si^+ & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Si^{2+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^+ & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + P^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + S^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{2+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Cl^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{-} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{-} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{-+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{++} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{++} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{++} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{++} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{++} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + Ar^{++} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + K^{++} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + K^{++} & Photoexcitation & 10^{-4} - 10^0 & Th \\ & h\nu + K^{++} & Photoexcitation $	Th 726	$10^{-4} - 10^{0}$	Photoexcitation	$h\nu + Al$
$ \begin{split} & h\nu + Al^{2+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Si & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Si^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Si^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Si^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + P^+ & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + P^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + P^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + P^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + S^3 & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + S^4 & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + S^2 & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + S^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + S^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + S^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + S^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + S^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Cl^{1+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Cl^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Cl^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Cl^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Cl^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Ar^{2+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Ar^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Ar^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Ar^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Ar^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Ar^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + Ar^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + K^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + K^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + K^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + K^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & T$	Th 726	$10^{-4} - 10^{0}$	Photoexcitation	$h\nu + Al$
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$\begin{array}{lll} h\nu + {\bf Si}^{2+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Si}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf P} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf P}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf P}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf P}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf S} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf S} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf S}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf S}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf S}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf S}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf S}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf S}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf S}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf S}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Cl} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Cl}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Cl}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Cl}^{5+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Cl}^{5+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Ar}^{+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Ar}^{+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Ar}^{5+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Ar}^{5+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Ar}^{5+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf Ar}^{5+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf K}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf K}^{3+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf K}^{5+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ h\nu + {\bf K}^{5+} & {\rm Photoexcitation} & 10^{-4} - 10^0 & {\rm Th} \\ $	Th $726$	$10^{-4} - 10^{0}$	Photoexcitation	$h\nu + Si^{+}$
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Th 726	$10^{-4} - 10^{0}$	+ Photoexcitation	$h\nu + Si^2$
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$\begin{array}{llllllllllllllllllllllllllllllllllll$	Th 726	$10^{-4} - 10^{0}$	- Photoexcitation	$\mathbf{h}\nu + \mathbf{P}^2$
$ \begin{split} & h\nu + \mathbf{P}^{4+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S}^{+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S}^{2+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Cl} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Cl}^{+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Cl}^{+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Cl}^{+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Cl}^{+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Cl}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Cl}^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Cl}^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Ar}^{+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Ar}^{+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Ar}^{+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Ar}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Ar}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Ar}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Ar}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{Ar}^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{++} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{++} & Photoex$	Th 726	$10^{-4} - 10^{0}$	- Photoexcitation	$h\nu + P^3$
$ \begin{split} & h\nu + \mathbf{S} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S}^+ & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S}^{2+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{S}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{C} \mathbf{I} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{C} \mathbf{I}^+ & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{C} \mathbf{I}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{C} \mathbf{I}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{C} \mathbf{I}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{C} \mathbf{I}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{C} \mathbf{I}^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{A} \mathbf{r}^{4+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{A} \mathbf{r}^{4+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{A} \mathbf{r}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{A} \mathbf{r}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{A} \mathbf{r}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{A} \mathbf{r}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{A} \mathbf{r}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{A} \mathbf{r}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{A} \mathbf{r}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{3+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{5+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{6+} & \text{Photoexcitation} & 10^{-4} - 10^0 & \text{Th} \\ & h\nu + \mathbf{K}^{6+} & Photoe$	Th 726	$10^{-4} - 10^{0}$	Photoexcitation	$\mathbf{h}\nu + \mathbf{P}^4$
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$\begin{array}{llllllllllllllllllllllllllllllllllll$	Th 726	$10^{-4} - 10^{0}$	Photoexcitation	$h\nu + S^+$
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Th 726	$10^{-4} - 10^{0}$	Photoexcitation	$h\nu + S^2$
$ \begin{aligned} \mathbf{h}\nu + \mathbf{S}^{4+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{S}^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Cl} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Cl}^{+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Cl}^{2+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Cl}^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Cl}^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Cl}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Ar}^{7+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Ar}^{2+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Ar}^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Ar}^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Ar}^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Ar}^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Ar}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Ar}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{Ar}^{7+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{3+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{5+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0 & Th \\ \mathbf{h}\nu + \mathbf{K}^{6+} & Photoexcitation & 10^{-4} - 10^0$	Th 726	$10^{-4} - 10^{0}$	Photoexcitation	$h\nu + S^3$
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$h\nu + Ar^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + Ar^{4+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + Ar^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + Ar^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + Ar^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{2+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	Th 726	$10^{-4} - 10^{-4}$	Photoexcitation	$h\nu + Ar$
$h\nu + Ar^{++}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + Ar^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + Ar^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + Ar^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{2+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	1 h (20 Th 796	$10^{-4} - 10^{-4}$	Photoexcitation	$n\nu + Ar$
$h\nu + Ar^{++}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + Ar^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + Ar^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{2+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	1 h (20 Th 796	$10^{-4} - 10^{-4}$	Photoexcitation	$n\nu + Ar$
$h\nu + Ar^{2+}$ Photoexcitation $10^{-2} - 10^{2}$ Th $h\nu + Ar^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{2+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	1 fn (20 Th 796	$10^{-4} - 10^{-4}$	Photoexcitation	$n\nu + Ar$
$h\nu + K^{+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{2+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	Th 726	$10^{-4} - 10^{-4}$	Thotoexcitation	$n\nu + Ar$
$h\nu + K^{+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{2+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{4+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	Th 726	$10^{-4} - 10^{-4}$	Photoexcitation	$\mathbf{n}\nu + \mathbf{A}\mathbf{r}$ $\mathbf{h}\nu + \mathbf{K}^{+}$
$h\nu + K^{4+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{4+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	$\begin{array}{ccc} 111 & 720 \\ Th & 726 \end{array}$	$10 - 10^{4}$ $10^{-4}$ 10 <sup>6</sup>	- Photoexcitation	$\mathbf{h}\nu + \mathbf{K}^2$
$h\nu + K$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{6+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	111 (20 Th 796	$10^{-2} - 10^{\circ}$ $10^{-4} - 10^{\circ}$	F HOLOEXCITATION - Destocycitation	$\mathbf{n}\nu + \mathbf{n}^2$ $\mathbf{h}\nu \perp \mathbf{k}^3$
$h\nu + K$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	111 (20 Th 796	$10 - 10^{-1}$	F HOLOEXCITATION - Destocycitation	$\mathbf{n}\nu + \mathbf{n}^\circ$ $\mathbf{h}\nu \perp \mathbf{V}^4$
$h\nu + K^6 +$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^0$ Th $h\nu + K^{7+}$ Photoexcitation $10^{-4} - 10^0$ Th	Th 726	$10 - 10^{-4}$	+ Photoeveitation	$\mathbf{h}\nu + \mathbf{K}^5$
$ \mathbf{h}\nu + \mathbf{K}^{7+} $ Photoexcitation $10^{-4} - 10^{0}$ Th	Th 726	$10^{-4} - 10^{-10}$	+ Photoevcitation	$\mathbf{h}_{\nu} \perp \mathbf{K}^{6}$
	Th 720	$10^{-4} - 10^{-10}$	+ Photoexcitation	$\mathbf{h}_{\nu} + \mathbf{K}^{7}$
$h\nu + K^{s+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	$\frac{11}{\text{Th}} = \frac{720}{796}$	$10^{-4} - 10^{-10}$	+ Photoexcitation	$h\nu + K^8$
$h\nu + Ca^{2+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	Th 726	$10^{-4} - 10^{-10}$	Photoexcitation	$h\nu + C_{P}$
$h\nu + Ca^{3+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	Th 726	$10^{-4} - 10^{0}$	<sup>3+</sup> Photoexcitation	$h\nu + Ca$
$h\nu + Ca^{4+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	Th 726	$10^{-4} - 10^{0}$	<sup>1+</sup> Photoexcitation	$h\nu + Ca$
$h\nu + Ca^{5+}$ Photoexcitation $10^{-4} - 10^{0}$ Th	Th 726	$10^{-4} - 10^{0}$	5+ Photoexcitation	$h\nu + Ca$

$h\nu + Ca^{6+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Ca^{7+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Ca^{8+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Ca^{9+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Sc^{3+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Sc^{4+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Sc^{5+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$\mathbf{h}\nu + \mathbf{Sc}^{6+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Sc^{7+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Sc^{8+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Sc^{9+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$\mathbf{h}\nu + \mathbf{Sc}^{10+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Ti^{4+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Ti^{5+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Ti^{6+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Ti^{7+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Ti^{8+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Ti^{9+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$\mathbf{h}\nu + \mathbf{Ti}^{10+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Ti^{11+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$\mathbf{h}\nu + \mathbf{V}^{5+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$\mathbf{h}\nu + \mathbf{V}^{6+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + V^{7+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + V^{8+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + V^{9+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$\mathbf{h}\nu + \mathbf{V}^{10+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + V^{11+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$\mathbf{h}\nu + \mathbf{V}^{12+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Cr^{6+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Cr^{7+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Cr^{8+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Cr^{9+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$\mathbf{h}\nu + \mathbf{Cr}^{10+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$\mathbf{h}\nu + \mathbf{C}\mathbf{r}^{11+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Cr^{12+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Cr^{13+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Mn^{7+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Mn^{8+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Mn^{9+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$\mathbf{h}\nu + \mathbf{Mn}^{10+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Mn^{11+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Mn^{12+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$\mathbf{h}\nu + \mathbf{Mn}^{13+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Mn^{14+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Fe^{8+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Fe^{9+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{10+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$h\nu + Fe^{11+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th $726$
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{12+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Fe^{13+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{14+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Fe^{15+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th 726
$h\nu + Mg^{5+}$	Photoexcitation	12-60 Ry	Th $727$
$h\nu + Ti^{5+}$	Photoexcitation	$10^{-3} - 10^{0}$	Th 728
$h\nu + He$	Elastic Scattering	1-20,000  keV	Th 729
$h\nu + He^+$	Elastic Scattering	1-20,000  keV	Th 729
$h\nu + C$	Elastic Scattering	1-20,000  keV	Th 729

$h\nu + C^+$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{C}^{2+}$	Elastic Scattering	1-20,000  keV	Th	729
$\mathbf{h} u + \mathbf{C}^{3+}$	Elastic Scattering	1-20,000  keV	Th	729
$\mathbf{h} u + \mathbf{C}^{4+}$	Elastic Scattering	1-20,000  keV	Th	729
$\mathbf{h} u + \mathbf{C}^{5+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + N$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{N}^+$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{N}^{2+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{N}^{3+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + N^{4+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{N}^{5+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + O$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + O^+$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{O}^{2+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h u + O^{3+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + O^{4+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{O}^{5+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{O}^{6+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{O}^{7+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ne$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ne^+$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ne^{2+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ne^{3+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ne^{4+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ne^{5+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h}\nu + \mathbf{N}\mathbf{e}^{6+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{N}\mathbf{e}^{7+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h}\nu + \mathbf{N}\mathbf{e}^{8+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h}\nu + \mathbf{N}\mathbf{e}^{9+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Mg$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{Mg}^+$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{M}\mathbf{g}^{2+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{M}\mathbf{g}^{3+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{M}\mathbf{g}^{4+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{Mg}^{5+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{M}\mathbf{g}^{6+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{M}\mathbf{g}^{7+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{M}\mathbf{g}^{8+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{Mg}^{9+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u$ + $\mathbf{M}\mathbf{g}^{10+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Si$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{Si}^+$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{Si}^{2+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Si^{3+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Si^{4+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Si^{5+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Si^{6+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Si^{7+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Si^{8+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Si^{9+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h}\nu + \mathbf{Si}^{10+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + S$	Elastic Scattering	1-20,000 keV	Th	729
$h\nu + S^+$	Elastic Scattering	1-20,000  keV	Th	729
$h\nu + S^{2+}$	Elastic Scattering	1-20,000  keV	Th	729
$h\nu + S^{3+}$	Elastic Scattering	1-20,000  keV	Th	729
$h\nu + S^{4+}$	Elastic Scattering	1-20,000  keV	Th	729
$h u + S^{5+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729

$\mathbf{h} u + \mathbf{S}^{6+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + S^{7+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + S^{8+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h}\nu + \mathbf{S}^{9+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h} u + \mathbf{S}^{10+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ar$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ar^+$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$\mathbf{h}\nu + \mathbf{A}\mathbf{r}^{2+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ar^{3+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ar^{4+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ar^{5+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ar^{6+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ar^{7+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ar^{8+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Ar^{9+}$	Elastic Scattering	1-20.000  keV	$\mathrm{Th}$	729
$h\nu + Ar^{10+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Fe$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Fe^+$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$	729
$h\nu + Fe^{2+}$	Elastic Scattering	1-20.000  keV	$\mathrm{Th}$	729
$h\nu + Fe^{3+}$	Elastic Scattering	1-20.000  keV	$\mathrm{Th}$	729
$h\nu + Fe^{4+}$	Elastic Scattering	1-20,000  keV	Th	729
$h\nu + Fe^{5+}$	Elastic Scattering	1-20.000  keV	Th	729
$h\nu + Fe^{6+}$	Elastic Scattering	1-20,000  keV	Th	729
$h\nu + Fe^{7+}$	Elastic Scattering	1-20,000  keV	Th	729
$h\nu + Fe^{8+}$	Elastic Scattering	1-20,000  keV	Th	729
$h\nu + Fe^{9+}$	Elastic Scattering	1-20,000  keV	Th	729
$h\nu + Fe^{10+}$	Elastic Scattering	1-20.000  keV	$\mathrm{Th}$	729
$h\nu + Au^{47+}$	Photoexcitation	5-40.000  eV	$\mathrm{Th}$	730
$h\nu + Au^{48+}$	Photoexcitation	5-40.000  eV	$\mathrm{Th}$	730
$h\nu + Au^{49+}$	Photoexcitation	5-40,000  eV	$\mathrm{Th}$	730
$h\nu + Au^{50+}$	Photoexcitation	5-40,000  eV	$\mathrm{Th}$	730
$h\nu + Au^{51+}$	Photoexcitation	5-40,000  eV	$\mathrm{Th}$	730
$h\nu + Au^{52+}$	Photoexcitation	5-40,000  eV	$\mathrm{Th}$	730
$h\nu + Si^{10+}$	Photoexcitation	$35-175 \mathrm{Rv}$	$\mathrm{Th}$	731
$h\nu + Mg^{4+}$	Photoexcitation	$10^{-7} - 10^{0}$	$\mathrm{Th}$	732
$h\nu + Fe^{14+}$	Photoexcitation	$10^{-15} - 10^{0}$	$\mathrm{Th}$	733
$h\nu + Co^{15+}$	Photoexcitation	$10^{-15} - 10^{0}$	$\mathrm{Th}$	733
$h\nu + Ni^{16+}$	Photoexcitation	$10^{-15} - 10^{0}$	$\mathrm{Th}$	733
$h\nu + Mg^{8+}$	Photoexcitation	25-125 Ry	$\mathrm{Th}$	734
$\mathbf{n}\mathbf{h}\mathbf{v} + \mathbf{O}_2$	Photodissociation	550-1800 nm	Exp	396
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{O}_2$	Photoionization	550-1800 nm	Exp	396
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{N}\mathbf{e}$	Photoionization	800 nm	Exp	397
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{A}\mathbf{r}$	Photoionization	800 nm	Exp	397
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{H}_2$	Photodissociation	266 nm	Th	405
$\mathbf{n}\mathbf{h}\nu + \mathbf{H}_2^+$	Photodissociation	266 nm	$\mathrm{Th}$	405
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{H}\mathbf{e}$	Photoionization	390 nm	$\mathrm{Th}$	413
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{H}$	Photoionization	6.5-22  eV	$\mathrm{Th}$	418
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{H}\mathbf{e}$	Photoionization	6.5-22  eV	$\mathrm{Th}$	418
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{H}\mathbf{e}$	Photoionization	810 nm	E/T	448
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{H}$	Photoionization	$1.93  \mathrm{eV}$	$\mathrm{Th}$	449
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{X}\mathbf{e}$	Photoionization	$1.93  \mathrm{eV}$	$\mathrm{Th}$	449
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{H}\mathbf{e}$	Photoionization	11.2-49.50  eV	$\mathrm{Th}$	450
$\mathbf{n}\mathbf{h} u + \mathbf{H}\mathbf{e}^*$	Photoionization	11.2-49.50  eV	$\mathrm{Th}$	450
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{H}\mathbf{e}$	Photoionization	2-30 eV	$\mathrm{Th}$	451
$\mathbf{n}\mathbf{h} u + \mathbf{H}_2$	Photoionization	2-30 eV	$\mathrm{Th}$	451
$\mathbf{n}\mathbf{h} u + \mathbf{H}^{-}$	Photodetachment	$0.0043$ - $0.0253 \omega(a.u.)$	E/T	648
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{F}^{-}$	Photodetachment	0.0043-0.0253 $\omega(a.u.)$	$\dot{E/T}$	648

$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{H}$	Photoionization	$0.675 \ \omega(a.\mathrm{u.})$	$\mathrm{Th}$	649
$2h\nu + He$	Photoionization	$91.6 \mathrm{~eV}$	$\mathrm{Th}$	496
$2h\nu + H$	Photoionization	243  nm	E/T	644
$h\nu + Cl Z = ?-?$	Photoexcitation		$\mathrm{Th}$	700

## 2.2.2 Electron Collisions

$\mathbf{h} u + \mathbf{Si}^{6+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathrm{h} u$ + $\mathrm{P}^{7+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u + \mathbf{S}^{8+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Cl^{9+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u + \mathbf{Ar}^{10+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u$ + $\mathbf{K}^{11+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathrm{h} u$ + $\mathrm{Ca}^{12+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Sc^{13+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u$ + $\mathbf{Ti}^{14+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u + \mathbf{V}^{15+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u$ + $\mathbf{Cr}^{16+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u + \mathbf{Mn}^{17+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Fe^{18+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u + \mathbf{Co}^{19+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u$ + $\mathbf{Ni}^{20+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u + \mathbf{C}\mathbf{u}^{21+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathrm{h} u$ + $\mathrm{Zn}^{22+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathrm{h} u$ + $\mathrm{Ga}^{23+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u$ + $\mathbf{G}\mathbf{e}^{24+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u + \mathbf{As}^{25+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u + \mathbf{S}\mathbf{e}^{26+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u + \mathbf{Br}^{27+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h} u + \mathbf{K}\mathbf{r}^{28+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Rb^{29+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Sr^{30+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Y^{31+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Zr^{32+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Nb^{33+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Mo^{34+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Tc^{35+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Ru^{36+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Rh^{37+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Pd^{38+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Ag^{39+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Cd^{40+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + In^{41+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Sn^{42+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Sb^{43+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Te^{44+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + I^{45+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Xe^{46+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Cs^{47+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Ba^{48+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + La^{49+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Ce^{50+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Pr^{51+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Nd^{52+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Pm^{53+}$	Excitation	0-10,000 Ry	Th	1027
$h\nu + Sm^{54+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027

$\mathbf{h}\nu + \mathbf{E}\mathbf{u}^{55+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{Gd}^{56+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Tb^{57+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Dy^{58+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Ho^{59+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{Er}^{60+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Tm^{61+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{Y}\mathbf{b}^{62+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{L}\mathbf{u}^{63+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{H}\mathbf{f}^{64+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Ta^{65+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{W}^{66+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{Re}^{67+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Os^{68+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{Ir}^{69+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{Pt}^{70+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Au^{71+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Hg^{72+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{Tl}^{73+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Pb^{74+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Bi^{75+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Po^{76+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + At^{77+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$h\nu + Rn^{78+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{Fr}^{79+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{Ra}^{80+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$	1027
$\mathbf{h}\nu + \mathbf{A}\mathbf{c}^{81+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Th^{82+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + Pa^{81+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$h\nu + U^{82+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$	1027
$e + U^{89+}$	Angular Scattering	$2.18-218 { m MeV/u}$	Th	735
$e + U^{91+}$	Angular Scattering	$2.18-218 { m MeV/u}$	Th	735
$e + U^{89+}$	Recombination	2.18-218 MeV/u	Th	735
$e + U^{91+}$	Recombination	2.18-218 MeV/u	Th F (Th	735
e + Zn	Angular Scattering	15-60 eV	E/T	736
e + Zn	Excitation	15-60  eV	E/T	736
$\mathbf{e} + \mathbf{H}\mathbf{e}_2^+$	Dissociation	$10^{-4} - 50 \text{ eV}$	Exp	737
$\mathbf{e} + \mathbf{H}\mathbf{e}_2^+$	Recombination	$10^{-4} - 50 \text{ eV}$	Exp	737
$\mathbf{e} + \mathbf{H} \mathbf{e}_2^{\top}$	Excitation	$10^{-4} - 50 \text{ eV}$	Exp	737
e + Ne	Excitation	2500 eV	E/T	738
$\mathbf{e} + \mathbf{H}_2^+$	Excitation	10-250 eV	Th	739
$\mathbf{e} + \mathbf{H}_2$	Ionization	10-250 eV	Th	739
e + OCS	Elastic Scattering	0-2 eV	Th	740
$\mathbf{e} + \mathbf{N}_2$	Ionization	35.0-400 eV		741
e + fe'		0-10  Ky		742
$e + H_3'$	Dissociation	$10^{-3} - 10 \text{ eV}$	1 fi Th	743
$\mathbf{e} + \mathbf{n}_2 \mathbf{D}^+$	Dissociation	$10^{-3} - 10 \text{ eV}$	1 II Th	745
$e + HD_2$	Dissociation	10 - 10  eV $10^{-3} - 10 \text{ eV}$	1 II Th	743
$\mathbf{e} + \mathbf{H}_{3}\mathbf{D}^{+}$	Recombination	10 - 10 eV $10^{-3} - 10 eV$	111 Th	740 779
$e + HD_{e}^{+}$	Recombination	10 - 10 eV $10^{-3} - 10 eV$	111 Th	740 779
$e + Ho^{2+}$	Dissociation	10 - 10 eV 1 15 oV	111 Th	743 777
$e + He_2^{2+}$	Becombination	1-15  eV 1-15  eV	1 11 Th	744 777
$\mathbf{e} + \mathbf{h}\mathbf{e}_2$	Excitation	1-10  eV 0 5-10 eV	111 Fyn	744 745
e + H	Ionization	15 eV	њхр ТЪ	740 746
$e + \Delta r$	Ionization	113 5-200 aV	111 Th	740
$e + C_{e}H_{e}$	Excitation	300-800 eV	111 Th	1±1 7/8
0 + 0.2112	LAGIGUIUII	000-000 C V	± 11	140

$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_4$	Ionization	25-1000  eV	Exp 7	49
$e + HeH^+$	Dissociation	0-2  eV	Th $7$	50
$e + HeH^+$	Recombination	0-2  eV	Th $7$	50
e + Ar	Angular Scattering	113.5-200  eV	Th $7$	51
e + Ar	Ionization	$113.5\text{-}200\;\mathrm{eV}$	Th $7$	51
e + He	Ionization	2080  eV	E/T 7	52
$\mathbf{e} + \mathbf{CO}_2$	Excitation	250-500  eV	Th $7$	53
$\mathbf{e} + \mathbf{C}_4 \mathbf{H}_6$	Excitation	$250\text{-}500~\mathrm{eV}$	Th $7$	53
$e + Pb^+$	Ionization	$0-1000 {\rm ~eV}$	E/T 7	54
$\mathbf{e} + \mathbf{P}\mathbf{b}^{2+}$	Ionization	$0-1000 {\rm ~eV}$	E/T 7	54
$\mathbf{e} + \mathbf{P}\mathbf{b}^{3+}$	Ionization	$0-1000 {\rm ~eV}$	E/T 7	54
$\mathbf{e} + \mathbf{P} \mathbf{b}^{4+}$	Ionization	$0-1000 {\rm ~eV}$	E/T 7	54
$\mathbf{e} + \mathbf{P} \mathbf{b}^{5+}$	Ionization	$0-1000 {\rm ~eV}$	E/T 7	54
$\mathbf{e} + \mathbf{P} \mathbf{b}^{6+}$	Ionization	$0-1000   {\rm eV}$	E/T 7	54
$\mathbf{e} + \mathbf{P}\mathbf{b}^{7+}$	Ionization	$0-1000   {\rm eV}$	E/T 7	54
$\mathbf{e} + \mathbf{P} \mathbf{b}^{8+}$	Ionization	$0-1000   {\rm eV}$	E/T 7	54
$\mathbf{e} + \mathbf{P} \mathbf{b}^{9+}$	Ionization	$0-1000   {\rm eV}$	E/T 7	54
$\mathbf{e} + \mathbf{P} \mathbf{b}^{10+}$	Ionization	$0-1000   {\rm eV}$	E/T 7	54
e + H	Ionization	10-10,000  eV	Th $7$	55
$e + He^+$	Ionization	10-10,000  eV	Th $7$	55
e + Li	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{C}^{5+}$	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{N}^{4+}$	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{N}^{6+}$	Ionization	10-10,000  eV	Th $7$	55
$e + O^{5+}$	Ionization	10-10,000  eV	Th $7$	55
$e + O^{7+}$	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{N}\mathbf{e}^{8+}$	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{T} \mathbf{i}^{19+}$	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{V}^{20+}$	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{C}\mathbf{r}^{21+}$	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{M} \mathbf{n}^{22+}$	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{F} \mathbf{e}^{23+}$	Ionization	10-10,000  eV	Th $7$	55
$e + Mo^{41+}$	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{D}\mathbf{y}^{65+}$	Ionization	10-10,000  eV	Th $7$	55
$e + U^{89+}$	Ionization	10-10,000  eV	Th $7$	55
$e + U^{90+}$	Ionization	10-10,000  eV	Th $7$	55
$e + U^{91+}$	Ionization	10-10,000  eV	Th $7$	55
$\mathbf{e} + \mathbf{N}_2$	Angular Scattering	75.6  eV	Th $7$	56
$\mathbf{e} + \mathbf{N}_2$	Ionization	75.6  eV	Th $7$	56
$e + Mo^+$	Ionization	15-150  eV	Th $7$	57
e + He	Elastic Scattering	4-22  eV	Th $7$	58
e + He	Angular Scattering	4-22  eV	Th $7$	58
$e + Be^+$	Ionization	0-200  eV	E/T 7	59
$e + B^{2+}$	Ionization	0-200  eV	E/T 7	59
$e + C^{3+}$	Ionization	0-200  eV	E/T 7	59
$\mathbf{e} + \mathbf{N}^{4+}$	Ionization	0-200  eV	E/T 7	59
$e + O_{2}^{5+}$	Ionization	0-200  eV	E/T 7	59
$\mathbf{e} + \mathbf{F}^{6+}$	Ionization	0-200  eV	E/T 7	59
$\mathbf{e} + \mathbf{N}\mathbf{e}^{\gamma+}$	Ionization	0-200  eV	E/T 7	59
$\mathbf{e} + \mathbf{N}\mathbf{a}^{8+}$	Ionization	0-200  eV	E/T 7	59
$e + Mg^{9+}$	Ionization	0-200  eV	E/T 7	59
$\mathbf{e} + \mathbf{A} \mathbf{l}^{10+}$	Ionization	0-200  eV	E/T 7	59
$e + H_2O$	Dissociation	20-200 eV	Exp 7	60
$e + H_2O$	Ionization	20-200 eV	Exp 7	60
$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{14}$	Elastic Scattering	0.4-1000  eV	Exp 7	61
$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{12}$	Elastic Scattering	0.4-1000  eV	Exp 7	61
$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{14}$	Excitation	0.4-1000  eV	Exp 7	61

$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{12}$	Excitation	0.4-1000  eV	Exp	761
$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{14}$	Ionization	0.4-1000  eV	Exp	761
$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{12}$	Ionization	0.4-1000  eV	Exp	761
e + Kr	Elastic Scattering	$1.5-30  {\rm eV}$	Th	762
$e + Kr^*$	Elastic Scattering	$1.5-30  \mathrm{eV}$	Th	762
e + Kr	Excitation	$1.5-30 { m eV}$	Th	762
$e + Kr^*$	Excitation	$1.5-30 { m eV}$	Th	762
$\mathbf{e} + \mathbf{Cl}_2^-$	Dissociation	0-200  eV	Exp	763
$\mathbf{e} + \mathbf{Cl}_2^-$	Detachment	0-200  eV	Exp	763
e + He	Excitation	$1000\text{-}1600~\mathrm{eV}$	Exp	764
e + He	Ionization	$1000\text{-}1600~\mathrm{eV}$	Exp	764
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Elastic Scattering	$0.5-20 \ eV$	Th	765
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Angular Scattering	0.5-20  eV	Th	765
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Total Scattering	$0.5-20 \ eV$	Th	765
e + Xe	Ionization	10-28  keV	Exp	766
$\mathbf{e} + \mathbf{W}^+$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{2+}$	Ionization	0-250  keV	Th	767
$e + W^{3+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{4+}$	Ionization	0-250  keV	Th	767
$e + W^{5+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{6+}$	Ionization	0-250  keV	Th	767
$e + W^{7+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{8+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{9+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{10+}$	Ionization	0-250  keV	Th	767
$e + W^{11+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{12+}$	Ionization	0-250  keV	Th	767
$e + W^{13+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{14+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{15+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{16+}$	Ionization	0-250  keV	Th	767
$e + W^{17+}$	Ionization	0-250  keV	Th	767
$e + W^{18+}$	Ionization	0-250  keV	Th	767
$e + W^{19+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{20+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{21+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{22+}$	Ionization	0-250  keV	Th	767
$e + W^{23+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{24+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{25+}$	Ionization	0-250  keV	Th	767
$e + W^{26+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{27+}$	Ionization	0-250  keV	Th	767
$e + W^{28+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{29+}$	Ionization	0-250  keV	Th	767
$e + W^{30+}$	Ionization	0-250  keV	Th	767
$e + W^{31+}$	Ionization	0-250  keV	Th	767
$\mathbf{e} + \mathbf{W}^{32+}$	Ionization	0-250  keV	Th	767
$e + W^{33+}$	Ionization	0-250  keV	Th	767
$e + W^{34+}$	Ionization	0-250  keV	Th	767
$e + W^{35+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{36+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{37+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{38+}$	Ionization	0-250  keV	Th $T$	767
$e + W^{39+}$	Ionization	0-250  keV	Th $T$	767
$e + W^{40+}$	Ionization	0-250  keV	Th $T$	767
$e + W^{41+}$	Ionization	0-250  keV	Th $T$	767
$\mathbf{e} + \mathbf{W}^{42+}$	Ionization	0-250  keV	Th $T$	767

$\mathbf{e} + \mathbf{W}^{43+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{44+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{45+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{46+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{47+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{48+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{49+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{50+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{51+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{52+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{53+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{54+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{55+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{56+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{57+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{58+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{59+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{60+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{61+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{62+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{63+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{64+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{65+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$e + W^{66+}$	Ionization	0-250  keV	$\mathrm{Th}$	767
$\mathbf{e} + \mathbf{W}^{67+}$	Ionization	0-250  keV	Th	767
$e + W^{00+}$	Ionization	0-250  keV	Th	767
$e + W^{09+}$	Ionization	0-250  keV	Th	767
$e + W^{70+}$	Ionization	0-250 keV	Th	767
$e + W^{11}$	Ionization	0-250 keV	Th	767
$e + W^{72+}$	Ionization	0-250 keV	Th	767
$e + W^{\circ}$	Ionization	0-250 KeV	Th	767
$e + CH_4$		0-500 eV		708
$e + He^{-}$	Ionization	200-500 ev	1 II Th	709
$e + H_2 O$	Evolution	25  eV	1 II Furn	771
$e + Cr_4$	Angular Scattering	0.1-2  eV	Exp	779
e + Na	Angular Scattering	10-75  eV	Exp	779
e + Mg o + K	Angular Scattering	10-75 eV	Exp	772
e + R e + Ca	Angular Scattering	10-75  eV 10-75  eV	Exp	772
e + Na	Ionization	10-75 eV	Exp	772
$e + M\sigma$	Ionization	10-75 eV	Exp	772
e + K	Ionization	10-75 eV	Exp	772
e + Ca	Ionization	10-75 eV	Exp	772
e + He	Angular Scattering	26.3-40.7 eV	Th	773
e + He	Ionization	26.3-40.7 eV	Th	773
e + CF	Attachment	0-2 eV	Th	774
e + CF	Dissociation	0-2  eV	Th	774
e + CF	Excitation	$0-2  \mathrm{eV}$	$\mathrm{Th}$	774
e + Ar	Angular Scattering	12-24  keV	Exp	775
e + Ar	Ionization	12-24  keV	Exp	775
$e + C_4 H_8 O$	Elastic Scattering	2-21 eV	Exp	776
$e + CS_2$	Elastic Scattering	0-10 eV	Th	777
$e + CS_2$	Angular Scattering	0-10 eV	$\mathrm{Th}$	777
e + Kr	Elastic Scattering	20-260  eV	E/T	778
e + Kr	Angular Scattering	20-260  eV	$\dot{\mathrm{E}/\mathrm{T}}$	778
$e + CHF_3$	Elastic Scattering	20-500  eV	Exp	779
$e + CHF_3$	Angular Scattering	20-500  eV	Exp	779

e + Ca	Elastic Scattering	$10-100 {\rm ~eV}$	E/T 78
e + Ca	Excitation	$10-100 {\rm ~eV}$	Th 78
$e + He^+$	Line Broadening	1.75  eV	Exp 78
$e + He^+$	Fluorescence	1.75  eV	Exp 78
$\mathbf{e} + \mathbf{H}_2$	Excitation	4087  eV	Th 78
$\mathbf{e} + \mathbf{H}_2$	Ionization	4087  eV	Th 78
e + Ba	Elastic Scattering	20  eV	Exp 78-
$e + Ba^*$	Elastic Scattering	20  eV	Exp 78-
e + Ba	Excitation	20  eV	Exp 78-
$e + Ba^*$	Excitation	20  eV	Exp 78-
$e + Pb^+$	Ionization	20-1000  eV	Exp 78-
$e + Pb^{2+}$	Ionization	20-1000  eV	Exp 78-
$\mathbf{e} + \mathbf{P} \mathbf{b}^{3+}$	Ionization	20-1000  eV	Exp 78-
$e + Pb^{4+}$	Ionization	20-1000  eV	Exp 78-
$\mathbf{e} + \mathbf{P} \mathbf{b}^{5+}$	Ionization	20-1000  eV	Exp 78-
$\mathbf{e} + \mathbf{P} \mathbf{b}^{6+}$	Ionization	20-1000  eV	Exp 78-
$\mathbf{e} + \mathbf{P}\mathbf{b}^{7+}$	Ionization	20-1000  eV	Exp 78-
$e + Pb^{8+}$	Ionization	20-1000  eV	Exp 78-
$\mathbf{e} + \mathbf{P} \mathbf{b}^{9+}$	Ionization	20-1000  eV	Exp 78-
$\mathbf{e} + \mathbf{Ar}$	Elastic Scattering	$2-10   \mathrm{eV}$	Th 78
$\mathbf{e} + \mathbf{Ar}$	Angular Scattering	$2-10   \mathrm{eV}$	Th 78
$\mathbf{e} + \mathbf{CO}_2$	Angular Scattering	20-100  eV	Exp = 78
$e + CO_2$	Ionization	20-100  eV	Exp 78
$e + Fe^+$	Excitation	30-100,000 K	Th 78
e + H	Elastic Scattering	0.026-218  eV	Th $78$
e + He	Elastic Scattering	0.026-218  eV	Th $78$
$e + He^+$	Elastic Scattering	0.026-218  eV	Th $78$
e + H	Excitation	0.026-218  eV	Th $78$
e + He	Excitation	0.026-218  eV	Th $78$
$e + He^+$	Excitation	0.026-218  eV	Th $78$
$\mathbf{e} + \mathbf{H}_2^+$	Ionization	20-160  eV	E/T 79
e + Rb	Angular Scattering	20  eV	Th 79
e + Rb	Excitation	20  eV	Th 79
e + Rb	Elastic Scattering	$15-80  {\rm eV}$	E/T 79
e + Rb	Angular Scattering	$15-80  {\rm eV}$	$\dot{\mathrm{E/T}}$ 792
e + Rb	Excitation	15-80 eV	E/T 79
$\mathbf{e} + \mathbf{C}_2 \mathbf{F}_6$	Dissociation	30-1000  eV	$E_{\rm XD}$ 79
$\mathbf{e} + \mathbf{C}_2 \mathbf{F}_6$	Elastic Scattering	30-1000  eV	Exp 79
$\mathbf{e} + \mathbf{C}_2 \mathbf{F}_6$	Angular Scattering	30-1000  eV	Exp 79
$\mathbf{e} + \mathbf{C}_2 \mathbf{F}_6$	Ionization	30-1000  eV	Exp 79
e + Yb	Angular Scattering	10-40 eV	Exp 79
e + Yb	Excitation	10-40 eV	Exp 79
e + Cs	Elastic Scattering	$5-100   \mathrm{eV}$	Exp 79
e + N	Excitation	2-120  eV	Th 79
$\mathbf{e} + \mathbf{N}_2$	Elastic Scattering	0.8-5  eV	Exp 79
$\mathbf{e} + \mathbf{N}_2$	Excitation	0.8-5  eV	Exp 79
e + Li	Excitation		Th 79
e + CH	Elastic Scattering	0.1-20 eV	Th 79
$e + CH_2$	Elastic Scattering	0.1-20  eV	Th 79
$e + CH_3$	Elastic Scattering	0.1-20  eV	Th 79
$e + CH_{4}$	Elastic Scattering	0.1-20 eV	Th 79
e + CH	Angular Scattering	0.1-20 eV	Th 79
$e + CH_2$	Angular Scattering	0.1-20 eV	Th 79
$e + CH_2$	Angular Scattering	0.1-20 eV	Th 79
$e + CH_4$	Angular Scattering	0.1-20  eV	Th 79
$e + C^{2+}$	Recombination	0-100.000 K	Th 80
$e + CH_2O$	Elastic Scattering	0.008-20  eV	Th 80
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$e + CH_2O$	Angular Scattering	0.008-20  eV	$\mathrm{Th}$	801
$\mathbf{e} + \mathbf{C}\mathbf{H}_2\mathbf{O}$	Total Scattering	0.008-20  eV	$\mathrm{Th}$	801
$\mathbf{e} + \mathbf{O}_3$	Elastic Scattering	0-15  eV	$\mathrm{Th}$	802
$e + O_3$	Angular Scattering	0-15  eV	$\mathrm{Th}$	802
$\mathbf{e} + \mathbf{O}_3$	Total Scattering	0-15  eV	$\mathrm{Th}$	802
$\mathbf{e} + \mathbf{O}_3$	Excitation	0-15  eV	$\mathrm{Th}$	802
e + Mg	Angular Scattering	20  eV	Exp	803
e + Mg	Excitation	20  eV	Exp	803
e + He	Excitation	200-570  eV	E/T	804
e + He	Ionization	200-570  eV	$\dot{\mathrm{E}/\mathrm{T}}$	804
$\mathbf{e} + \mathbf{H}_2$	Angular Scattering	12-30  eV	$\mathbf{T}_{\mathbf{h}}^{'}$	805
$\mathbf{e} + \mathbf{H}_2$	Excitation	12-30  eV	Th	805
$\mathbf{e} + \mathbf{C}^{\mathbf{\tilde{2}}+}$	Recombination	$10 - 10^7 \text{ K}$	E/T	806
$e + N^{3+}$	Recombination	$10 - 10^7 \text{ K}$	Е́/Т	806
$e + O^{4+}$	Recombination	$10 - 10^7$ K	E/T	806
$e + Ca^{12+}$	Excitation	40-200 Ry	Th	807
$e + Fe^{17+}$	Excitation	0-20 Rv	Th	808
$e + Fe^{3+}$	Excitation	$3.3-6.0 \log T_{c}(k)$	Th	809
$e + Ne^+$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + Na^{2+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + Me^{3+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$\mathbf{e} + \mathbf{A}\mathbf{I}^{4+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + Si^{5+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	810
$e + P^{6+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	810
$e + S^{7+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	810
$e + Cl^{8+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	810
$\mathbf{e} + \mathbf{A}\mathbf{r}^{9+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + K^{10+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + Ca^{11+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	810
$e + Se^{12+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	810
$e + Ti^{13+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + V^{14+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	810
$e + Cr^{15+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + Mn^{16+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + Fe^{17+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + Ce^{18+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + Ni^{19+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + Cu^{20+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + Zn^{21+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	810
$e + Kr^{27+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	810
$e + Mo^{33+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	810
$e + Xe^{45+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	810
$e + He^+$	Becombination	$0 - 10^5 \text{ eV}$	Th	811
$e + Li^{2+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	811
$e + Be^{3+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	811
$\mathbf{e} + \mathbf{B}^{4+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	811
$e + C^{5+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	811
$e + N^{6+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	811
$e + 0^{7+}$	Becombination	$0 - 10^{5} \text{ eV}$	Th	811
$e^{-} + F^{8+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	811
$\mathbf{e} + \mathbf{N}\mathbf{e}^{9+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	811
$e + Ne^{10+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	811
$e + M\sigma^{11+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e + Al^{12+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e + Si^{13+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	811
$e + P^{14+}$	Becombination	$0 - 10^5 \text{ eV}$	Th	811
$e + S^{15+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
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$e + Cl^{16+}$	Recombination	$0 - 10^5 { m eV}$	Th	811
$e + Ar^{17+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e + K^{18+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e + Ca^{19+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e + Se^{20+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e + Ti^{21+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e + V^{22+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e + Cr^{23+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e + Mn^{24+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e \perp Fe^{25+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
e + fe $e + Ce^{26+}$	Recombination	$0 - 10^{5} \text{ eV}$	Th	811
e + 00 $e + Ni^{27+}$	Recombination	$0 - 10^{5} \text{ eV}$	Th	811
$e + Cu^{28+}$	Recombination	$0 - 10^{5} \text{ eV}$	Th	811
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{29+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
$e + \Sigma n$ $e + Kr^{35+}$	Recombination	$0 - 10^{5} \text{ eV}$	Th	811
e + M $e + Me^{41+}$	Recombination	$0 - 10^{5} \text{ eV}$	Th	811
$\mathbf{e} \perp \mathbf{X} \mathbf{e}^{53+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	811
e + Ae $e \perp S^{4+}$	Excitation	$4.0-6.0 \log T(k)$	Th	812
e + b $e + Fe^{16+}$	Excitation	$1_{-100} \text{ By}$	Th	813
$e + Fe^{17+}$	Excitation	1-100  Ry 1-100  By	Th	813
$e + Fe^{18+}$	Excitation	1-100  Ry 1-100  By	Th	813
$e + Fe^{19+}$	Excitation	1 100  Ry	Th Th	813
$e + Fe^{20+}$	Excitation	1 + 100  Ry	111 Th	813
$e + Fe^{21+}$	Excitation	1 + 100  Ry	111 Th	813
$e + Fe^{22+}$	Excitation	1-100  Ky 1 100 P <sub>W</sub>	111 Th	813 813
$e + Fe^{22+}$	Becombination	1-100  Ky	тп F/T	814
e + Ie	Excitation	0.6  eV	12/1 Th	815
$e + H_2$ $e + Fe^+$	Ionization	50 1000 eV	111 Th	816
$e + Fe^{3+}$	Ionization	50-1000 eV	тн Тh	816
e + Ie e + CH	Excitation	0.2000  eV	111 Th	817
$e + CH_4$	Ionization	0.2000  eV	111 Th	817
$\mathbf{e} + \mathbf{O}\mathbf{H}_4$ $\mathbf{e} \perp \mathbf{N}_2$	Ionization	35 6-400 eV	Th	818
$\mathbf{e} \perp \mathbf{H}_2$	Ionization	10-60 eV	E/T	810
e + La	Excitation	0-900 eV	Eyn	820
e + Pr	Excitation	0-900 eV	Exp	820
$e + H_0$	Excitation	0-900 eV	Exp	820
e + Tm	Excitation	0-900 eV	Exp	820
e + Lu	Excitation	0-900 eV	Exp	820
e + La	Ionization	0-900 eV	Exp	820
e + Pr	Ionization	0-900 eV	Exp	820
$e + H_0$	Ionization	0-900 eV	Exp	820
e + Tm	Ionization	0-900 eV	Exp	820
e + Lu	Ionization	0-900 eV	Exp	820
e + Ne	Bremsstrahlung	28-50 keV	Exp	821
e + Ar	Bremsstrahlung	28-50 keV	Exp	821
e + Kr	Bremsstrahlung	28-50 keV	Exp	821
e + Xe	Bremsstrahlung	28-50 keV	Exp	821
e + Ar	Angular Scattering	750 eV	Exp	822
e + Kr	Angular Scattering	750  eV	Exp	822
e + Ar	Ionization	750  eV	Exp	822
e + Kr	Ionization	750  eV	Exp	822
e + He	Angular Scattering	6  keV: 100 MeV/amu	Th	823
e + He	Ionization	6  keV: 100 MeV/amu	Th	823
e + He	Elastic Scattering	1.5-20  eV	E/T	824
$\mathbf{e} + \mathbf{N}_2$	Elastic Scattering	1.5-20  eV	E/T	824
$e + N_2 O$	Elastic Scattering	1.5-20  eV	E/T	824
e + He	Angular Scattering	1.5-20  eV	E/T	824
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$\mathbf{e} + \mathbf{N}_2$	Angular Scattering	1.5-20  eV	E/T	824
$\mathbf{e} + \mathbf{N}_2 \mathbf{O}$	Angular Scattering	1.5-20  eV	E/T	824
e + Ne	Excitation	$1.5-20 { m eV}$	E/T	824
$\mathbf{e} + \mathbf{N}_2$	Excitation	$1.5-20 { m eV}$	E/T	824
$\mathbf{e} + \mathbf{H}_2$	Elastic Scattering	$0.1-20 {\rm ~eV}$	$\mathrm{Th}$	825
$\mathbf{e} + \mathbf{H}_2$	Angular Scattering	0.1-20  eV	$\mathrm{Th}$	825
$\mathbf{e} + \mathbf{N}_2$	Angular Scattering	0.1-20  eV	$\mathrm{Th}$	825
$\mathbf{e} + \mathbf{H}_2$	Excitation	0.1-20  eV	$\mathrm{Th}$	825
$\mathbf{e} + \mathbf{N}_2$	Excitation	0.1-20  eV	$\mathrm{Th}$	825
e + Ti	Ionization	10-120  keV	$\operatorname{Exp}$	826
e + Ni	Ionization	10-120  keV	$\operatorname{Exp}$	826
e + Cu	Ionization	10-120  keV	$\operatorname{Exp}$	826
e + Ag	Ionization	10-120  keV	$\operatorname{Exp}$	826
e + Au	Ionization	10-120  keV	$\operatorname{Exp}$	826
$e + CH_4$	Ionization	10-28  keV	$\operatorname{Exp}$	827
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$	Ionization	10-28  keV	$\operatorname{Exp}$	827
$e + B^{4+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$	828
$e + C^{4+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$	828
$\mathbf{e} + \mathbf{N}^{6+}$	Ionization	$10 - 10^4 { m eV}$	$\mathrm{Th}$	828
$e + O^{7+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$	828
$e + Ne^{8+}$	Ionization	$10 - 10^4 { m eV}$	$\mathrm{Th}$	828
$\mathbf{e} + \mathbf{Mo}^{41+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$	828
$\mathbf{e} + \mathbf{D} \mathbf{y}^{65+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$	828
$\mathbf{e} + \mathbf{A}\mathbf{u}^{78+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$	828
$\mathbf{e} + \mathbf{Bi}^{82+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$	828
$e + U^{90+}$	Ionization	$10 - 10^4 \text{ eV}$	$\mathrm{Th}$	828
$e + U^{91+}$	Ionization	$10 - 10^4 \text{ eV}$	$\mathrm{Th}$	828
$\mathbf{e} + \mathbf{O}^{6+}$	Recombination	0.1-1260  eV	$\mathrm{Th}$	829
$\mathbf{e} + \mathbf{N}_2$	Elastic Scattering	$0-6  \mathrm{eV}$	E/T	830
$\mathbf{e} + \mathbf{CF}_4$	Elastic Scattering	$0-6  \mathrm{eV}$	E/T	830
$\mathbf{e} + \mathbf{N}_2$	Angular Scattering	$0-6  \mathrm{eV}$	E/T	830
$e + CF_4$	Angular Scattering	$0-6  \mathrm{eV}$	E/T	830
$\mathbf{e} + \mathbf{N}_2$	Excitation	$0-6  \mathrm{eV}$	E/T	830
$e + CF_4$	Excitation	$0-6  \mathrm{eV}$	E/T	830
$\mathbf{e} + \mathbf{N}_2$	Electron Collisions	$0-6  \mathrm{eV}$	E/T	830
$\mathbf{e} + \mathbf{CF}_4$	Electron Collisions	$0-6  \mathrm{eV}$	E/T	830
e + He	Excitation	$112-319 \mathrm{eV}$	E/T	831
e + He	Ionization	$112-319 \mathrm{eV}$	E/T	831
$\mathbf{e} + \mathbf{H}_2$	Dissociation	250  eV	E/T	832
$\mathbf{e} + \mathbf{H}_2$	Angular Scattering	250  eV	E/T	832
$\mathbf{e} + \mathbf{H}_2$	Ionization	250  eV	E/T	832
$\mathbf{e} + \mathbf{F} \mathbf{e}^{17+}$	Excitation	0-3.0  keV	E/T	833
$\mathbf{e} + \mathbf{F}\mathbf{e}^{18+}$	Excitation	0-3.0  keV	E/T	833
$\mathbf{e} + \mathbf{F}\mathbf{e}^{19+}$	Excitation	0-3.0  keV	E/T	833
$\mathbf{e} + \mathbf{F}\mathbf{e}^{20+}$	Excitation	0-3.0  keV	E/T	833
$\mathbf{e} + \mathbf{F}\mathbf{e}^{21+}$	Excitation	0-3.0  keV	E/T	833
$\mathbf{e} + \mathbf{F}\mathbf{e}^{22+}$	Excitation	0-3.0  keV	E/T	833
$\mathbf{e} + \mathbf{F}\mathbf{e}^{23+}$	Excitation	0-3.0  keV	E/T	833
e + H	Attachment	0.9-51  eV; 1000-25,000  K	$\mathrm{Th}$	834
$e + He^+$	Recombination	0.9-51  eV; 1000-25,000  K	$\mathrm{Th}$	834
e + H	Ionization	$0.015 - 10^{6} \text{ keV}$	$\mathrm{Th}$	835
e + He	Ionization	$0.015 - 10^{6} \text{ keV}$	$\mathrm{Th}$	835
e + C	Ionization	$0.015 - 10^{6} \text{ keV}$	$\mathrm{Th}$	835
e + Al	Ionization	$0.015 - 10^{6} \text{ keV}$	$\mathrm{Th}$	835
e + Ar	Ionization	$0.015 - 10^{6} \text{ keV}$	$\mathrm{Th}$	835
e + V	Ionization	$0.015 - 10^{6} \text{ keV}$	$\mathrm{Th}$	835
e + Ni	Ionization	$0.015 - 10^6 { m ~keV}$	Th	835

e + Cu	Ionization	$0.015 - 10^6 { m ~keV}$	$\mathrm{Th}$	835
e + Se	Ionization	$0.015 - 10^6 { m ~keV}$	$\mathrm{Th}$	835
e + Ag	Ionization	$0.015 - 10^6 { m ~keV}$	$\mathrm{Th}$	835
e + Sn	Ionization	$0.015 - 10^6 { m ~keV}$	$\mathrm{Th}$	835
e + Au	Ionization	$0.015 - 10^6 { m ~keV}$	$\mathrm{Th}$	835
e + Pb	Ionization	$0.015 - 10^6 { m ~keV}$	$\mathrm{Th}$	835
e + Bi	Ionization	$0.015 - 10^6 { m ~keV}$	$\mathrm{Th}$	835
$\mathbf{e} + \mathbf{C}_{60}$	Elastic Scattering	0-50  eV	$\mathrm{Th}$	836
$\mathbf{e} + \mathbf{C}_{60}$	Angular Scattering	0-50  eV	$\mathrm{Th}$	836
$\mathbf{e} + \mathbf{C}_2 \mathbf{O}$	Elastic Scattering	1-10  eV	$\mathrm{Th}$	837
$\mathbf{e} + \mathbf{C}_2 \mathbf{O}$	Angular Scattering	1-10  eV	$\mathrm{Th}$	837
$e + H_2O$	Angular Scattering	250  eV	E/T	838
$e + H_2O$	Ionization	250  eV	E/T	838
$\mathbf{e} + \mathbf{F} \mathbf{e}^{16+}$	Excitation	700-1200  eV	$\mathrm{Th}$	839
e + Ar	Angular Scattering	113.5  eV	$\mathrm{Th}$	840
e + Ar	Ionization	113.5  eV	$\mathrm{Th}$	840
$\mathbf{e} + \mathbf{I}^{50+}$	Excitation	29.5-32  keV	$\operatorname{Exp}$	841
$\mathbf{e} + \mathbf{I}^{50+}$	Ionization	29.5-32  keV	$\operatorname{Exp}$	841
e + Li	Excitation		$\mathrm{Th}$	842
$\mathbf{e} + \mathbf{H}_2$	Attachment	0-10  eV	$\mathrm{Th}$	843
$\mathbf{e} + \mathbf{H}_2$	Dissociation	0-10  eV	$\mathrm{Th}$	843
e + O	Ionization	400-2400  eV	$\operatorname{Exp}$	844
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Dissociation	10-200  keV	$\mathrm{Th}$	845
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Ionization	10-200  keV	$\mathrm{Th}$	845
$\mathbf{e} + \mathbf{C}_3^+$	Dissociation		$\operatorname{Exp}$	846
$\mathbf{e} + \mathbf{C}_5^+$	Dissociation		$\operatorname{Exp}$	846
$\mathbf{e} + \mathbf{C}_4{}^+$	Dissociation		$\operatorname{Exp}$	846
$\mathbf{e} + \mathbf{C}_7^+$	Dissociation		$\operatorname{Exp}$	846
$\mathbf{e} + \mathbf{C}_6^+$	Dissociation		$\operatorname{Exp}$	846
$\mathbf{e} + \mathbf{C}_3^+$	Recombination		$\operatorname{Exp}$	846
$\mathbf{e} + \mathbf{C}_5^+$	Recombination		$\operatorname{Exp}$	846
$\mathbf{e} + \mathbf{C}_4{}^+$	Recombination		$\operatorname{Exp}$	846
$\mathbf{e} + \mathbf{C}_7^+$	Recombination		$\operatorname{Exp}$	846
$\mathbf{e} + \mathbf{C}_6^+$	Recombination		$\operatorname{Exp}$	846
e + Mg	Angular Scattering	400-3000  eV	$\operatorname{Exp}$	847
e + Mg	Ionization	400-3000  eV	$\operatorname{Exp}$	847
$\mathbf{e} + \mathbf{C}^{2+}$	Excitation	$10-28   {\rm eV}$	$\operatorname{Exp}$	848
$\mathbf{e} + \mathbf{N}\mathbf{e}_2^+$	Dissociation	$10^{-4} - 1 \text{ eV}$	$\mathrm{Th}$	849
$\mathbf{e} + \mathbf{N}\mathbf{e}_2^+$	Recombination	$10^{-4} - 1 \text{ eV}$	$\mathrm{Th}$	849
$\mathbf{e} + \mathbf{N}_2$	Angular Scattering	15  eV	$\operatorname{Exp}$	850
$\mathbf{e} + \mathbf{N}_2$	Excitation	15  eV	$\operatorname{Exp}$	850
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Dissociation	45-1500  eV	$\operatorname{Exp}$	851
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Ionization	45-1500  eV	$\operatorname{Exp}$	851
$\mathbf{e} + \mathbf{SO}_2$	Dissociation	1-15  eV	$\mathrm{Th}$	852
$\mathbf{e} + \mathbf{SO}_2$	Elastic Scattering	1-15  eV	$\mathrm{Th}$	852
$\mathbf{e} + \mathbf{SO}_2$	Angular Scattering	1-15  eV	$\mathrm{Th}$	852
$\mathbf{e} + \mathbf{SO}_2$	Excitation	1-15  eV	$\mathrm{Th}$	852
$\mathbf{e} + \mathbf{A}\mathbf{r}$	Angular Scattering	2500  eV	E/T	853
$\mathbf{e} + \mathbf{A}\mathbf{r}$	Excitation	2500  eV	E/T	853
$\mathbf{e} + \mathbf{Ar}_2^+$	Dissociation	$3x10^{-3} - 0.5 \text{ eV}$	$\mathrm{Th}$	854
$\mathbf{e} + \mathbf{A} \mathbf{r}_2^+$	Recombination	$3x10^{-3} - 0.5 \text{ eV}$	$\mathrm{Th}$	854
e + He	Angular Scattering	32-45  eV	$\mathrm{Th}$	855
e + He	Ionization	32-45  eV	$\mathrm{Th}$	855
e + Xe	Angular Scattering	1200-2400  eV	$\mathrm{Th}$	856
e + Xe	Ionization	1200-2400  eV	$\mathrm{Th}$	856
e + K	Excitation	20-23  eV	E/T	857
e + Mn	Ionization	6-30  keV	$\mathrm{Th}$	858

e +	Fe	Ionization	6-30  keV	Th	858
e +	Ni	Ionization	6-30  keV	Th	858
e +	Cu	Ionization	6-30  keV	$\mathrm{Th}$	858
e +	W	Ionization	6-30  keV	$\mathrm{Th}$	858
e +	CO	Excitation	0-4  eV	Exp	859
e +	$\mathbf{Fe}^{24+}$	Recombination	4550-5500  eV	$\mathrm{Th}$	860
e +	$Ni^{26+}$	Recombination	4550-5500  eV	Th	860
e +	Ga	Fluorescence	1.5-39  keV	Exp	861
$\mathbf{e}$ +	$\mathbf{As}$	Fluorescence	1.5-39  keV	Exp	861
$\mathbf{e}$ +	Ga	Ionization	1.5-39  keV	Exp	861
e +	$\mathbf{As}$	Ionization	1.5-39 keV	Exp	861
e +	$H_2O$	Attachment	5-7 eV	$\mathrm{Th}$	862
e +	$\mathbf{H}_{2}\mathbf{S}$	Attachment	5-7 eV	$\mathrm{Th}$	862
e +	$H_2O$	Dissociation	5-7 eV	$\mathrm{Th}$	862
e +	$\mathbf{H}_2\mathbf{S}$	Dissociation	5-7 eV	$\mathrm{Th}$	862
e +	$\mathbf{Kr}^{5+}$	Ionization	74-175 eV	E/T	863
e +	$C_4H_8O$	Elastic Scattering	1-370 eV	$\operatorname{Exp}$	864
e +	$C_4H_8O$	Excitation	1-370 eV	Exp	864
e +	Η	Angular Scattering	15.6-17.6  eV	$\mathrm{Th}$	865
e +	H	Ionization	15.6-17.6  eV	Th	865
e +	Ne	Excitation	2-400  eV	$\mathrm{Th}$	866
e +	$\mathbf{Ne}^*$	Excitation	2-400  eV	$\mathrm{Th}$	866
e +	Ar	Excitation	2-400  eV	$\mathrm{Th}$	866
e +	$\mathbf{Ar}^*$	Excitation	2-400 eV	$\mathrm{Th}$	866
e +	Kr	Excitation	2-400 eV	Th	866
e +	Kr*	Excitation	2-400 eV	Th	866
e +	Xe	Excitation	2-400 eV	Th	866
e +	Xe*	Excitation	2-400 eV	Th	866
e +	$H_2O$	Angular Scattering	0.4-4 keV	E/T	867
e +	$H_2O$	Ionization	0.4-4 keV	E/T	867
e +	He	Excitation	0-40 eV; $2x10^4 - 2x10^5$ K	Th	868
e +	He*	Excitation	$0-40 \text{ eV}$ ; $2x10^4 - 2x10^5 \text{ K}$	Th	868
e +	He	Angular Scattering	5.6 keV	Th	869
e +	He	Ionization	5.6 keV	Th	869
e +	$C_2N_2$	Elastic Scattering	1-100 eV	Th	870
e +	$\mathbf{O}_2$	Angular Scattering	5-15 eV	Th	871
e +	$\mathbf{U}_2$	Excitation	5-15 eV		871
e +		Lastic Scattering	0-15 eV		812
e +	$N_2 O$	Angular Scattering	0-15 eV	1 n E	812
e +	$\mathbf{Ar}$ $\mathbf{E}_{2}^{25+}$	Excitation	5-150 KeV	схр Б-тр	010
e +	ге	Excitation	5-150 KeV	схр ть	010
e +	II No	Excitation Electic Scattoring	7 15 oV	111 Fyn	074 875
e +	No	Angular Scattering	7-15 eV	Exp	875
e +	СН	Dissociation	5 13 oV	Exp	876
e +	$N_{0}^{8+}$	Excitation	66 5 00 Pr	птр Тр	877
e +	ИСООН	Excitation Electic Scattoring	0.1.15 oV	TH Th	011 979
e +	нсоон	Angular Scattering	0.1-15 eV	тн Тh	010 979
	нсоон	Total Scattering	0.1.15 eV	Th	878
	$\mathbf{Fe}^{16+}$	Excitation	700-1200 eV	Th	870
с т е ⊥	CF <sub>2</sub> I	Attachment	0.5-500  meV	E/T	880
с т е ⊥	Na	Ionization	0-2.5 eV	$-\frac{1}{Th}$	881
e +	Ni <sup>4+</sup>	Excitation	0-6 Bv	Th	882
e +	Н	Excitation	5 5 Ity	Th	883
e +	 Ba	Elastic Scattering	20 eV	Exp	884
e +	Ba	Angular Scattering	20 eV	Exp	884
с т е ⊥	Ra	Total Scattering	20 eV	Exp	88/
υT	<u>-u</u>	10,001 0,000,0011112		^P	004

e + Ba	Excitation	$20  \mathrm{eV}$	$\operatorname{Exp}$	884
e + Ca	Angular Scattering	10-25  eV	$\mathrm{Th}$	885
e + Ca	Excitation	10-25  eV	$\mathrm{Th}$	885
e + Xe	Ionization	1000  eV	$\mathrm{Th}$	886
e + K	Excitation	20-28  eV	E/T	887
e + Ar	Elastic Scattering	40-200  eV	$\operatorname{Exp}$	888
e + Kr	Elastic Scattering	$40-200 {\rm ~eV}$	$\operatorname{Exp}$	888
e + Ar	Angular Scattering	$40-200 {\rm ~eV}$	$\operatorname{Exp}$	888
e + Kr	Angular Scattering	$40-200 {\rm ~eV}$	$\operatorname{Exp}$	888
e + H	Angular Scattering	$16.5-54 { m eV}$	E/T	889
e + H	Excitation	$16.5-54 { m eV}$	E/T	889
$e + CF_3^+$	Dissociation	$2x10^{-4} - 2x10^1 \text{ eV}$	$\operatorname{Exp}$	890
$\mathbf{e} + \mathbf{CF}_2^+$	Dissociation	$2x10^{-4} - 2x10^1 \text{ eV}$	$\operatorname{Exp}$	890
$e + CF_3^+$	Recombination	$2x10^{-4} - 2x10^1 \text{ eV}$	$\operatorname{Exp}$	890
$\mathbf{e} + \mathbf{CF}_2^+$	Recombination	$2x10^{-4} - 2x10^1 \text{ eV}$	$\operatorname{Exp}$	890
e + C	Excitation	$0-200   \mathrm{eV}$	$\mathrm{Th}$	891
e + C	Ionization	$0-200   \mathrm{eV}$	$\mathrm{Th}$	891
e + He	Angular Scattering	601  eV	$\mathrm{Th}$	892
e + He	Ionization	601  eV	$\mathrm{Th}$	892
$e + H^-$	Ionization	$40-60   \mathrm{eV}$	$\mathrm{Th}$	893
e + Ne	Angular Scattering	$16.6-19.5 { m eV}$	E/T	894
e + Ne	Excitation	$16.6-19.5 { m eV}$	E/T	894
$\mathbf{e} + \mathbf{H}_2$	Angular Scattering	35.3-4168  eV	$\mathrm{Th}$	895
$\mathbf{e} + \mathbf{H}_2$	Ionization	35.3-4168  eV	$\mathrm{Th}$	895
e + Li	Ionization	5-1000  eV	$\mathrm{Th}$	896
$e + Be^+$	Ionization	5-1000  eV	$\mathrm{Th}$	896
$e + B^{2+}$	Ionization	5-1000  eV	$\mathrm{Th}$	896
$e + C^{3+}$	Ionization	5-1000  eV	$\mathrm{Th}$	896
$\mathbf{e} + \mathbf{N}^{4+}$	Ionization	5-1000  eV	$\mathrm{Th}$	896
$e + O^{5+}$	Ionization	5-1000  eV	$\mathrm{Th}$	896
$e + Ti^+$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ti^{2+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ti^{3+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ti^{4+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ti^{5+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{T}\mathbf{i}^{6+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Fe^+$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{F}\mathbf{e}^{2+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{F}\mathbf{e}^{3+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{F}\mathbf{e}^{4+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{F}\mathbf{e}^{5+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{F}\mathbf{e}^{6+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ni^+$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ni^{2+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ni^{3+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ni^{4+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{N}\mathbf{i}^{5+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{N}\mathbf{i}^{\mathbf{o}+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ga^+$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ga^{2+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ga^{3+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ga^{4+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Ga^{o+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{G}\mathbf{a}^{6+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Kr^+$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Kr^{2+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Kr^{3+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897

$\mathbf{e} + \mathbf{K} \mathbf{r}^{4+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Mo^+$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Mo^{2+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Mo^{3+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Mo^{4+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Mo^{5+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{Mo}^{6+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Pr^+$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{P}\mathbf{r}^{2+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{P}\mathbf{r}^{3+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{P}\mathbf{r}^{4+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{Sm}^+$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Sm^{2+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Sm^{3+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{Sm}^{4+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Sm^{5+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{Sm}^{6+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{W}^{6+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{P} \mathbf{b}^{6+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$e + Bi^+$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{B}\mathbf{i}^{2+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{B}\mathbf{i}^{3+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{B} \mathbf{i}^{4+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{Bi}^{5+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{Bi}^{6+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{Bi}^{7+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{Bi}^{8+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{B} \mathbf{i}^{9+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{B} \mathbf{i}^{10+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{B} \mathbf{i}^{11+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
$\mathbf{e} + \mathbf{B} \mathbf{i}^{12+}$	Ionization	100-10,000  eV	$\mathrm{Th}$	897
e + He	Excitation	22.6-24.2  eV	E/T	898
e + Kr	Line Broadening		E/T	899
$e + O^+$	Excitation	$1 \mathrm{Ry}$	$\mathrm{Th}$	900
e + H	Line Broadening		$\mathrm{Th}$	901
e + Cd	Excitation	60-80  eV	$\operatorname{Exp}$	902
$\mathbf{e} + \mathbf{C}_4 \mathbf{H}_8 \mathbf{O}$	Elastic Scattering	1-20  eV	$\mathrm{Th}$	903
$\mathbf{e} + \mathbf{C}_4 \mathbf{H}_8 \mathbf{O}$	Angular Scattering	1-20  eV	$\mathrm{Th}$	903
e + He	Angular Scattering	721-729.6  eV	$\operatorname{Exp}$	904
e + Ar	Angular Scattering	721-729.6  eV	$\operatorname{Exp}$	904
e + He	Ionization	721-729.6  eV	$\operatorname{Exp}$	904
e + Ar	Ionization	721-729.6  eV	Exp	904
$\mathbf{e} + \mathbf{C}_2$	Excitation	0-10  eV	Th	905
$\mathbf{e} + \mathbf{C}_{60}$	Elastic Scattering	15-40  eV	E/T	906
$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_6$	Elastic Scattering	15-40  eV	E/T	906
$\mathbf{e} + \mathbf{C}_6 \mathbf{F}_6$	Elastic Scattering	15-40  eV	E/T	906
$e + C_8 H_8$	Elastic Scattering	15-40  eV	E/T	906
e + O	Elastic Scattering	$0-10  \mathrm{eV}$	E/T	907
e + Hg	Fluorescence	15-100 eV	E/T	908
e + Hg	Excitation	15-100 eV	E/T	908
$\mathbf{e} + \mathbf{H}_2$	Excitation	1200-2000 eV	E/T	909
$\mathbf{e} + \mathbf{H}_2$	Ionization	1200-2000 eV	E/T	909
e + Ba	Elastic Scattering	0-10 ev; 0-2.5 eV	E/T	910
$e + H_{3^+}$	Recombination	130-300 K	Exp	911
$\mathbf{e} + \mathbf{D}_3^+$	Recombination	130-300 K	Exp	911
$\mathbf{e} + \mathbf{H}_5^+$	Recombination	130-300 K	Exp	911
$e + D_5^+$	Recombination	130-300 K	$\operatorname{Exp}$	911

e + Mg	Angular Scattering	$10-100 {\rm ~eV}$	E/T	912
e + Mg	Excitation	$10-100 {\rm ~eV}$	E/T	912
$\mathbf{e} + \mathbf{A}\mathbf{r}^{3+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{A}\mathbf{r}^{4+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{A}\mathbf{r}^{5+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{A}\mathbf{r}^{6+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$e + Ar^{7+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$e + Kr^+$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$e + Kr^{2+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$e + Kr^{3+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{K} \mathbf{r}^{4+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$e + Kr^{5+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{K} \mathbf{r}^{6+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{K} \mathbf{r}^{7+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{X} \mathbf{e}^{4+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{X} \mathbf{e}^{5+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{X} \mathbf{e}^{6+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$e + Xe^{7+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{X}\mathbf{e}^{8+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{X} \mathbf{e}^{9+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{X} \mathbf{e}^{10+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{X} \mathbf{e}^{11+}$	Ionization	$30 - 3x10^4 \text{ eV}$	$\mathrm{Th}$	913
$\mathbf{e} + \mathbf{O}_2$	Attachment	5-9.3  eV	$\operatorname{Exp}$	914
$\mathbf{e} + \mathbf{O}_2$	Ionization	5-9.3  eV	$\operatorname{Exp}$	914
$\mathbf{e} + \mathbf{F} \mathbf{e}^{14+}$	Recombination	0.1-1600  eV	$\mathrm{Th}$	915
e + HCOOH	Excitation	1-5 eV	$\operatorname{Exp}$	916
$e + He^+$	Elastic Scattering	$3x10^{1} - 5x10^{7}$ Ry	$\mathrm{Th}$	917
$ m e + He^+$	Excitation	$3x10^{1} - 5x10^{7}$ Ry	$\mathrm{Th}$	917
e + O	Excitation	15-100  eV	$\mathrm{Th}$	918
$\mathbf{e} + \mathbf{C}_3$	Elastic Scattering	1-10 eV	$\operatorname{Exp}$	919
$\mathbf{e} + \mathbf{C}_3$	Angular Scattering	$1-10   \mathrm{eV}$	$\operatorname{Exp}$	919
$e + C_3$	Excitation	1-10 eV	Exp	919
$e + CO^+$	Dissociation	5-2500  eV	Exp	920
$e + CO^+$	Ionization	5-2500 eV	Exp	920
$\mathbf{e} + \mathbf{CS}_2$	Elastic Scattering	1000 eV	Exp	921
$\mathbf{e} + \mathbf{CS}_2$	Angular Scattering	1000 eV	Exp	921
$\mathbf{e} + \mathbf{CS}_2$	Excitation	1000  eV	Exp	921
$\mathbf{e} + \mathbf{N}^{3+}$	Excitation	$0-4X E(4 P_1) Ry$	Th	922
$\mathbf{e} + \mathbf{N}^{\circ +}$	Excitation	$0-4X E(4 P_1) Ry$	Th	922
$e + Mg^{10+}$	Excitation	$0-4X E(4 P_1) Ry$	Th	922
$\mathbf{e} + \mathbf{A} \mathbf{I}^{11+}$	Excitation	$0-4X E(4 P_1) Ry$	Th	922
$e + Si^{12+}$	Excitation	$0-4X E(4 P_1) Ry$	Th	922
$\mathbf{e} + \mathbf{S}^{1+1}$	Excitation	$0-4X E(4 P_1) Ry$	Th	922
$e + Ca^{10+}$	Excitation	$0-4X E(4 P_1) Ry$		922
$e + W^{\circ}$	Excitation	1500-4000 ev		923
e + Ae	An analysis Constitution	10-100 eV	E/I	924
e + Ae	English ting	10-100 eV		924
$e + LI^{+}$	Excitation	15-2500 Ry	1 II Th	920
e + Fe	Attachment	15-2500 Ky	1 II Erm	920
$e + n_2 O$	Attachment	5-20 eV	Exp E-m	920 096
$e + D_2 O$ $a + H_c O$	Dissociation	5-20 ev 5-20 eV	Exp F	920 096
$e + n_2 O$ $a \perp D_c O$	Dissociation	5-20 eV 5-20 eV	Exp Fyr	920 096
$c + D_2 O$ $a \perp Ar$	Electic Scottoring	5-20 e v 75 6-78 7 oV	Exp Th	940 097
c + Ar	Angular Scattering	75.6-78.7 oV	111 Th	941 097
c + AI $o \perp N_c$	Angular Scattering	75.6-78.7 oV	111 Th	941 097
$\mathbf{e} + \mathbf{N}_2$	Ionization	75.6-78.7 oV	111 Tհ	941 097
	IOIIIZatIOII	10.0-10.1 ev	111	921

e + Fr	Elastic Scattering	0-3.4  eV	Th 92	8
e + H	Elastic Scattering	$0-1000   \mathrm{eV}$	Th 92	9
$\mathbf{e} + \mathbf{H}^*$	Elastic Scattering	$0-1000   \mathrm{eV}$	Th 92	9
$e + He^+$	Elastic Scattering	$0-1000   \mathrm{eV}$	Th 92	9
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Elastic Scattering	$0-1000 {\rm ~eV}$	Th 92	9
$e + Be^{3+}$	Elastic Scattering	0-1000  eV	Th 92	9
e + H	Angular Scattering	$0-1000   \mathrm{eV}$	Th 92	9
$e + H^*$	Angular Scattering	$0-1000   \mathrm{eV}$	Th 92	9
$e + He^+$	Angular Scattering	$0-1000   \mathrm{eV}$	Th 92	9
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Angular Scattering	$0-1000   \mathrm{eV}$	Th 92	9
$e + Be^{3+}$	Angular Scattering	$0-1000   \mathrm{eV}$	Th 92	9
e + H	Excitation	$0-1000 {\rm ~eV}$	Th 92	9
$e + H^*$	Excitation	$0-1000 {\rm ~eV}$	Th 92	9
$e + He^+$	Excitation	$0-1000 {\rm ~eV}$	Th 92	9
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Excitation	$0-1000 {\rm ~eV}$	Th 92	9
$\mathbf{e} + \mathbf{B}\mathbf{e}^{3+}$	Excitation	$0-1000 \mathrm{eV}$	Th 92	9
e + H	Ionization	$0-1000 \mathrm{eV}$	Th 92	9
$e + H^*$	Ionization	$0-1000 \mathrm{eV}$	Th 92	9
$e + He^+$	Ionization	$0-1000 \mathrm{eV}$	Th 92	9
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Ionization	$0-1000 \mathrm{eV}$	Th 92	9
$\mathbf{e} + \mathbf{B}\mathbf{e}^{3+}$	Ionization	0-1000  eV	Th 92	9
e + H	Electron Collisions	$0-1000   \mathrm{eV}$	Th 92	9
$e + H^*$	Electron Collisions	$0-1000   \mathrm{eV}$	Th 92	9
$e + He^+$	Electron Collisions	$0-1000 \mathrm{eV}$	Th 92	9
$\mathbf{e} + \mathbf{L}\mathbf{i}^{2+}$	Electron Collisions	$0-1000 \mathrm{eV}$	Th 92	9
$\mathbf{e} + \mathbf{B}\mathbf{e}^{3+}$	Electron Collisions	0-1000  eV	Th 92	9
$\mathbf{e} + \mathbf{K}^+$	Excitation	20-400  eV	Th 93	0
$e + K^+$	Ionization	20-400  eV	Th 93	0
e + Ar	Angular Scattering	910  eV	E/T 93	1
e + Ar	Ionization	910  eV	E/T 93	1
$\mathbf{e} + \mathbf{F}\mathbf{e}^{13+}$	Recombination	0-230  eV	E/T 93	2
e + He	Fluorescence	55-60  eV	E/T 93	3
e + He	Excitation	55-60  eV	E/T 93	3
e + Ar	Ionization	$466-956 \mathrm{eV}$	E/T 93	4
e + Xe	Excitation	30-500  eV	Exp 93	5
e + Xe	Ionization	$30-500   \mathrm{eV}$	Exp 93	5
$e + O_2^+$	Dissociation	4-2500 eV	Exp 93	6
$e + O_2^+$	Ionization	4-2500 eV	Exp 93	6
$e + Si^{3+}$	Recombination	0-20  eV	E/T 93	7
$e + C^+$	Excitation	$3.0-4.5 \log T(K)$	Th 93	8
e + 0	Excitation	0-40  eV	Th 93	9
$e + Li^+$	Recombination	$10 - 10^{\prime}$ K	Th 94	0
$e + Be^{2+}$	Recombination	$10 - 10^{7}$ K	Th 94	:0
$\mathbf{e} + \mathbf{B}^{3+}$	Recombination	$10 - 10^{7} \text{ K}$	Th 94	:0
$\mathbf{e} + \mathbf{C}^{\pm \pm}$	Recombination	$10 - 10^{7} \text{ K}$	Th 94	:0
$\mathbf{e} + \mathbf{N}^{6+}$	Recombination	$10 - 10^{7} \text{ K}$	Th 94	:0
$e + O^{0+}$	Recombination	$10 - 10^{7} \text{ K}$	Th 94	:0
$\mathbf{e} + \mathbf{F}'$	Recombination	$10 - 10^{7} \text{ K}$	Th 94	:0
$\mathbf{e} + \mathbf{N}\mathbf{e}^{\circ}$	Recombination	10 - 10'  K	Th 94	:0
$e + 1Na^{-1}$	Recombination	10 - 10'  K	Th 94	:0
$e + Mg^{++}$	Recombination	10 - 10'  K	Th 94	:0
$e + AI^{++}$	Recombination	10 - 10'  K 10 - 107 V	Th 94	0
$e + 51^{+2}$	Recombination	$10 - 10^{\circ} \text{ K}$ 10 - 107 V	Th 94	:U
$e + P^{4}$	Recombination	$10 - 10^{\circ} \text{ K}$ 10 - 107 V	Th 94	:U
$e + S^{++}$	Recombination	$10 - 10^{\circ} \text{ K}$ 10 - 107 V	Th 94	:U
$e + CI^{+0+}$	Recombination	10 - 10'  K	Th 94	:0
$e + Ar^{++}$	Recombination	10 - 10' K	Th 94	U.

$\mathbf{e} + \mathbf{K}^{17+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$\mathbf{e} + \mathbf{C}\mathbf{a}^{18+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$e + Sc^{19+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$\mathbf{e} + \mathbf{T}\mathbf{i}^{20+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$e + V^{21+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$e + Cr^{22+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$e + Mn^{23+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$\mathbf{e} + \mathbf{F}\mathbf{e}^{24+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$e + Co^{25+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$\mathbf{e} + \mathbf{N}\mathbf{i}^{26+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{27+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$\mathbf{e} + \mathbf{K} \mathbf{r}^{28+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$e + Mo^{29+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$\mathbf{e} + \mathbf{X} \mathbf{e}^{30+}$	Recombination	$10 - 10^7 { m K}$	Th 940
$\mathbf{e} + \mathbf{F} \mathbf{e}^{19+}$	Excitation	$5-9 \log(K)$	Th 941
e + H	Ionization	$0 - 10^5  {\rm eV}$	Th $942$
e + He	Ionization	$0 - 10^5 { m eV}$	Th $942$
$e + He^+$	Ionization	$0 - 10^5 { m eV}$	Th 942
e + Li	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + Li^+$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
e + Be	Ionization	$0 - 10^5 {\rm eV}$	Th 942
$\mathrm{e} + \mathrm{Be^+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{B}\mathbf{e}^{2+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{B}\mathbf{e}^{3+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
e + B	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$e + B^+$	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$\mathbf{e} + \mathbf{B}^{2+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th $942$
$e + B^{3+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th $942$
$e + B^{4+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th $942$
e + C	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + C^+$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + C^{2+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + C^{3+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{C}^{4+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{C}^{5+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
e + N	Ionization	$0 - 10^{3} \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{N}^+$	Ionization	$0 - 10^{3} \text{ eV}$	Th 942
$e + N^{2+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{N}^{5+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{N}^{6+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + N^{\circ}$		$0 - 10^{5} \text{ eV}$	Th 942
e + 0		$0 - 10^{5} \text{ eV}$	In 942
e + 0'		$0 - 10^{5} \text{ eV}$	In 942
$e + O^{2+}$		$0 - 10^{5} \text{ eV}$	In 942
$e + 0^{4+}$		$0 - 10^{5} \text{ eV}$	In 942
$e + 0^{1+}$		$0 - 10^{5} \text{ eV}$	In 942
$e + 0^{\circ +}$		$0 - 10^{\circ} \text{ eV}$	In 942
$e + 0^{-1}$	Ionization	$0 - 10^{\circ} \text{ eV}$ 0 $10^{5} \text{ eV}$	1 n 942 Th 049
$e + O^{-1}$	Ionization	$0 - 10^{2} \text{ eV}$ 0 $10^{5} \text{ eV}$	1 fi 942 Th 049
$\mathbf{e} + \mathbf{r}$	Ionization	$0 - 10^{2} \text{ eV}$ 0 $10^{5} \text{ eV}$	1 fi 942 Th 049
$\mathbf{e} + \mathbf{r}$	Ionization	$0 - 10^{2} \text{ eV}$ $0 - 10^{5} \text{ eV}$	1 fi 942 Th 049
$\mathbf{e} + \mathbf{r}$		$0 - 10^{5} eV$	111 942 Th 049
$\mathbf{e} + \mathbf{r}$		$0 - 10^{5} eV$	111 942 Th 049
$\mathbf{e} + \mathbf{r}$	Ionization	$0 - 10^{5} eV$	111 942 Th 049
$\mathbf{e} + \mathbf{r}$		$0 - 10^{5} eV$	111 942 Th 049
C T L	IOHIZatIOH	v - 10 ev	111 942

$\mathbf{e} + \mathbf{F}^{7+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{F}^{8+}$	Ionization	$0 - 10^5 { m eV}$	Th	942
$\mathbf{e} + \mathbf{N}\mathbf{e}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{e}^+$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{e}^{2+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{e}^{3+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{e}^{4+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{N}\mathbf{e}^{5+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{N}\mathbf{e}^{\mathbf{o}+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{N}\mathbf{e}^{\prime +}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{N} \mathbf{e}^{\circ +}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$e + Ne^{s+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
e + Na		$0 - 10^{5} \text{ eV}$	Th	942
e + Na'	Ionization	$0 - 10^{\circ} \text{ eV}$	Th	942
$e + 1Na^{-1}$		$0 - 10^{\circ} \text{ eV}$	Th Th	942
$e + Ne^{4+}$		$0 - 10^{\circ} \text{ eV}$ 0 $10^{5} \text{ eV}$	111 Th	942
$e + Na^{-1}$		$0 - 10^{\circ} \text{ eV}$ 0 - 105 eV	111 Th	942
$e + Na^{6+}$	Ionization	$0 - 10^{5} \text{ eV}$	1 II ТЪ	942 042
$e + Na^{7+}$	Ionization	$0 - 10^{\circ} \text{ eV}$ $0 - 10^{\circ} \text{ eV}$	TH Th	942 042
$e + Na^{8+}$	Ionization	$0 - 10^{\circ} eV$ 0 - 10 <sup>5</sup> eV	Th	942 042
$e + Na^{9+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	042 042
$e + Na^{10+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942 942
$e + M\sigma$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942 942
$e + Mg^+$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{M}\mathbf{g}^{2+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$e + Mg^{3+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{M}\mathbf{g}^{4+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{M}\mathbf{g}^{5+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{M}\mathbf{g}^{6+}$	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{M}\mathbf{g}^{7+}$	Ionization	$0-10^5 \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{M} \mathbf{g}^{8+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{M} \mathbf{g}^{9+}$	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{M} \mathbf{g}^{10+}$	Ionization	$0-10^5 { m eV}$	Th	942
$\mathbf{e} + \mathbf{M} \mathbf{g}^{11+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{Al}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{Al}^+$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{A} \mathbf{l}^{2+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{Al}^{3+}$	Ionization	$0 - 10^{5}$ eV	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{Al}^{4+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{A} \mathbf{l}^{5+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{A} \mathbf{l}^{0+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{A}\mathbf{I}^{\prime +}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{A}\mathbf{I}^{0+}$		$0 - 10^{5} \text{ eV}$	Th	942
$e + AI^{3+}$		$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{A}\mathbf{I}^{10+}$		$0 - 10^{5} \text{ eV}$		942
$e + AI^{12+}$	Ionization	$0 - 10^{\circ} \text{ eV}$	1 fl Th	942
e + AI		$0 - 10^{\circ} \text{ eV}$ 0 $10^{\circ} \text{ eV}$	111 Th	942
$e + Si^+$	Ionization	$0 - 10^{5} eV$	ти Th	942 0/19
$e + Si^{2+}$	Ionization	$0 - 10^{5} eV$	ти Th	342 0/19
$e + Si^{3+}$	Ionization	$0 - 10^5  eV$	ти Th	942 949
$\mathbf{e} + \mathbf{Si}^{4+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$e + Si^{5+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$e + Si^{6+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$e + Si^{7+}$	Ionization	$0-10^5 \mathrm{eV}$	Th	942
$\mathbf{e} + \mathbf{Si}^{8+}$	Ionization	$0-10^5 \mathrm{eV}$	$\mathrm{Th}$	942

$\mathbf{e} + \mathbf{Si}^{9+}$	Ionization	$0-10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Si}^{10+}$	Ionization	$0 - 10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Si}^{11+}$	Ionization	$0-10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Si}^{12+}$	Ionization	$0-10^5~{ m eV}$	Th 942	
$\mathbf{e} + \mathbf{Si}^{13+}$	Ionization	$0 - 10^5 { m eV}$	Th 942	
e + P	Ionization	$0 - 10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{P}^+$	Ionization	$0 - 10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{P}^{2+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$	
$e + P^{3+}$	Ionization	$0 - 10^5 { m eV}$	Th 942	
$e + P^{4+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942	
$e + P^{5+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942	
$e + P^{6+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942	
$e + P^{7+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$e + P^{8+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$e + P^{9+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$e + P^{10+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th $942$	
$e + P^{11+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$\mathbf{e} \perp \mathbf{P}^{12+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 042	
$\mathbf{e} + \mathbf{I}$ $\mathbf{e} + \mathbf{P}^{13+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 042	
$\mathbf{e} + \mathbf{I}$	Ionization	$0 - 10^{\circ} eV$	Th 042	
e + 1	Ionization	$0 - 10^{\circ} eV$	Th 042	
e + 5	Ionization	$0 - 10^{5} eV$	Th 042	
e + 5	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$e + S^{4+}$		$0 - 10^{5} eV$	Th 942	
$e + 5^{-+}$	Ionization	$0 - 10^{\circ} \text{ eV}$	In 942	
$e + 5^{\circ +}$	Ionization	$0 - 10^{\circ} \text{ eV}$	In 942	
$e + S^{*+}$	Ionization	$0 - 10^{\circ} \text{ eV}$	In 942	
e + 5''	Ionization	$0 - 10^{\circ} \text{ eV}$	In 942	
$e + 5^{\circ +}$	Ionization	$0 - 10^{\circ} \text{ eV}$	In 942	
$e + S^{0+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$e + S^{10+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$e + S^{11+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$e + S^{12+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$e + S^{13+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$e + S^{14+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th 942	
$\mathbf{e} + \mathbf{S}^{10+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th 942	
e + Cl	Ionization	$0 - 10^{3} \text{ eV}$	Th 942	
$e + Cl^+$	Ionization	$0 - 10^{3} \text{ eV}$	Th 942	
$e + Cl^{2+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942	
$e + Cl^{3+}$	Ionization	$0 - 10^{\circ}$ eV	Th $942$	
$e + Cl^{4+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th $942$	
$e + Cl^{5+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th $942$	
$\mathbf{e} + \mathbf{Cl}^{6+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th $942$	
$\mathbf{e} + \mathbf{Cl}^{\gamma+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th $942$	
$e + Cl^{8+}$	Ionization	$0-10^5 { m eV}$	Th $942$	
$\mathbf{e} + \mathbf{Cl}^{9+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$	
$\mathbf{e} + \mathbf{Cl}^{10+}$	Ionization	$0 - 10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Cl}^{11+}$	Ionization	$0 - 10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Cl}^{12+}$	Ionization	$0 - 10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Cl}^{13+}$	Ionization	$0 - 10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Cl}^{14+}$	Ionization	$0-10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Cl}^{15+}$	Ionization	$0-10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Cl}^{16+}$	Ionization	$0 - 10^5 { m eV}$	Th 942	
e + Ar	Ionization	$0 - 10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Ar}^+$	Ionization	$0-10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{A}\mathbf{r}^{2+}$	Ionization	$0-10^5 { m eV}$	Th 942	
$e + Ar^{3+}$	Ionization	$0-10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{A}\mathbf{r}^{4+}$	Ionization	$0 - 10^5 { m eV}$	Th 942	
$\mathbf{e} + \mathbf{Ar}^{5+}$	Ionization	$0 - 10^5 { m eV}$	Th	942
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$\mathbf{e} + \mathbf{Ar}^{6+}$	Ionization	$0 - 10^5 { m eV}$	Th	942
$\mathbf{e} + \mathbf{A}\mathbf{r}^{7+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{Ar}^{8+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{A}\mathbf{r}^{9+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{Ar}^{10+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{Ar}^{11+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$e + Ar^{12+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Ar^{13+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Ar^{14+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Ar^{10+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$e + Ar^{10+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Ar^{++}$		$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{K}$	Ionization	$0 - 10^{\circ} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{K}$	Ionization	$0 - 10^{\circ} \text{ eV}$	1 n Th	942
$\mathbf{e} + \mathbf{K}$	Ionization	$0 - 10^{5} \text{ eV}$	1 II Th	942
$\mathbf{e} + \mathbf{K}^{4+}$	Ionization	$0 - 10^{\circ} eV$	1 II ТЪ	942
$\mathbf{e} + \mathbf{K}^{-1}$	Ionization	$0 - 10^{5} \text{ eV}$	1 II ТЪ	942
$\mathbf{e} + \mathbf{K}^{6+}$	Ionization	$0 - 10^{\circ} \text{ eV}$ 0 - 10 <sup>5</sup> oV	TH Th	942
$\mathbf{e} + \mathbf{K}^{+}$	Ionization	$0 - 10^{\circ} eV$ 0 - 10 <sup>5</sup> eV	Th	942 042
$e + K^{8+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	042 042
$e + K^{9+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + K^{10+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$e + K^{11+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$e + K^{12+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$e + K^{13+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{K}^{14+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$e + K^{15+}$	Ionization	$0 - 10^5 { m eV}$	Th	942
$\mathbf{e} + \mathbf{K}^{16+}$	Ionization	$0 - 10^5 { m eV}$	Th	942
$\mathbf{e} + \mathbf{K}^{17+}$	Ionization	$0-10^5 { m eV}$	Th	942
$\mathbf{e} + \mathbf{K}^{18+}$	Ionization	$0-10^5 { m eV}$	Th	942
e + Ca	Ionization	$0-10^5 { m eV}$	Th	942
$e + Ca^+$	Ionization	$0-10^5 { m eV}$	Th	942
$\mathbf{e} + \mathbf{C}\mathbf{a}^{2+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{C}\mathbf{a}^{3+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$e + Ca^{4+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{C}\mathbf{a}^{5+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{Ca}^{6+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{Ca}^{\prime +}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{Ca}^{8+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Ca^{9+}$	lonization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Ca^{10+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Ca^{11+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Ca^{12+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Ca^{13}$		$0 - 10^{5} \text{ eV}$	Th	942
$e + Ca^{11}$	Ionization	$0 - 10^{\circ} \text{ eV}$	In Th	942
$e + Ca^{16+}$	Ionization	$0 - 10^{5} \text{ ev}$	111 Th	942 049
$e + Ca^{17+}$	Ionization	$0 - 10^{6} \text{ ev}$ $0 - 10^{5} \text{ oV}$	тп Тh	942 049
$c + Ca^{18+}$	Ionization	$0 - 10^{5} eV$	тп Th	942 049
$c + Ca^{19+}$	Ionization	$0 - 10^{5} eV$	тн Th	942 0/9
e + Sc	Ionization	$0 - 10^{5} \text{ eV}$	Th	942 949
$e + Sc^+$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{S}\mathbf{c}^{2+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{S}\mathbf{c}^{3+}$	Ionization	$0 - 10^5 \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{S}\mathbf{c}^{4+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942

$\mathbf{e} + \mathbf{S} \mathbf{c}^{5+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$\mathbf{e} + \mathbf{S}\mathbf{c}^{6+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$e + Sc^{7+}$	Ionization	$0-10^5 { m eV}$	Th $942$
$e + Sc^{8+}$	Ionization	$0-10^5 { m eV}$	Th 942
$e + Sc^{9+}$	Ionization	$0-10^5 { m eV}$	Th $942$
$\mathbf{e} + \mathbf{S}\mathbf{c}^{10+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + Sc^{11+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$e + Sc^{12+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$e + Sc^{13+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$\mathbf{e} + \mathbf{S}\mathbf{c}^{14+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$e + Sc^{15+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$\mathbf{e} + \mathbf{S}\mathbf{c}^{16+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + Sc^{17+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + Sc^{18+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$\mathbf{e} + \mathbf{S}\mathbf{c}^{19+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{S}\mathbf{c}^{20+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
e + Ti	Ionization	$0 - 10^5 { m eV}$	Th $942$
$e + Ti^+$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{T}\mathbf{i}^{2+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + Ti^{3+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{T}\mathbf{i}^{4+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ti^{5+}$	Ionization	$0 - 10^5  {\rm eV}$	Th 942
$e + Ti^{6+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ti^{7+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ti^{8+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ti^{9+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ti^{10+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{T}\mathbf{i}^{11+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{T}\mathbf{i}^{12+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{T}\mathbf{i}^{13+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{T}\mathbf{i}^{14+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + Ti^{15+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{T}\mathbf{i}^{16+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$e + Ti^{17+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + Ti^{18+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + Ti^{19+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$\mathbf{e} + \mathbf{T}\mathbf{i}^{20+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$e + Ti^{21+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
e + V	Ionization	$0 - 10^5 { m eV}$	Th $942$
$\mathbf{e} + \mathbf{V}^+$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$\mathbf{e} + \mathbf{V}^{2+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$e + V^{3+}$	Ionization	$0 - 10^5 { m eV}$	Th $942$
$\mathbf{e} + \mathbf{V}^{4+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + V^{5+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + V^{6+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + V^{7+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + V^{8+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + V^{9+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + V^{10+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + V^{11+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{V}^{12+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + V^{13+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{V}^{14+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{V}^{15+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{V}^{16+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{V}^{17+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{V}^{18+}$	Ionization	$0-10^5 { m eV}$	Th $942$

$e + V^{19+}$	Ionization	$0-10^5 { m eV}$	Th 942
$e + V^{21+}$	Ionization	$0-10^5 { m eV}$	Th 942
$e + V^{22+}$	Ionization	$0-10^5 { m eV}$	Th 942
e + Cr	Ionization	$0-10^5 { m eV}$	Th 942
$e + Cr^+$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{2+}$	Ionization	$0-10^5 { m eV}$	Th 942
$e + Cr^{3+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{4+}$	Ionization	$0-10^5 { m eV}$	Th 942
$e + Cr^{5+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{6+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{7+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{8+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{9+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{10+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{11+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{12+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C} \mathbf{r}^{13+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{14+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{15+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C} \mathbf{r}^{16+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{17+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C} \mathbf{r}^{18+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{19+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{20+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{21+}$	Ionization	$0-10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{22+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$\mathbf{e} + \mathbf{C}\mathbf{r}^{23+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
e + Mn	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + Mn^+$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{Mn}^{2+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Mn^{3+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Mn^{4+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Mn^{5+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Mn^{6+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{M}\mathbf{n}^{7+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Mn^{8+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Mn^{9+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Mn^{10+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Mn^{11+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th 942
$e + Mn^{12+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th 942
$e + Mn^{13+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Mn^{14+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Mn^{10+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Mn^{10+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Mn^{1/1}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Mn^{10+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Mn^{10+}$		$0 - 10^{5} \text{ eV}$	Th 942
$e + Mn^{20+}$		$0 - 10^{\circ} \text{ eV}$	In 942 Th 049
$e + 1011^{-1}$	Ionization	$0 - 10^{\circ} \text{ eV}$ $0 - 10^{\circ} \text{ eV}$	1 n 942 Th 049
$e + 1010^{1}$		$U = 10^{\circ} \text{ eV}$	In 942
$e + 1 v m^{-2}$	Ionization	$0 - 10^{\circ} \text{ eV}$	1 fi 942 Th 049
$e + win^{}$	Ionization	$0 - 10^{\circ} \text{ eV}$ 0 $10^{5} \text{ eV}$	1 fi 942 Th 042
e + re $a + Fa^+$	Ionization	$0 - 10^{5} eV$	111 942 Th 049
$e + re^{2}$ $a + Fe^{2+}$	Ionization	$0 - 10^{5} eV$	Th 042
$e + re^{3+}$	Ionization	$0 - 10^{5} eV$	Th 042
$e + re^{4+}$	Ionization	$0 - 10^{5} eV$	Th 042
e T Te	TOHIZATION	0 - 10  GV	III 942

$e + Fe^{5+}$	Ionization	$0 - 10^5 { m eV}$	Th 942
$e + Fe^{6+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Fe^{7+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Fe^{8+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Fe^{9+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Fe^{10+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Fe^{11+}$	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$e + Fe^{12+}$	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$e + Fe^{13+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Fe^{14+}$	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$\mathbf{e} + \mathbf{F} \mathbf{e}^{15+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{F} \mathbf{e}^{16+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
e + Fe $e + Fe^{17+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Fe^{18+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Fe^{19+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Fe^{20+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$\mathbf{e} + \mathbf{F}\mathbf{e}^{21+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Fe^{22+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Fe^{23+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
e + Fe $e + Fe^{24+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 042
$e + Fe^{25+}$	Ionization	$0 - 10^{5} eV$	Th 942
e + fe a + Ca	Ionization	$0 - 10^{5} \text{ eV}$	Th 042
e + Co $e + Ce^+$	Ionization	$0 - 10^{5} eV$	Th 942
$e + Co^{+}$	Ionization	$0 - 10^{5} eV$	Th 942
e + Co $e + Ce^{3+}$	Ionization	$0 - 10^{5} eV$	Th 942
$e + Co^{4+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{5+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{6+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{7+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{8+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{9+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{10+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th $942$
$e + Ce^{11+}$	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$e + Ce^{12+}$	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$e + Co^{13+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{14+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{15+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{16+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{17+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{18+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{19+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{20+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 942
$e + Co^{21+}$	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$e + Ce^{22+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ce^{23+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Co^{24+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ce^{25+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Co^{26+}$	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
e + 00 e + Ni	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$e + Ni^+$	Ionization	$0 - 10^5 \text{ eV}$	Th 042
$\mathbf{e} + \mathbf{N}\mathbf{i}^{2+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 042
$e + Ni^{3+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 042
$e + Ni^{4+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ni^{5+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ni^{6+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ni^{7+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Ni^{8+}$	Ionization	$0-10^5 \text{ eV}$	Th 942
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$\mathbf{e} + \mathbf{N}\mathbf{i}^{9+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{10+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{11+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$e + Ni^{12+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{13+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$e + Ni^{14+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{15+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{16+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$e + Ni^{17+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$e + Ni^{18+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{19+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{20+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{21+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{22+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$e + Ni^{23+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{24+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{25+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{N}\mathbf{i}^{26+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$e + Ni^{27+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
e + Cu	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$e + Cu^+$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$e + Cu^{2+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{C}\mathbf{u}^{3+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$e + Cu^{4+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$	942
$e + Cu^{5+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$e + Cu^{6+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$e + Cu^{7+}$	Ionization	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	942
$e + Cu^{8+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{C}\mathbf{u}^{9+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$\mathbf{e} + \mathbf{C}\mathbf{u}^{10+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$e + Cu^{11+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$e + Cu^{12+}$	Ionization	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	942
$e + Cu^{13+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Cu^{14+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Cu^{15+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Cu^{16+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{C}\mathbf{u}^{1}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Cu^{10+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$e + Cu^{19+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$e + Cu^{20+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$e + Cu^{21+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$e + Cu^{22+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$e + Cu^{23+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$e + Cu^{24+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Cu^{25+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Cu^{20+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
$e + Cu^{27+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Cu^{20+}$	Ionization	$0 - 10^{3} \text{ eV}$	Th	942
e + Zn	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{\top}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$e + Zn^{2+}$	Ionization	$0 - 10^{\circ} \text{ eV}$	Th	942
$e + Zn^{3+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{\pm \pm}$	Ionization	$0 - 10^{5} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{\circ \pm}$	Ionization	$0 - 10^{5} \text{ eV}$	Th T	942
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{\circ \pm}$	Ionization	$0 - 10^{\circ} \text{ eV}$	Th	942
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{\prime \pm}$	Ionization	$0 - 10^{\circ} \text{ eV}$	Th	942
$e + Zn^{\circ +}$	Ionization	$0 - 10^{\circ} \text{ eV}$	Th	942

$e + Zn^{9+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Zn^{10+}$	Ionization	$0 - 10^5 \text{ eV}$	Th 942
$e + Zn^{11+}$	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$e + Zn^{12+}$	Ionization	$0 - 10^5 \text{ eV}$	Th $942$
$e + Zn^{13+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th $942$
$\mathbf{e} \perp \mathbf{Z} \mathbf{n}^{14+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 042
$\mathbf{e} + \mathbf{Z}\mathbf{n}$ $\mathbf{e} + \mathbf{Z}\mathbf{n}^{15+}$	Ionization	$0 - 10^{5} \text{ eV}$	Th 042
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{16+}$	Ionization	$0 = 10^{5} \text{ eV}$	Th 042
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{17+}$	Ionization	$0 = 10^{5} \text{ eV}$	Th 042
$e + 2n^{18+}$	Ionization	$0 - 10^{5} eV$	Th 042
e + Zn $e + Zn^{19+}$	Ionization	$0 - 10^{5} eV$	Th 042
e + 2n	Ionization	$0 - 10^{5} eV$	Th 042
e + Zn	Ionization	$0 - 10^{5} eV$	Th 042
e + Zn $e + Zn^{22+}$	Ionization	$0 - 10^{5} eV$	Th 042
e + 2n $e + 7n^{23+}$	Ionization	$0 - 10^{5} eV$	Th 042
e + Zn	Ionization	$0 - 10^{\circ} eV$	Th 042
e + Zn $e + Zn^{25+}$	Ionization	$0 - 10^{5} eV$	Th 042
e + Zn	Ionization	$0 - 10^{\circ} eV$	Th 942
$e + Zn^{27+}$	Ionization	$0 - 10^{5} eV$	Th 942
$e + Zn^{28+}$	Ionization	$0 - 10^{5} eV$	Th 942
$e + Zn^{29+}$	Ionization	$0 - 10^{\circ} \text{ eV}$	Th 942
$e + 2n^{-9+}$		$0 - 10^{-1} eV$	E 042
$\mathbf{e} + \mathbf{A}\mathbf{e}^{+}$	Fiuorescence	100-000 eV	Exp 945
$e + Ae^{+}$	Angulan Souttoning	100-000  eV	Exp 945 E/T 044
e + Ae	Angular Scattering	147.8 eV	E/I 944
e + Ae	Diggo sistion	147.8 eV	E/1 944 E-m 045
$e + H_2O$		9-700 eV	Exp 945
$e + H_2O$	Fluorescence	9-700  eV	Exp 945
e + Li	Ionization	$10^{2} - 10^{3} \text{ eV}$	E/I 940
e + Be'	Ionization	$10^{2} - 10^{3} \text{ eV}$	E/I 940
e + B'	Ionization	$10^{2} - 10^{3} \text{ eV}$	E/I 940
$e + B^{-1}$	Ionization	$10^{-} - 10^{-} \text{ eV}$	E/I 940 E/T 046
$e + C^{+}$		$10^{-} - 10^{-} \text{ eV}$	E/I 940 E/T 046
$e + C^{-1}$		$10^{-} - 10^{-} \text{ eV}$	E/I 940 E/T 046
$e + N^{-1}$		$10^{-} - 10^{-} \text{ eV}$	E/I 940 E/T 046
$e + N^{+}$		$10^{-} - 10^{-} \text{ eV}$	E/I 940 E/T 046
$e + 0^{+}$		$10^{-} - 10^{-} eV$ $10^{1} - 10^{5} eV$	E/I 940 E/T 046
$e + 0^{+}$		$10^{-} - 10^{-} eV$ $10^{1} - 10^{5} eV$	E/I 940 E/T 046
$e + 0^{-1}$		10 - 10  eV $10^1 - 10^5 \text{ eV}$	E/I 940 E/T 046
$e + Ne^{-1}$		10 - 10  eV $10^1 - 10^5 \text{ eV}$	E/I 940 E/T 046
$e + Ne^{7+}$		10 - 10  eV $10^1 - 10^5 \text{ eV}$	E/I 940 E/T 046
$e + 1 e^{-1}$	Ionization	$10^{-10} \text{ eV}$ $10^{1} 10^{5} \text{ eV}$	E/I 940 E/T 046
e + 0	Ionization	$10^{-} 10^{-} eV$ $10^{1} 10^{5} eV$	E/I 940 E/T 046
e + U	Ionization	10 - 10 eV 15 100 eV	E/1 = 940 F/T = 0.47
$\mathbf{e} + \mathbf{n}_2$	Floatic Scottoring	0.15  eV	E/1 = 947 F/T = 0.48
$\mathbf{e} + \mathbf{O}_2$	Elastic Scattering	0.15  eV	E/1 940 F/T 048
$\mathbf{e} + \mathbf{O}_2$	Excitation	0.15  eV	E/I 940 E/T 048
$\mathbf{e} + \mathbf{O}_2$	Excitation	0.15  eV	E/1 940 F/T 048
$e + O_2$	Excitation	0.180  Pr	E/I 940 F/T 040
$e + Ha^{75+}$	Becombination	45-54 koV	$E_{\rm T} = 949$ $E_{\rm VD} = 050$
$e + Ha^{76+}$	Recombination	45-54  keV	Exp 950 Exp 050
$e + Ha^{77+}$	Recombination	45-54  keV	Exp 950 Exp 050
$e + Ha^{78+}$	Recombination	45-54 keV 45-54 keV	Exp 950
$e + Ha^{75+}$	Recombination	45-54 keV 45-54 keV	шлр 950 Th 051
$e + Ha^{76+}$	Recombination	45-54 keV 45-54 keV	Th 051
$e + Ha^{77+}$	Recombination	45-54 boV	Th 051
$e + Ha^{78+}$	Recombination	45-54  keV 45-54  keV	Th 051
	recombination	40-04 KCV	111 951

e + H         Angular Scattering         0.1-0.8 Ry         Th         95           e + N         Ionization         350-4000 eV         E/T         95           e + N         Ionization         350-4000 eV         E/T         95           e + N         Ionization         350-4000 eV         E/T         95           e + H2O         Ionization         350-4000 eV         E/T         95           e + H2O         Ionization         350-4000 eV         E/T         95           e + C41         Ionization         350-4000 eV         E/T         95           e + C3         Elastic Scattering         0.4 eV         E/T         95           e + C4         Recombination         1.6-2.1 eV         Th         95           e + N2         Angular Scattering         1.6-2.1 eV         Th         95           e + N2         Angular Scattering         1.6-2.1 eV         Th         95           e + N2         Dissociation         1500-15,000 deg K         Th         95           e + H2         Dissociation         1500-15,000 deg K         Th         95           e + H2         Ionization         1500-15,000 deg K         Th         95           e + Cu </th <th>e +</th> <th>Н</th> <th>Elastic Scattering</th> <th>0.1-0.8 Ry</th> <th>Th</th> <th>952</th>	e +	Н	Elastic Scattering	0.1-0.8 Ry	Th	952
e + C         Ionization $330-4000 \text{ eV}$ E/T $95$ e + N         Ionization $350-4000 \text{ eV}$ E/T $95$ e + Ne         Ionization $330-4000 \text{ eV}$ E/T $95$ e + H2O         Ionization $330-4000 \text{ eV}$ E/T $95$ e + H2O         Ionization $330-4000 \text{ eV}$ E/T $95$ e + N2         Ionization $330-4000 \text{ eV}$ E/T $95$ e + N2         Ionization $330-4000 \text{ eV}$ E/T $95$ e + N2         Ionization $350-4000 \text{ eV}$ E/T $95$ e + Ca         Angular Scattering $0.4 \text{ eV}$ E/T $95$ e + Ca         Angular Scattering $1.62.1 \text{ eV}$ Th $95$ e + H2         Dissociation $150015,000 \text{ deg K}$ Th $95$ e + H2         Ionization $150015,000 \text{ deg K}$ Th $95$ e + H2         Ionization $150015,000 \text{ deg K}$ Th $95$ e + H2         Ionization $20100  e$	e +	Н	Angular Scattering	0.1-0.8 Ry	$\mathrm{Th}$	952
e + N         Ionization $330-4000 \text{ eV}$ E/T $95$ e + Ne         Ionization $350-4000 \text{ eV}$ E/T $95$ e + Ne         Ionization $350-4000 \text{ eV}$ E/T $95$ e + Ne         Ionization $350-4000 \text{ eV}$ E/T $95$ e + No         Ionization $350-4000 \text{ eV}$ E/T $95$ e + Cal         Ionization $350-4000 \text{ eV}$ E/T $95$ e + Ca         Issociation $350-4000 \text{ eV}$ E/T $95$ e + Ca         Excitation $16^{-5}-10^{0} \text{ eV}$ E/T $95$ e + Ca         Angular Scattering $0.4 \text{ eV}$ E/T $95$ e + N2         Angular Scattering $1.6^{-2}.1 \text{ eV}$ Th $95$ e + N2         Angular Scattering $1.6^{-2}.1 \text{ eV}$ Th $95$ e + N2         Dissociation $1500^{-1}.5000 \text{ deg K}$ Th $95$ e + H2         Dissociation         1500^{-1}.5000 \text{ deg K}         Th $95$ e + H2         Ionization	e +	С	Ionization	350-4000 eV	E/T	953
e + O         Ionization         350-4000 eV $E/T$ 95           e + H <sub>2</sub> O         Ionization         350-4000 eV $E/T$ 95           e + H <sub>2</sub> O         Ionization         350-4000 eV $E/T$ 95           e + CA         Iastic Scattering         0.4 eV $E/T$ 95           e + Ca         Angular Scattering         1.6-2.1 eV         Th         95           e + N2         Excitation         1500-15.000 deg K         Th         95           e + H2         Dissociation         1500-15.000 deg K         Th         95           e + OH         Doization         1500-15.000 deg K         Th         95           e + OH         Ionization         1500-15.000 deg K         Th         95           e + N1^{10+}         Excitation         0.75 Ry         Th         95           e + Cu         Angular Scattering         20-100 eV         Exp         96	e +	Ν	Ionization	350-4000  eV	E/T	953
e + Ne         Ionization         350-4000 eV $E/T$ 95           e + H2O         Ionization         350-4000 eV $E/T$ 95           e + CH4         Ionization         350-4000 eV $E/T$ 95           e + C3H4         Ionization         350-4000 eV $E/T$ 95           e + Ca         Angular Scattering         0-4 eV $E/T$ 95           e + Ca         Angular Scattering         0-4 eV $E/T$ 95           e + Ca         Angular Scattering         1-6-2.1 eV         Th         95           e + N2         Angular Scattering         1-6-2.1 eV         Th         95           e + N2         Excitation         1500-15.000 deg K         Th         95           e + H2         Excitation         1500-15.000 deg K         Th         95           e + H2         Excitation         1500-15.000 deg K         Th         95           e + H2         Excitation         100-15.000 deg K         Th         95           e + Cu         Angular Scattering         20-100 eV         Th         95           e + Cu         Excitation         0-100 eV         Th         96	e +	0	Ionization	350-4000  eV	E/T	953
e + H <sub>2</sub> O         Ionization         350-4000 eV         E/T         95           e + CH <sub>4</sub> Ionization         350-4000 eV         E/T         95           e + Ca         Ionization         350-4000 eV         E/T         95           e + Ca         Elastic Scattering         0-4 eV         E/T         95           e + Ca         Angular Scattering         0-4 eV         E/T         95           e + Ca         Angular Scattering         1.6-2.1 eV         Th         95           e + N2         Angular Scattering         1.6-2.1 eV         Th         95           e + H2         Dissociation         1500-15.000 deg K         Th         95           e + H2         Dissociation         1500-15.000 deg K         Th         95           e + H2         Ionization         1500-15.000 deg K         Th         95           e + OH         Excitation         1500-15.000 deg K         Th         95           e + H2         Ionization         1500-15.000 deg K         Th         95           e + Cu         Angular Scattering         20-100 eV         Th         95           e + Cu         Excitation         0.0-10.000 eV         Th         96	e +	Ne	Ionization	350-4000  eV	E/T	953
e + CH <sub>4</sub> Ionization       350-4000 eV       E/T       95         e + C <sub>3</sub> H <sub>4</sub> Ionization       350-4000 eV       E/T       95         e + C <sub>3</sub> H <sub>4</sub> Ionization       350-4000 eV       E/T       95         e + C <sub>3</sub> A       Elastic Scattering       0-4 eV       E/T       95         e + C <sup>6+</sup> Recombination       10 <sup>-5</sup> - 10 <sup>4</sup> eV       E/T       95         e + N <sub>2</sub> Angular Scattering       1.6-2.1 eV       Th       95         e + H <sub>2</sub> Dissociation       1500-15.000 deg K       Th       95         e + H <sub>2</sub> Excitation       1500-15.000 deg K       Th       95         e + H <sub>2</sub> Ionization       1500-15.000 deg K       Th       95         e + OH       Excitation       1500-15.000 deg K       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Ni <sup>10-4</sup> Excitation       0.0 <sup>-10,000</sup> eV       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Al       Dissociation       0.0 <sup>-10,000</sup> eV       Th<	e +	$H_2O$	Ionization	350-4000  eV	E/T	953
e + N2       Ionization       350-4000 eV       E/T       95         e + C3       Ionization       350-4000 eV       E/T       95         e + Ca       Elastic Scattering       0.4 eV       E/T       95         e + Ca       Angular Scattering       0.4 eV       E/T       95         e + N2       Angular Scattering       1.6-2.1 eV       Th       95         e + N2       Excitation       1.60-15,000 dg K       Th       95         e + H2       Dissociation       1500-15,000 dg K       Th       95         e + OH       Dissociation       1500-15,000 dg K       Th       95         e + OH       Excitation       1500-15,000 dg K       Th       95         e + OH       Lonization       1500-15,000 dg K       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Cu       Excitation       0.0-10,000 eV       Th       95         e + Cu       Excitation       0.0-10,000 eV       Exp       96         e + A12       Excitation       0.0-10,000 eV       Exp       96         <	$\mathbf{e}$ +	$\mathbf{CH}_4$	Ionization	$350\text{-}4000~\mathrm{eV}$	E/T	953
e + C <sub>3</sub> H <sub>4</sub> Ionization 350-4000 eV E/T 95 e + Ca Elastic Scattering 0-4 eV E/T 95 e + C <sup>4</sup> Angular Scattering 0-4 eV E/T 95 e + C <sup>5</sup> Angular Scattering 0-4 eV E/T 95 e + C <sup>5</sup> Angular Scattering 0-6 eV E/T 95 e + N <sub>2</sub> Angular Scattering 1-6-2.1 eV Th 95 e + N <sub>2</sub> Excitation 1500-15,000 deg K Th 95 e + H <sub>2</sub> Dissociation 1500-15,000 deg K Th 95 e + H <sub>2</sub> Excitation 1500-15,000 deg K Th 95 e + H <sub>2</sub> Excitation 1500-15,000 deg K Th 95 e + OH Dissociation 1500-15,000 deg K Th 95 e + OH Excitation 1500-15,000 deg K Th 95 e + Cu Excitation 20-100 eV Th 95 e + Cu Excitation 20-100 eV Th 95 e + Cu Excitation 20-100 eV Th 95 e + Ni <sup>10+</sup> Excitation 20-200 eV Exp 96 e + H <sub>2</sub> Excitation 0.0-10,000 eV Th 95 e + H <sub>2</sub> Excitation 0.0-100 eV Th 95 e + Cu Excitation 20-200 eV Exp 96 e + C <sub>2</sub> H <sub>2</sub> O Excitation 0.0-1000 eV Th 96 e + C <sub>3</sub> H <sub>4</sub> O Elastic Scattering 200-100 eV Th 96 e + C <sub>3</sub> H <sub>4</sub> O Elastic Scattering 200-100 eV Th 96 e + C <sub>3</sub> H <sub>4</sub> O Elastic Scattering 200-1000 eV Th 96 e + C <sub>4</sub> H <sub>4</sub> O Elastic Scattering 200-1000 eV Th 96 e + A <sub>3</sub> <sup>+</sup> Dissociation 10 <sup>-6</sup> - 10 <sup>-1</sup> eV Exp 96 e + C <sub>4</sub> H <sub>2</sub> O Excitation 0.0-1000 eV Th 96 e + A <sub>4</sub> Elastic Scattering 200-1000 eV Th 96 e + A <sub>4</sub> Elastic Scattering 200-1000 eV Th 96 e + A <sub>4</sub> Elastic Scattering 200-1000 eV Th 96 e + A <sub>4</sub> Elastic Scattering 200-1000 eV Th 96 e + H <sub>2</sub> O Dissociation 3.5-10 eV Th 96 e + H <sub>4</sub> Recombination 0.5000 eV E/T 97 e + Kr <sup>4+</sup> Recombination 0.5000 eV E/T 97 e + Kr <sup>10+</sup> Recombination 0.5000 eV E/T 97 e + Kr <sup>10+</sup> Recombination 0.5000 eV	$\mathbf{e}$ +	$\mathbf{N}_2$	Ionization	350-4000  eV	E/T	953
e + Ca       Elastic Scattering       0.4 eV       E/T       95         e + Ca       Angular Scattering       1.6-2.1 eV       Th       95         e + N2       Angular Scattering       1.6-2.1 eV       Th       95         e + N2       Excitation       1.6-2.1 eV       Th       95         e + N2       Excitation       1.500-15,000 deg K       Th       95         e + H2       Dissociation       1500-15,000 deg K       Th       95         e + OH       Dissociation       1500-15,000 deg K       Th       95         e + H2       Ionization       1500-15,000 deg K       Th       95         e + OH       Ionization       1500-15,000 deg K       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Cu       Excitation       20-100 eV       Th       95         e + R2       Excitation       20-200 eV       Exp       96         e + Cu       Excitation       20-200 eV       Exp       96         e + C3 H52       Excitation       0.1000 eV       Th       96         e + C44_6O       Elastic Scattering       200-1000 eV       Th       96	$\mathbf{e}$ +	$\mathbf{C}_3\mathbf{H}_4$	Ionization	350-4000  eV	E/T	953
e + Ca       Angular Scattering $0.4 \text{ eV}$ E/T       95         e + C <sup>6+</sup> Recombination $1.6^{-5} - 10^{0} \text{ eV}$ E/T       95         e + N <sub>2</sub> Angular Scattering $1.6 - 2.1 \text{ eV}$ Th       95         e + N <sub>2</sub> Excitation $1.50 - 15,000 \text{ deg K}$ Th       95         e + H <sub>2</sub> Dissociation $1500 - 15,000 \text{ deg K}$ Th       95         e + OH       Dissociation $1500 - 15,000 \text{ deg K}$ Th       95         e + OH       Ionization $1500 - 15,000 \text{ deg K}$ Th       95         e + OH       Ionization $1500 - 15,000 \text{ deg K}$ Th       95         e + Cu       Angular Scattering $20 - 100 \text{ eV}$ Th       95         e + Cu       Angular Scattering $20 - 100 \text{ eV}$ Th       95         e + Ni <sup>10+</sup> Excitation $20 - 100 \text{ eV}$ Th       96         e + H <sub>2</sub> Excitation $20 - 200 \text{ eV}$ Exp       96         e + Ca       Angular Scattering $20 - 200 \text{ eV}$ Exp       96         e + Au       Excitation $0 - 1000 \text{ eV}$ Th       96 <t< th=""><td><math>\mathbf{e}</math> +</td><th>Ca</th><td>Elastic Scattering</td><td>0-4  eV</td><td>E/T</td><td>954</td></t<>	$\mathbf{e}$ +	Ca	Elastic Scattering	0-4  eV	E/T	954
e + C <sup>6+</sup> Recombination $10^{-5} - 10^{0}$ eV         E/T         95           e + N <sub>2</sub> Angular Scattering $1.6 \cdot 2.1$ eV         Th         95           e + N <sub>2</sub> Dissociation $1500 \cdot 15,000$ deg K         Th         95           e + H <sub>2</sub> Dissociation $1500 \cdot 15,000$ deg K         Th         95           e + H <sub>2</sub> Excitation $1500 \cdot 15,000$ deg K         Th         95           e + H <sub>2</sub> Ionization $1500 \cdot 15,000$ deg K         Th         95           e + H <sub>2</sub> Ionization $1500 \cdot 15,000$ deg K         Th         95           e + H <sub>2</sub> Ionization $1500 \cdot 15,000$ deg K         Th         95           e + Cu         Angular Scattering $20 \cdot 100$ eV         Th         95           e + Cu         Excitation $20 \cdot 100$ eV         Th         96           e + Cu         Excitation $0.0 \cdot 10,00$ eV         Th         96           e + H <sub>2</sub> Excitation $0.0 \cdot 10,00$ eV         Th         96           e + Cu         Excitation $0.0 \cdot 100$ eV         Th         96           e + H <sub>2</sub> O         Excitation $0.100$ eV <td><math>\mathbf{e}</math> +</td> <th>Ca</th> <td>Angular Scattering</td> <td>0-4 eV</td> <td>E/T</td> <td>954</td>	$\mathbf{e}$ +	Ca	Angular Scattering	0-4 eV	E/T	954
e + N2       Angular Scattering $1.6-2.1 \text{ eV}$ Th       95         e + H2       Dissociation $1.6-2.1 \text{ eV}$ Th       95         e + H2       Dissociation $1500-15,000 \text{ deg K}$ Th       95         e + H2       Dissociation $1500-15,000 \text{ deg K}$ Th       95         e + OH       Excitation $1500-15,000 \text{ deg K}$ Th       95         e + OH       Lonization $1500-15,000 \text{ deg K}$ Th       95         e + Cu       Angular Scattering $20-100 \text{ eV}$ Th       95         e + Cu       Angular Scattering $20-100 \text{ eV}$ Th       95         e + Cu       Excitation $0.0-15,000 \text{ deg K}$ Th       95         e + Cu       Excitation $0.0-10,000 \text{ eV}$ Th       95         e + Cu       Excitation $0.0-10,000 \text{ eV}$ Th       96         e + H2O       Excitation $0.0-200 \text{ eV}$ Exp       96         e + Ca_H2O       Excitation $0.1000 \text{ eV}$ Th       96         e + Ca_H2O       Escitation $0.0-1000 \text{ eV}$ Th       96         e + Ca_H2O       Escitatering	$\mathbf{e}$ +	$\mathbf{C}^{6+}$	Recombination	$10^{-5} - 10^0 \text{ eV}$	E/T	955
e + $H_2$ Dissociation       1.60-2.1 eV       Th       95         e + $H_2$ Dissociation       1500-15,000 deg K       Th       95         e + $OH$ Dissociation       1500-15,000 deg K       Th       95         e + $H_2$ Excitation       1500-15,000 deg K       Th       95         e + $H_2$ Ionization       1500-15,000 deg K       Th       95         e + $OH$ Ionization       1500-15,000 deg K       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Cu       Excitation       20-100 eV       Th       95         e + Cu       Excitation       20-100 eV       Th       96         e + H_2O       Excitation       20-200 eV       Exp       96         e + CO       Excitation       0.1000 eV       E/T       96         e + Cal_F_2       Excitation       0.1000 eV       Th       96         e + Ag       Elastic Scattering       200-1000 eV       Th       96         e + Ag       Elastic Scattering       200-1000 eV       Th       96         e + Ag       Elastic Scattering       200-1000 eV       Th       96	e +	$\mathbf{N}_2$	Angular Scattering	1.6-2.1  eV	$\mathrm{Th}$	956
$e + H_2$ Dissociation       1500-15,000 deg K       Th       95 $e + H_2$ Excitation       1500-15,000 deg K       Th       95 $e + H_2$ Excitation       1500-15,000 deg K       Th       95 $e + H_2$ Ionization       1500-15,000 deg K       Th       95 $e + OH$ Ionization       1500-15,000 deg K       Th       95 $e + Cu$ Angular Scattering       20-100 eV       Th       95 $e + Cu$ Angular Scattering       20-100 eV       Th       95 $e + H_2$ Excitation       20-100 eV       Th       95 $e + H_2$ Excitation       20-200 eV       Th       96 $e + CO$ Excitation       20-200 eV       Exp       96 $e + C_4H_2O$ Excitation       0-100 eV       Th       96 $e + A_3^+$ Dissociation       10^{-6} - 10^{-1} eV       Exp       96 $e + A_4$ Elastic Scattering       200-1000 eV       Th       96 $e + A_3^+$ Dissociation       3.5-10 eV       Th       96 $e + A_4$ Elastic Scattering       200-1000 eV       Th <td>e +</td> <th><math>\mathbf{N}_2</math></th> <td>Excitation</td> <td>1.6-2.1  eV</td> <td><math>\mathrm{Th}</math></td> <td>956</td>	e +	$\mathbf{N}_2$	Excitation	1.6-2.1  eV	$\mathrm{Th}$	956
e + OH       Dissociation       1500-15,000 deg K       Th       95         e + OH       Excitation       1500-15,000 deg K       Th       95         e + OH       Ionization       1500-15,000 deg K       Th       95         e + OH       Ionization       1500-15,000 deg K       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Cu       Excitation       20-100 eV       Th       95         e + H2       Excitation       0.0-10,000 eV       Th       96         e + Ni <sup>10+</sup> Excitation       20-200 eV       Exp       96         e + C2H2F2       Excitation       0-1000 eV       E/T       96         e + C2H2F2       Excitation       0-1000 eV       E/T       96         e + C3H4O       Elastic Scattering       200-1000 eV       Th       96         e + A1       Elastic Scattering       200-1000 eV       Th       96         e + A2       Elastic Scattering       200-1000 eV       Th       96         e + A1       Elastic Scattering       200-1000 eV       Th       96         e + A2       Dissociation       3.5-10 eV       Th       96 <t< th=""><td>e +</td><th><math>\mathbf{H}_2</math></th><td>Dissociation</td><td><math>1500-15,000 \deg K</math></td><td><math>\mathrm{Th}</math></td><td>957</td></t<>	e +	$\mathbf{H}_2$	Dissociation	$1500-15,000 \deg K$	$\mathrm{Th}$	957
e + H2       Excitation       1500-15,000 deg K       Th       95         e + H2       Ionization       1500-15,000 deg K       Th       95         e + OH       Ionization       1500-15,000 deg K       Th       95         e + OH       Ionization       1500-15,000 deg K       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Cu       Excitation       20-100 eV       Th       95         e + H2       Excitation       0.0-10,000 eV       Th       95         e + H2       Excitation       20-200 eV       Exp       96         e + C2H2F2       Excitation       0-100 eV       Exp       96         e + C2H40       Elastic Scattering       0-15 eV       Th       96         e + C4H40       Elastic Scattering       200-1000 eV       Th       96         e + A1       Elastic Scattering       200-1000 eV       Th       96         e + A2       Elastic Scattering       200-1000 eV       Th       96         e + A3       Elastic Scattering       200-1000 eV       Th       96         e + A4       Elastic Scattering       200-1000 eV       Th       96	e +	OH	Dissociation	$1500-15,000 \deg K$	$\mathrm{Th}$	957
e + OH       Excitation       1500-15,000 deg K       Th       95         e + OH       Ionization       1500-15,000 deg K       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Cu       Excitation       20-100 eV       Th       95         e + Cu       Excitation       20-100 eV       Th       95         e + H2       Excitation       20-200 eV       Exp       96         e + C2H_2F2       Excitation       20-200 eV       Exp       96         e + C2H_2F2       Excitation       0-100 eV       E/T       96         e + C3H_2F2       Excitation       0-100 eV       E/T       96         e + C4H4O       Elastic Scattering       0-100 eV       E/T       96         e + C4H4O       Elastic Scattering       200-1000 eV       Th       96         e + AI       Elastic Scattering       200-1000 eV       Th       96         e + Au       Elastic Scattering       200-1000 eV       Th       96         e + Au       Elastic Scattering       200-1000 eV       Th       96         e + H2O       Dissociation       3.5-10 eV       Th       96	e +	$\mathbf{H}_2$	Excitation	$1500-15,000 \deg K$	$\mathrm{Th}$	957
e + H2       Ionization       1500-15,000 deg K       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Cu       Excitation       20-100 eV       Th       95         e + Ni <sup>10+</sup> Excitation       20-100 eV       Th       95         e + H2       Excitation       20-100 eV       Th       96         e + H2       Excitation       20-200 eV       Exp       96         e + CO       Excitation       20-200 eV       Exp       96         e + CO       Excitation       0-1000 eV       Exp       96         e + CA       H40       Elastic Scattering       0-100 eV       Exp       96         e + CA       H40       Elastic Scattering       200-1000 eV       Th       96         e + A1       Elastic Scattering       200-1000 eV       Th       96         e + A2       Elastic Scattering       200-1000 eV       Th       96         e + A3       Elastic Scattering       200-1000 eV       Th       96         e + A4       Elastic Scattering       200-1000 eV       Th       96         e + A4       Elastic Scattering       200-1000 eV       Th       9	e +	OH	Excitation	$1500-15,000 \deg K$	Th	957
e + OH       lonization       1500-15,000 deg K       Th       95         e + Cu       Angular Scattering       20-100 eV       Th       95         e + Ni <sup>10+</sup> Excitation       20-100 eV       Th       95         e + H2       Excitation       0.0-10,000 eV       Th       95         e + H2       Excitation       20-200 eV       Exp       96         e + CQ       Excitation       20-200 eV       Exp       96         e + CqH2F2       Excitation       0-1000 eV       E/T       96         e + CqH4IO       Elastic Scattering       0-100 eV       E/T       96         e + A1       Elastic Scattering       200-1000 eV       Th       96         e + A1       Elastic Scattering       200-1000 eV       Th       96         e + A1       Elastic Scattering       200-1000 eV       Th       96         e + A2       Elastic Scattering       200-1000 eV       Th       96         e + A4       Elastic Scattering       200-1000 eV       Th       96         e + A2       Dissociation       3.5-10 eV       Th       96         e + H2       Dissociation       0-140 eV       Th       96         <	e +	$\mathbf{H}_2$	Ionization	$1500-15,000 \deg K$	Th	957
e + Cu       Angular Scattering       20-100 eV       Th       95         e + Ni <sup>10+</sup> Excitation       20-100 eV       Th       95         e + H2       Excitation       0.0-10,000 eV       Th       96         e + H2       Excitation       20-200 eV       Exp       96         e + CQ       Excitation       20-200 eV       Exp       96         e + C2H2F2       Excitation       0-1000 eV       E/T       96         e + C3H4O       Elastic Scattering       0-15 eV       Th       96         e + A3       Dissociation       10 <sup>-6</sup> - 10 <sup>-1</sup> eV       Exp       96         e + Cu       Elastic Scattering       200-1000 eV       Th       96         e + Ag       Elastic Scattering       200-1000 eV       Th       96         e + Au       Elastic Scattering       200-1000 eV       Th       96         e + Ag       Elastic Scattering       200-1000 eV       Th       96         e + Au       Elastic Scattering       200-1000 eV       Th       96         e + H2O       Dissociation       3.5-10 eV       Th       96         e + H2O       Excitation       0.1-40 eV       Th       96	e +	OH	Ionization	$1500-15,000 \deg K$	Th	957
$e + Ni^{10+}$ Excitation $20-100 \text{ eV}$ Th $95$ $e + H_2$ Excitation $0.0-10,000 \text{ eV}$ Th $96$ $e + H_2O$ Excitation $20-200 \text{ eV}$ Exp $96$ $e + CO$ Excitation $20-200 \text{ eV}$ Exp $96$ $e + CQ$ Excitation $20-200 \text{ eV}$ Exp $96$ $e + CQ$ Excitation $0-100 \text{ eV}$ Exp $96$ $e + Cq$ H_4O       Elastic Scattering $0-15 \text{ eV}$ Th $96$ $e + A_3^+$ Dissociation $10^{-6} - 10^{-1} \text{ eV}$ Exp $96$ $e + Ag$ Elastic Scattering $200-1000 \text{ eV}$ Th $96$ $e + Ag$ Elastic Scattering $200-1000 \text{ eV}$ Th $96$ $e + Ag$ Elastic Scattering $200-1000 \text{ eV}$ Th $96$ $e + H_2O$ Dissociation $3.5 10 \text{ eV}$ Th $96$ $e + H_2O$ Excitation $0.1-40 \text{ eV}$ Th $96$ $e + H_2O$ Excitation $0.5000 \text{ eV}$ E/T $97$	e +	Cu	Angular Scattering	20-100 eV	Th	958
$e + H_2$ Excitation $10.75 \text{ Ry}$ Th $95$ $e + H_2$ O       Excitation $20.200 \text{ eV}$ Exp $96$ $e + CQ$ Excitation $20.200 \text{ eV}$ Exp $96$ $e + C_2H_2F_2$ Excitation $0.1000 \text{ eV}$ E/T $96$ $e + C_2H_2F_2$ Excitation $0.1000 \text{ eV}$ E/T $96$ $e + C_3H_4O$ Elastic Scattering $0.000 \text{ eV}$ Th $96$ $e + Al$ Elastic Scattering $200-1000 \text{ eV}$ Th $96$ $e + Ag$ Elastic Scattering $200-1000 \text{ eV}$ Th $96$ $e + Ag$ Elastic Scattering $200-1000 \text{ eV}$ Th $96$ $e + Ag$ Elastic Scattering $200-1000 \text{ eV}$ Th $96$ $e + He$ Ionization $3.5-10 \text{ eV}$ Th $96$ $e + H_2O$ Dissociation $3.5-10 \text{ eV}$ Th $96$ $e + H_2O$ Excitation $0.1-40 \text{ eV}$ Th $96$ $e + H_2O$ Excitation $0.5000 \text{ eV}$ $E/T$ $97$ <td< th=""><td>e +</td><th>Cu</th><td>Excitation</td><td>20-100  eV</td><td>Th</td><td>958</td></td<>	e +	Cu	Excitation	20-100  eV	Th	958
$e + H_2$ Excitation $0.0^{-1}0,000 eV$ Th       96 $e + H_2$ O       Excitation $20-200 eV$ Exp       96 $e + C_2H_2F_2$ Excitation $20-200 eV$ Exp       96 $e + C_2H_2F_2$ Excitation $0-1000 eV$ E/T       96 $e + N_3^+$ Dissociation $10^{-6} - 10^{-1} eV$ Exp       96 $e + A_1$ Elastic Scattering $200-1000 eV$ Th       96 $e + A_1$ Elastic Scattering $200-1000 eV$ Th       96 $e + A_2$ Elastic Scattering $200-1000 eV$ Th       96 $e + A_2$ Elastic Scattering $200-1000 eV$ Th       96 $e + A_2$ Elastic Scattering $200-1000 eV$ Th       96 $e + H_2$ Dissociation $3.5-10 eV$ Th       96 $e + H_2O$ Excitation $0.1-40 eV$ Th       96 $e + H_2O$ Excitation $0.5-000 eV$ $E/T$ 97 $e + Kr^{+}$ Recombination $0-5000 eV$ $E/T$ 97 $e + Kr^{2+}$ Recombination <td>e +</td> <th><math>Ni^{10+}</math></th> <td>Excitation</td> <td>10-75 Ry</td> <td>Th</td> <td>959</td>	e +	$Ni^{10+}$	Excitation	10-75 Ry	Th	959
$e + H_2O$ Excitation       20-200 eV       Exp       96 $e + CO$ Excitation       20-200 eV       Exp       96 $e + CQ$ Excitation       0-1000 eV       E/T       96 $e + C_4H_4O$ Elastic Scattering       0-15 eV       Th       96 $e + N_3^+$ Dissociation $10^{-6} - 10^{-1}$ eV       Exp       96 $e + AI$ Elastic Scattering       200-1000 eV       Th       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + Au$ Elastic Scattering       200-1000 eV       Th       96 $e + He$ Ionization       640 eV       Th       96 $e + H_2O$ Dissociation       3.5-10 eV       Th       96 $e + H_2O$ Excitation       0.1-40 eV       Th       96 $e + Kr^2$ Recombination       0-5000 eV       E/T       97 $e + Kr^4$ Recombination       0-5000 eV       E/T       97 $e + Kr^{3+}$ Recombination       0-5000 eV       E/T       97	e +	$\mathbf{H}_2$	Excitation	0.0-10,000 eV	Th	960
$e + CO$ Excitation $20-200 eV$ $Exp$ 96 $e + C_2H_2F_2$ Excitation $0-1000 eV$ $E/T$ 96 $e + C_4H_4O$ Elastic Scattering $0-15 eV$ Th $e + N_3^+$ Dissociation $10^{-6} - 10^{-1} eV$ Exp       96 $e + A1$ Elastic Scattering $200-1000 eV$ Th       96 $e + Au$ Elastic Scattering $200-1000 eV$ Th       96 $e + Ag$ Elastic Scattering $200-1000 eV$ Th       96 $e + Ag$ Elastic Scattering $200-1000 eV$ Th       96 $e + He$ Ionization $640 eV$ Th       96 $e + He$ Dissociation $3.5-10 eV$ Th       96 $e + H_2O$ Excitation $0.1-40 eV$ Th       96 $e + Hg$ Excitation $0.500 eV$ $E/T$ 97       97 $e + Kr$ Recombination $0-5000 eV$ $E/T$ 97       97 $e + Hg$ Excitation $0-5000 eV$ $E/T$ 97       97 $e + Kr^{++}$ Recombination $0-5000 eV$ $E/T$ 97       97<	e +	$H_2O$	Excitation	20-200 eV	Exp	961
$e + C_2H_2F_2$ Excitation       0-1000 eV $E/T$ 96 $e + C_4H_4O$ Elastic Scattering       0-15 eV       Th       96 $e + N_3^+$ Dissociation $10^{-6} - 10^{-1}$ eV       Exp       96 $e + Al$ Elastic Scattering       200-1000 eV       Th       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + Au$ Elastic Scattering       200-1000 eV       Th       96 $e + H_2$ Dissociation       3.5-10 eV       Th       96 $e + H_2O$ Excitation       0.1-40 eV       Th       96 $e + H_2O$ Excitation       15-10 eV       Th       96 $e + H_2$ Excitation       0.1-40 eV       Th       96 $e + Kr$ Recombination       0-5000 eV       E/T       97 $e + Kr^4$ Recombination       0-5000 eV       E/T       97 $e + Kr^{+1}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{+1}$ Recombination       0-5000 eV       E/T </th <td>e +</td> <th>CO</th> <td>Excitation</td> <td>20-200 eV</td> <td>Exp</td> <td>962</td>	e +	CO	Excitation	20-200 eV	Exp	962
$e + N_3^+$ Dissociation $10^{-6} - 10^{-1} eV$ Exp       96 $e + AI$ Dissociation $10^{-6} - 10^{-1} eV$ Exp       96 $e + AI$ Elastic Scattering       200-1000 eV       Th       96 $e + AI$ Elastic Scattering       200-1000 eV       Th       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + Au$ Elastic Scattering       200-1000 eV       Th       96 $e + Au$ Elastic Scattering       200-1000 eV       Th       96 $e + He$ Ionization       640 eV       Th       96 $e + H_2O$ Dissociation       3.5-10 eV       Th       96 $e + H_2O$ Excitation       0.1-40 eV       Th       96 $e + Hg$ Excitation       0.5-100 eV       E/T       97 $e + Kr^4$ Recombination       0-5000 eV       E/T       97 $e + Kr^{++}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{++}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{++}$ Recombination       0-5000 eV       <	e +	$\mathbf{C}_2\mathbf{H}_2\mathbf{F}_2$	Excitation	0-1000 eV	E/T	963
$e + Al$ Dissociation $10^{-0} - 10^{-1} e^{-V}$ Exp       96 $e + Al$ Elastic Scattering       200-1000 eV       Th       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + He$ Ionization       640 eV       Th       96 $e + H_2O$ Dissociation       3.5-10 eV       Th       96 $e + H_2O$ Excitation       0.1-40 eV       Th       96 $e + H_2O$ Excitation       0.1-40 eV       Th       96 $e + Hg$ Excitation       0.1-40 eV       Th       96 $e + Kr$ Recombination       0.5000 eV       E/T       97 $e + Kr^{+4}$ Recombination       0.5000 eV       E/T       97 $e + Kr^{2+}$ Recombination       0.5000 eV       E/T       97 $e + Kr^{3+}$ Recombination       0.5000 eV       E/T       97 $e + Kr^{5+}$ Recombination       0.5000 eV       E/T	e +	$C_4H_4O$	Elastic Scattering	0-15  eV	Th	964
$e + AI$ Elastic Scattering       200-1000 eV       1h       96 $e + Cu$ Elastic Scattering       200-1000 eV       Th       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + He$ Ionization       640 eV       Th       96 $e + H_2O$ Dissociation       3.5-10 eV       Th       96 $e + H_2O$ Excitation       0.1-40 eV       Th       96 $e + O^+$ Excitation       15-100 eV       E/T       97 $e + Kr$ Recombination       0.5000 eV       E/T       97 $e + Kr^{+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{3+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{5+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{5+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{6+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{6+}$ Recombination       0-5000 eV       E/T <td< th=""><td>e +</td><th>IN<sub>3</sub> '</th><td>Dissociation</td><td><math>10^{\circ} - 10^{\circ} \text{ eV}</math></td><td>Exp</td><td>965</td></td<>	e +	IN <sub>3</sub> '	Dissociation	$10^{\circ} - 10^{\circ} \text{ eV}$	Exp	965
$e + Ag$ Elastic Scattering       200-1000 eV       1h       96 $e + Ag$ Elastic Scattering       200-1000 eV       Th       96 $e + Au$ Elastic Scattering       200-1000 eV       Th       96 $e + He$ Ionization       640 eV       Th       96 $e + H_2O$ Dissociation       3.5-10 eV       Th       96 $e + H_2O$ Excitation       0.1-40 eV       Th       96 $e + Hg$ Excitation       0.5-100 eV       E/T       97 $e + Hg$ Excitation       0.5-000 eV       E/T       97 $e + Kr^+$ Recombination       0-5000 eV       E/T       97 $e + Kr^{3+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{4+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{3+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{4+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{5+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{6+}$ Recombination       0-5000 eV       E/T       97 </th <td>e +</td> <th>Al</th> <td>Elastic Scattering</td> <td>200-1000 eV</td> <td>1 n Th</td> <td>966</td>	e +	Al	Elastic Scattering	200-1000 eV	1 n Th	966
$e + Ag$ Elastic Scattering       200-1000 eV       11       96 $e + Au$ Elastic Scattering       200-1000 eV       Th       96 $e + He$ Ionization       640 eV       Th       96 $e + H_2O$ Dissociation       3.5-10 eV       Th       96 $e + H_2O$ Excitation       3.5-10 eV       Th       96 $e + H_2O$ Excitation       0.1-40 eV       Th       96 $e + Hg$ Excitation       0.1-40 eV       Th       96 $e + Kr$ Recombination       0.5000 eV       E/T       97 $e + Kr^+$ Recombination       0-5000 eV       E/T       97 $e + Kr^{2+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{3+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{3+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{4+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{4+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{4+}$ Recombination       0-5000 eV       E/T       97	e +	Cu A	Elastic Scattering	200-1000 eV	1 fi Th	900
$e + He$ Init Stattering       200-100 eV       11       90 $e + He$ Init Statter Stattering       200-100 eV       Th       96 $e + H_2O$ Dissociation       3.5-10 eV       Th       96 $e + H_2O$ Excitation       3.5-10 eV       Th       96 $e + O^+$ Excitation       0.1-40 eV       Th       96 $e + Hg$ Excitation       0.1-40 eV       Th       96 $e + Hg$ Excitation       0.1-40 eV       Th       96 $e + Hg$ Excitation       0.1-40 eV       Th       96 $e + Kr$ Recombination       0-5000 eV       E/T       97 $e + Kr^+$ Recombination       0-5000 eV       E/T       97 $e + Kr^{3+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{5+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{6+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{6+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{10+}$ Recombination       0-5000 eV       E/T       97	e +	Ag	Elastic Scattering	200-1000 eV	1 fl Th	900
$e + He$ Ionization       040 eV       In       90 $e + H_2O$ Dissociation       3.5-10 eV       Th       96 $e + H_2O$ Excitation       3.5-10 eV       Th       96 $e + O^+$ Excitation       0.1-40 eV       Th       96 $e + Hg$ Excitation       0.1-40 eV       Th       96 $e + Hg$ Excitation       0.1-40 eV       E/T       97 $e + Kr$ Recombination       0-5000 eV       E/T       97 $e + Kr^+$ Recombination       0-5000 eV       E/T       97 $e + Kr^{3+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{3+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{5+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{6+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{6+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{6+}$ Recombination       0-5000 eV       E/T       97 $e + Kr^{10+}$ Recombination       0-5000 eV       E/T       97	e +	Au Uo	Lonization	200-1000 eV	111 Th	900
$e + H_2O$ Dissolution $3.5-10 eV$ Th $96$ $e + H_2O$ Excitation $3.5-10 eV$ Th $96$ $e + O^+$ Excitation $0.1-40 eV$ Th $96$ $e + Hg$ Excitation $15-100 eV$ $E/T$ $97$ $e + Kr$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^+$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{2+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{3+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{3+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{5+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{0+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ <	e +		Dissociation	2 5 10 eV	111 Th	907
$e + H_2O$ Excitation $3.3-10 eV$ $111$ $90$ $e + O^+$ Excitation $0.1-40 eV$ Th $96$ $e + Hg$ Excitation $15-100 eV$ $E/T$ $97$ $e + Kr$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^+$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{4+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{3+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{3+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{5+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{7+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{11+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{12+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0-5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0-5000 $	e +		Excitation	3.5-10 eV	Th	908
$e + Hg$ Excitation $15-100 \text{ eV}$ $E/T$ $97$ $e + Hg$ Excitation $15-100 \text{ eV}$ $E/T$ $97$ $e + Kr$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^+$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^{4+}$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^{3+}$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^{3+}$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^{5+}$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^{8+}$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^{9+}$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0-5000 \text{ eV}$ $E/T$ $97$ $e + Kr^{12+}$ Recombination $0-5000 \text{ eV}$ $E/T$		$\Omega^+$	Excitation	0.1.40 oV	Th	060
e + HgDeclarion15-100 eV $E/T$ 97e + KrRecombination0-5000 eV $E/T$ 97e + Kr <sup>4+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>3+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>3+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>4+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>4+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>5+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>6+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>6+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>8+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>9+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>10+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>11+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>11+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>11+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>13+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>14+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>15+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>16+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>16+</sup> Recombination0-5000 eV $E/T$ 97e + Kr <sup>17+</sup> Recombination0-5000 eV $E/T$ 97 <td></td> <th>U Ha</th> <td>Excitation</td> <td>15 100 oV</td> <td>тп F/T</td> <td>909 070</td>		U Ha	Excitation	15 100 oV	тп F/T	909 070
$e + Kr^{+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{2+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{3+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{3+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{3+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{4+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{5+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{7+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{8+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{9+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{11+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{12+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0^{-5000} eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0^{-5000} eV$ <		IIg Kr	Becombination	0.5000  eV	E/T	071
$\mathbf{c} + \mathbf{Kr}^{2+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{3+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{3+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{4+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{5+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{6+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{7+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{8+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{8+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{10+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{11+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{13+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{13+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{13+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{16+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{16+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{16+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ $\mathbf{e} + \mathbf{Kr}^{16+}$ Recombination $0.5000 \text{ eV}$ $\mathbf{E}/T$ $97$ <td></td> <th>Kr<sup>+</sup></th> <td>Becombination</td> <td>0-5000 eV</td> <td>E/T</td> <td>971</td>		Kr <sup>+</sup>	Becombination	0-5000 eV	E/T	971
$e + Kr^{3+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{3+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{5+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{5+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{7+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{7+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{8+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{9+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{11+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{12+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{14+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{15+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{17+}$ Recombination $0 -5000 eV$ $E/T$ $97$		$\mathbf{Kr}^{2+}$	Becombination	0-5000 eV	E/T	971
$e + Kr^{4+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{5+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{7+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{7+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{8+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{9+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{11+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{12+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{17+}$ Recombination $0 -5000 eV$ $E/T$ $97$	e +	Kr <sup>3+</sup>	Becombination	0-5000 eV	E/T	971
$e + Kr^{5+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{6+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{7+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{8+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{9+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{11+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{12+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{15+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{17+}$ Recombination $0.5000 eV$ $E/T$ $97$	e +	Kr <sup>4+</sup>	Becombination	0-5000 eV	E/T	971
$e + Kr^{6+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{7+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{8+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{8+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{9+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{11+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{12+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{14+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{15+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{17+}$ Recombination $0.5000 eV$ $E/T$ $97$	e +	Kr <sup>5+</sup>	Recombination	0-5000 eV	E/T	971
$e + Kr^{7+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{8+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{9+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{11+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{12+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{14+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{15+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{17+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{17+}$ Recombination $0.5000 eV$ $E/T$ $97$	e +	Kr <sup>6+</sup>	Recombination	0-5000 eV	E/T	971
$e + Kr^{8+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{9+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{11+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{12+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{14+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{15+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0 -5000 eV$ $E/T$ $97$ $e + Kr^{17+}$ Recombination $0 -5000 eV$ $E/T$ $97$	e +	Kr <sup>7+</sup>	Recombination	0-5000 eV	E/T	971
$e + Kr^{9+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{10+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{11+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{12+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{13+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{14+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{14+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{15+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{16+}$ Recombination $0.5000 eV$ $E/T$ $97$ $e + Kr^{17+}$ Recombination $0.5000 eV$ $E/T$ $97$	e +	Kr <sup>8+</sup>	Recombination	0-5000 eV	E/T	971
$e + Kr^{10+}$ Recombination0-5000 eV $E/T$ 97 $e + Kr^{11+}$ Recombination0-5000 eV $E/T$ 97 $e + Kr^{12+}$ Recombination0-5000 eV $E/T$ 97 $e + Kr^{13+}$ Recombination0-5000 eV $E/T$ 97 $e + Kr^{13+}$ Recombination0-5000 eV $E/T$ 97 $e + Kr^{14+}$ Recombination0-5000 eV $E/T$ 97 $e + Kr^{15+}$ Recombination0-5000 eV $E/T$ 97 $e + Kr^{16+}$ Recombination0-5000 eV $E/T$ 97 $e + Kr^{16+}$ Recombination0-5000 eV $E/T$ 97 $e + Kr^{17+}$ Recombination0-5000 eV $E/T$ 97	e +	$\mathbf{Kr}^{9+}$	Recombination	0-5000 eV	E/T	971
$e + Kr^{11+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{12+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{13+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{13+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{13+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{14+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{15+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{16+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{17+}$ Recombination       0-5000 eV $E/T$ 97	e +	$\mathbf{Kr}^{10+}$	Recombination	0-5000 eV	$\dot{E/T}$	971
$e + Kr^{12+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{13+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{13+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{14+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{15+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{16+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{16+}$ Recombination       0-5000 eV $E/T$ 97 $e + Kr^{17+}$ Recombination       0-5000 eV $E/T$ 97	e +	$\mathbf{Kr}^{11+}$	Recombination	0-5000  eV	$\dot{\mathrm{E/T}}$	971
$\mathbf{e} + \mathbf{Kr}^{13+}$ Recombination0-5000 eV $\mathbf{E}/\mathbf{T}$ 97 $\mathbf{e} + \mathbf{Kr}^{14+}$ Recombination0-5000 eV $\mathbf{E}/\mathbf{T}$ 97 $\mathbf{e} + \mathbf{Kr}^{15+}$ Recombination0-5000 eV $\mathbf{E}/\mathbf{T}$ 97 $\mathbf{e} + \mathbf{Kr}^{16+}$ Recombination0-5000 eV $\mathbf{E}/\mathbf{T}$ 97 $\mathbf{e} + \mathbf{Kr}^{16+}$ Recombination0-5000 eV $\mathbf{E}/\mathbf{T}$ 97 $\mathbf{e} + \mathbf{Kr}^{17+}$ Recombination0-5000 eV $\mathbf{E}/\mathbf{T}$ 97	e +	$\mathbf{Kr}^{12+}$	Recombination	0-5000  eV	$\dot{\mathrm{E/T}}$	971
$\mathbf{e} + \mathbf{Kr}^{14+}$ Recombination0-5000 eV $\mathbf{E}/\mathrm{T}$ 97 $\mathbf{e} + \mathbf{Kr}^{15+}$ Recombination0-5000 eV $\mathbf{E}/\mathrm{T}$ 97 $\mathbf{e} + \mathbf{Kr}^{16+}$ Recombination0-5000 eV $\mathbf{E}/\mathrm{T}$ 97 $\mathbf{e} + \mathbf{Kr}^{17+}$ Recombination0-5000 eV $\mathbf{E}/\mathrm{T}$ 97	e +	$\mathbf{Kr}^{13+}$	Recombination	0-5000  eV	$\dot{\mathrm{E/T}}$	971
$\mathbf{e} + \mathbf{Kr}^{15+}$ Recombination0-5000 eV $\mathbf{E}/\mathrm{T}$ 97 $\mathbf{e} + \mathbf{Kr}^{16+}$ Recombination0-5000 eV $\mathbf{E}/\mathrm{T}$ 97 $\mathbf{e} + \mathbf{Kr}^{17+}$ Becombination0-5000 eV $\mathbf{E}/\mathrm{T}$ 97	e +	$\mathbf{Kr}^{14+}$	Recombination	0-5000  eV	$\dot{\mathrm{E/T}}$	971
<b>e</b> + $\mathbf{Kr}^{16+}$ Recombination 0-5000 eV E/T 97 <b>e</b> + $\mathbf{Kr}^{17+}$ Recombination 0-5000 eV E/T 97	e +	$\mathbf{Kr}^{15+}$	Recombination	0-5000  eV	$\dot{\mathrm{E/T}}$	971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{17+}$ Becombination 0-5000 eV E/T 97	e +	$\mathbf{Kr}^{16+}$	Recombination	0-5000  eV	$\dot{\mathrm{E/T}}$	971
	e +	$\mathbf{Kr}^{17+}$	Recombination	0-5000  eV	$\dot{\mathrm{E/T}}$	971

$e + Kr^{18+}$	Recombination	0-5000  eV	E/T 971
$e + Kr^{19+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{20+}$	Recombination	0-5000  eV	Е/Т 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{21+}$	Recombination	0-5000  eV	Е/Т 971
$e + Kr^{22+}$	Recombination	0-5000  eV	E/T 971
$e + Kr^{23+}$	Recombination	0-5000  eV	Е/Т 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{24+}$	Recombination	0-5000  eV	Е/Т 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{25+}$	Recombination	0-5000  eV	Е/Т 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{26+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{27+}$	Recombination	0-5000  eV	Е/Т 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{28+}$	Recombination	0-5000  eV	Е/Т 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{29+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{30+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{31+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{32+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{33+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{34+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{35+}$	Recombination	0-5000  eV	E/T 971
e + Mo	Recombination	0-5000  eV	E/T 971
$e + Mo^+$	Recombination	0-5000  eV	E/T 971
$e + Mo^{2+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{3+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{4+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{5+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{Mo}^{6+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{7+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{8+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{9+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{M}\mathbf{o}^{10+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{11+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{Mo}^{12+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{13+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{14+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{Mo}^{15+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{Mo}^{16+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{17+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{18+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{19+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{20+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{21+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{22+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{23+}$	Recombination	0-5000 eV	E/T 971
$e + Mo^{24+}$	Recombination	0-5000 eV	Е/Т 971
$e + Mo^{25+}$	Recombination	0-5000 eV	Е/Т 971
$e + Mo^{20+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{2/+}$	Recombination	0-5000 eV	Е/Т 971
$e + Mo^{28+}$	Recombination	0-5000  eV	E/T 971
$e + Mo^{29+}$	Recombination	0-5000 eV	Е/Т 971
$e + Mo^{30+}$	Recombination	0-5000 eV	E/T 971
$e + Mo^{31+}$	Recombination	0-5000 eV	E/T 971
$e + Mo^{32+}$	Recombination	0-5000 eV	E/T 971
$e + Mo^{34+}$	Recombination	0-5000 eV	E/T 971
$e + Mo^{3+\tau}$	Recombination	0-5000 eV	E/T 971
$e + Mo^{36\pm}$	Recombination	0-5000 eV	E/T 971
$e + Mo^{30+}$	Recombination	0-5000 eV	E/T 971
$e + Mo^{3/7}$	Recombination	0-5000 eV	E/T 971
$e + Mo^{30+}$	Recombination	0-5000 eV	E/T 971

$\mathbf{e} + \mathbf{Mo}^{39+}$	Recombination	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{Mo}^{40+}$	Recombination	$0-5000   {\rm eV}$	E/T 971
$\mathbf{e} + \mathbf{Mo}^{41+}$	Recombination	0-5000  eV	Е/Т 971
e + Kr	Ionization	$0-5000   {\rm eV}$	E/T 971
$ m e + Kr^+$	Ionization	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{2+}$	Ionization	0-5000  eV	E/T 971
$e + Kr^{3+}$	Ionization	0-5000  eV	E/T 971
$e + Kr^{4+}$	Ionization	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{5+}$	Ionization	0-5000  eV	E/T 971
$e + Kr^{7+}$	Ionization	0-5000  eV	E/T 971
$e + Kr^{8+}$	Ionization	0-5000  eV	E/T 971
$e + Kr^{9+}$	Ionization	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{10+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{11+}$	Ionization	0-5000  eV	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{12+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{13+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{14+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{15+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{16+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{17+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$\mathbf{e} + \mathbf{K} \mathbf{r}^{18+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
e + Mo	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$e + Mo^+$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$e + Mo^{2+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$e + Mo^{3+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$e + Mo^{4+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$e + Mo^{5+}$	Ionization	$0-5000 \mathrm{eV}$	E/T 971
$\mathbf{e} + \mathbf{Mo}^{6+}$	Ionization	0-5000  eV	E/T 971
$e + Mo^{7+}$	Ionization	0-5000  eV	E/T 971
$e + Mo^{8+}$	Ionization	0-5000  eV	E/T 971
$e + Mo^{41+}$	Ionization	0-5000  eV	E/T 971
$e + Kr^{3+}$	Ionization	$39-179  \mathrm{eV}$	Exp 972
$\mathbf{e} + \mathbf{Cl}_2$	Attachment	0-1.5  eV	Th 973
$\mathbf{e} + \mathbf{Cl}_2$	Dissociation	0-1.5  eV	Th 973
$\mathbf{e} + \mathbf{Cl}_2$	Excitation	0-1.5  eV	Th 973
e + H	Ionization	0-3.4  keV	Th $974$
$e + He^+$	Ionization	0-3.4  keV	Th 974
$e + Li^{2+}$	Ionization	0-3.4  keV	Th 974
$e + Be^{3+}$	Ionization	0-3.4  keV	Th 974
$\mathbf{e} + \mathbf{B}^{\pm \pm}$	Ionization	0-3.4  keV	Th 974
$e + C^{3+}$	Ionization	0-3.4  keV	Th 974
e + He	Excitation	0-4 a.u.	Th 975
e + He	Angular Scattering	102-1000 eV	Exp 976
e + He	Ionization	102-1000 eV	Exp 976
e + He	Angular Scattering	106 eV	Exp 977
e + He	Ionization	106  eV	Exp 977
$e + Si^{3+}$	Ionization	$10 - 10^{9} \text{ eV}$	Th 978
$\mathbf{e} + \mathbf{S}$	Ionization	$10 - 10^{9} \text{ eV}$	Th 978
$\mathbf{e} + \mathbf{S}^{\pm}$	Ionization	$10 - 10^{\circ} \text{ eV}$	Th 978
$e + Cl^{+}$	Ionization	$10 - 10^{\circ} \text{ eV}$	Th 978
$e + CI^{\pm +}$	Ionization	$10 - 10^{\circ} \text{ eV}$	Th 978
$e + Cl^{s_{\pm}}$	Ionization	$10 - 10^{\circ} \text{ eV}$	Th 978
e + Ar	Ionization	$10 - 10^{\circ} \text{ eV}$	Th 978
$e + Ar^{5+}$	Ionization	$10 - 10^{\circ} \text{ eV}$	Th 978
$e + Ar^{o_+}$	Ionization	$10 - 10^{\circ} \text{ eV}$	Th 978
$e + Ar^{\circ}$	Ionization	$10 - 10^{\circ} \text{ eV}$	Th 978
$e + K^{T}$	Ionization	$10 - 10^{\circ} \text{ eV}$	Th 978

$\mathbf{e} + \mathbf{T} \mathbf{i}^{5+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
$e + Cr^{6+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
$e + Cr^{7+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
$e + Cr^{8+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
$\mathbf{e} + \mathbf{C}\mathbf{r}^{10+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
$\mathbf{e} + \mathbf{F} \mathbf{e}^{6+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
$e + Fe^{9+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
$e + Fe^{11+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
$e + Ni^{12+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
$e + Ni^{14+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
e + Pb	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
e + Bi	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
e + U	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$	978
e + He	Ionization	$10 - 10^5$ ; $10 - 10^3 \text{ eV}$	$\mathrm{Th}$	979
$e + He^*$	Ionization	$10 - 10^5$ ; $10 - 10^3 \text{ eV}$	$\mathrm{Th}$	979
$\mathbf{e} + \mathbf{A} \mathbf{g}^{11+}$	Excitation	0.6-30 keV	$\mathrm{Th}$	980
$\mathbf{e} + \mathbf{A} \mathbf{g}^{19+}$	Excitation	0.6-30  keV	$\mathrm{Th}$	980
$\mathbf{e} + \mathbf{A}\mathbf{g}^{29+}$	Excitation	0.6-30  keV	$\mathrm{Th}$	980
$\mathbf{e} + \mathbf{A} \mathbf{g}^{37+}$	Excitation	0.6-30  keV	$\mathrm{Th}$	980
$\mathbf{e} + \mathbf{A} \mathbf{g}^{43+}$	Excitation	0.6-30  keV	$\mathrm{Th}$	980
$\mathbf{e} + \mathbf{A} \mathbf{g}^{11+}$	Ionization	0.6-30  keV	$\mathrm{Th}$	980
$\mathbf{e} + \mathbf{A} \mathbf{g}^{19+}$	Ionization	0.6-30  keV	$\mathrm{Th}$	980
$\mathbf{e} + \mathbf{A} \mathbf{g}^{29+}$	Ionization	0.6-30  keV	$\mathrm{Th}$	980
$\mathbf{e} + \mathbf{A} \mathbf{g}^{37+}$	Ionization	0.6-30  keV	$\mathrm{Th}$	980
$\mathbf{e} + \mathbf{A} \mathbf{g}^{43+}$	Ionization	0.6-30  keV	$\mathrm{Th}$	980
e + He	Ionization	3.6-8  MeV/u; 1-100  eV; 2  keV	E/T	981
$e + CO_2$	Attachment	$0-1000 { m MeV}$	$\operatorname{Exp}$	982
$\mathbf{e} + \mathbf{N}_2 \mathbf{O}$	Attachment	$0-1000 { m MeV}$	$\operatorname{Exp}$	982
$e + CO_2$	Excitation	$0-1000 { m MeV}$	$\operatorname{Exp}$	982
$\mathbf{e} + \mathbf{N}_2 \mathbf{O}$	Excitation	$0-1000 { m MeV}$	$\operatorname{Exp}$	982
$e + CO_2$	Elastic Scattering	0-5  eV	$\operatorname{Exp}$	983
$\mathbf{e} + \mathbf{N}_2 \mathbf{O}$	Elastic Scattering	0-5  eV	$\operatorname{Exp}$	983
$\mathbf{e} + \mathbf{CS}_2$	Elastic Scattering	0-5  eV	$\operatorname{Exp}$	983
$e + CO_2$	Excitation	0-5  eV	$\operatorname{Exp}$	983
$\mathbf{e} + \mathbf{N}_2 \mathbf{O}$	Excitation	0-5  eV	$\operatorname{Exp}$	983
$\mathbf{e} + \mathbf{CS}_2$	Excitation	0-5  eV	$\operatorname{Exp}$	983
e + NO	Elastic Scattering	0-2.5  eV	$\operatorname{Exp}$	984
e + NO	Angular Scattering	0-2.5  eV	$\operatorname{Exp}$	984
e + NO	Excitation	0-2.5  eV	Exp	984
$e + H_2^+$	Dissociation	$10^{-4} - 10^{-1} \text{ eV}$	Th	985
$e + HeH^+$	Dissociation	$10^{-4} - 10^{-1} \text{ eV}$	Th	985
$e + LiH^+$	Dissociation	$10^{-4} - 10^{-1} \text{ eV}$	Th	985
$e + H_2^+$	Recombination	$10^{-4} - 10^{-1} \text{ eV}$	Th	985
$e + HeH^+$	Recombination	$10^{-4} - 10^{-1} \text{ eV}$	Th	985
$e + LiH^+$	Recombination	$10^{-4} - 10^{-1} \text{ eV}$	Th	985
$e + H_{3}^{+}$	Dissociation	$10^{-4} - 10^{+1} \text{ eV}$	Th	986
$e + H_3^+$	Recombination	$10^{-4} - 10^{+1} \text{ eV}$	Th	986
$\mathbf{e} + \mathbf{H}_2$	Elastic Scattering	80-150 eV	Exp	987
$e + D_2$	Elastic Scattering	80-150 eV	Exp	987
$\mathbf{e} + \mathbf{N}_2$	Elastic Scattering	80-150 eV	Exp	987
$\mathbf{e} + \mathbf{H}_2$	Excitation	80-150 eV	Exp	987
$\mathbf{e} + \mathbf{D}_2$	Excitation	80-150 eV	Exp	987
$\mathbf{e} + \mathbf{N}_2$	Excitation	80-150 eV	Exp	987
$\mathbf{e} + \mathbf{H}_2$		80-150 eV	Exp	987
$\mathbf{e} + \mathbf{D}_2$	Ionization	80-150 eV	Exp E	987
$\mathbf{e} + \mathbf{N}_2$	Ionization	80-150 eV	Exp	987
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Dissociation	U-3 eV	$\operatorname{Exp}$	988

$\mathbf{e} + \mathbf{C} \mathbf{H}_2^+$	Dissociation	$0-3  \mathrm{eV}$	$\operatorname{Exp}$	988
$\mathbf{e} + \mathbf{N}\mathbf{H}_2^+$	Dissociation	$0-3  \mathrm{eV}$	Exp	988
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}^+$	Recombination	$0-3  \mathrm{eV}$	$\operatorname{Exp}$	988
$\mathbf{e} + \mathbf{C} \mathbf{H}_2^+$	Recombination	$0-3  \mathrm{eV}$	$\operatorname{Exp}$	988
$\mathbf{e} + \mathbf{N}\mathbf{H}_2^+$	Recombination	$0-3  \mathrm{eV}$	$\operatorname{Exp}$	988
$\mathbf{e} + \mathbf{H}_3^+$	Dissociation	$10^{-4} - 50 \text{ eV}$	$\operatorname{Exp}$	989
$\mathbf{e} + \mathbf{H}_3^+$	Recombination	$10^{-4} - 50 \text{ eV}$	$\operatorname{Exp}$	989
e + H	Angular Scattering	15.6  eV	$\mathrm{Th}$	990
e + H	Ionization	15.6  eV	$\mathrm{Th}$	990
$\mathbf{e} + \mathbf{H}_3^+$	Dissociation	0-42  eV	E/T	991
$\mathbf{e} + \mathbf{S} \mathbf{i}^{11+}$	Recombination	0-42  eV	E/T	991
$\mathbf{e} + \mathbf{H}_3^+$	Recombination	0-42  eV	E/T	991
$ m e + He^+$	Excitation	0-42  eV	E/T	991
$\mathbf{e} + \mathbf{F} \mathbf{e}^{9+}$	Excitation	0-42  eV	E/T	991
$\mathbf{e} + \mathbf{N}^{4+}$	Recombination	0-1.6  eV	E/T	992
$ m e + He^+$	Angular Scattering	150-273  eV	Exp	993
e + Xe	Angular Scattering	$150-273 {\rm ~eV}$	$\operatorname{Exp}$	993
$ m e + He^+$	Excitation	$150-273 {\rm ~eV}$	$\operatorname{Exp}$	993
e + Xe	Excitation	$150-273 {\rm ~eV}$	$\operatorname{Exp}$	993
$e + He^+$	Ionization	$150-273 {\rm ~eV}$	$\operatorname{Exp}$	993
e + Xe	Ionization	$150-273 {\rm ~eV}$	$\operatorname{Exp}$	993
e + H	Elastic Scattering	$14.6-40 { m eV}$	$\operatorname{Exp}$	994
e + H	Angular Scattering	$14.6-40 { m eV}$	$\operatorname{Exp}$	994
e + H	Excitation	$14.6-40 { m eV}$	$\operatorname{Exp}$	994
e + H	Ionization	$14.6-40 { m eV}$	$\operatorname{Exp}$	994
e + Ar	Angular Scattering	$466-956 \mathrm{eV}$	Exp	995
e + Ar	Ionization	$466-956 \mathrm{eV}$	$\operatorname{Exp}$	995
e + H	Angular Scattering	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
e + He	Angular Scattering	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
e + Li	Angular Scattering	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
$e + B^+$	Excitation	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
$\mathbf{e} + \mathbf{Si}^{2+}$	Excitation	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
$e + Fe^+$	Excitation	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
e + Kr	Excitation	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
$e + CO_2$	Excitation	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
e + H	Ionization	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
e + He	Ionization	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
e + Li	Ionization	$10-100 {\rm ~eV}$	$\mathrm{Th}$	996
e + Hg	Excitation	8-40  eV	$\mathrm{Th}$	997
e + H	Ionization	$55  \mathrm{eV}$	$\mathrm{Th}$	998
$e + CH_4$	Dissociation	7-15  eV	Exp	999
$e + Ca^+$	Excitation	$0.0\text{-}1.0 \mathrm{Ry}$	$\mathrm{Th}$	1000
$\mathbf{e} + \mathbf{F} \mathbf{e}^{14+}$	Recombination	0-45  eV	E/T	1001
$\mathbf{e} + \mathbf{O}_2$	Excitation	$10  \mathrm{eV}$	$\operatorname{Exp}$	1002
e + He	Ionization	102  eV	$\operatorname{Exp}$	1003
e + H	Excitation	54.4  eV	Exp	1004
e + He	Excitation	20.30-23.48  eV	E/T	1005
$\mathbf{e} + \mathbf{H}_3^+$	Excitation	$0.02-0.3 \; eV$	$\mathrm{Th}$	1006
$e + B(CD_3)_3$	Elastic Scattering	0.4-370  eV	$\operatorname{Exp}$	1007
$e + B(CH_3)_3$	Elastic Scattering	0.4-370  eV	$\operatorname{Exp}$	1007
e + Ar	Angular Scattering	$8-17  \mathrm{eV}$	E/T	1008
e + Xe	Angular Scattering	$8-17  \mathrm{eV}$	E/T	1008
e + Ar	Excitation	$8-17  \mathrm{eV}$	E/T	1008
e + Xe	Excitation	$8-17  \mathrm{eV}$	E/T	1008
$e + HCO^+$	Dissociation	$0.001\text{-}0.2\;\mathrm{eV}$	$\mathrm{Th}$	1009
$e + HCO^+$	Recombination	$0.001\text{-}0.2\;\mathrm{eV}$	$\mathrm{Th}$	1009
e + Cs	Ionization	$7-400   \mathrm{eV}$	E/T	1010

$e + Cs^*$	Ionization	7-400  eV	E/T	1010
$e + NH_3$	Elastic Scattering	0.0225-20  eV	Th	1011
$e + NH_3$	Angular Scattering	0.0225-20  eV	Th	1011
$e + NH_3$	Excitation	0.0225-20  eV	Th	1011
e + He	Ionization	75-550  eV	Exp	1012
e + He	Angular Scattering	730  eV	Th	1013
e + He	Ionization	730  eV	Th	1013
$\mathbf{e} + \mathbf{S}^{9+}$	Excitation	$10^4 - 10^7 { m K}$	Th	1014
e + N	Excitation	$10^3 - 6x10^5 \text{ K}$	Th	1015
e + H	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + He	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + C	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + N	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + O	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Ne	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Na	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + Mg	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + Al	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + Si	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + Cl	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + Ar	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + K	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + Ca	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + Ti	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + V	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Cr	Ionization	$10^{-2} - 10^{3} \text{ keV}$	$\operatorname{Exp}$	1016
e + Mn	Ionization	$10^{-2} - 10^{3} \text{ keV}$	Exp	1016
$\mathbf{e} + \mathbf{F}\mathbf{e}$	Ionization	$10^{-2} - 10^{3} \text{ keV}$	Exp	1016
e + Co	Ionization	$10^{-2} - 10^{3} \text{ keV}$	Exp	1016
e + Ni	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp	1016
e + Cu	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp	1016
e + Zn	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp	1010
e + Ge	Ionization	$10^{-2} - 10^{5} \text{ keV}$ $10^{-2} - 10^{5} \text{ keV}$	Exp E	1010
e + As	Ionization	$10^{-2} - 10^{5} \text{ keV}$ $10^{-2} - 10^{5} \text{ lmV}$	Exp E-m	1010
e + Se	Ionization	$10^{-2} - 10^{5} \text{ keV}$ $10^{-2} - 10^{5} \text{ lmV}$	Exp Evr	1010
e + br	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp Evp	1010
e + Ki a + Bb	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp Exp	1010
e + Rb	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp Evn	1010
e + SI e + V	Ionization	$10^{-2} - 10^5 \text{ keV}$	Evn	1010
e + Zr	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Nb	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Mo	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Pd	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Ag	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Cd	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + In	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Sn	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Sb	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Te	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Xe	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Ba	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + La	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Ce	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Pr	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Nd	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + Sm	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016

e + 1	Eu	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + 0	Gd	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + l	Ho	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + l	Er	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + 2	Гm	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + `	Yb	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + 2	Га	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e +	W	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
e + 1	Pt	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp	1016
$\mathbf{e} + \mathbf{z}$	Au	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + 1	Pb	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + 1	Bi	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + 1	U	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$	1016
e + 1	$Fe^{7+}$	Excitation	10-70 Ry	Th	1017
e + 0	$Cl^{2+}$	Excitation	7500-200,000 K	Th	1018
e + 0	Ca	Excitation	1000-10,000 K	Th	1019
e + 1	$\mathbf{H}_2$	Attachment	0-200 eV	E/T	1020
e + 1	$H_2^*$	Attachment	0-200 eV	E/T	1020
e + 1	HD	Attachment	0-200 eV	E/T	1020
e + 1	HD*	Attachment	0-200 eV	E/T	1020
e + 1		Attachment	0-200 eV	E/T	1020
e + 1	H'I'*	Attachment	0-200 eV	E/T	1020
e + 1	$D_2$	Attachment	0-200 eV	E/T	1020
e + 1	$D_2^*$	Attachment	0-200 eV	E/T	1020
e + 1	D'T'	Attachment	0-200 eV	E/T E/T	1020
e + 1	D.T.	Attachment	0-200 eV	E/I E/T	1020
e + :	L <sup>2</sup>	Attachment	0-200 eV	E/I E/T	1020
e + 1		Attachment	0-200 eV	E/I E/T	1020
e + 1	<b>n</b> <sub>2</sub>		0-200 eV	E/I E/T	1020
e + 1	$\mathbf{n}_2$	Dissociation	0-200 eV	E/I E/T	1020
e + 1	D <sub>2</sub> D <sub>2</sub> *	Dissociation	0.200 eV	L/I F/T	1020
		Dissociation	0.200  eV	$\mathbf{E}/\mathbf{T}$	1020
	DT*	Dissociation	0.200  eV	E/T	1020
	Б1 Г.	Dissociation	0-200 eV	E/T	1020
	т <u>у</u> Г.*	Dissociation	0.200 eV	E/T	1020
	н <u>у</u> Н <sub>о</sub>	Excitation	0-200 eV	E/T	1020
	H_*	Excitation	0-200 eV	E/T	1020
e + 1	$\mathbf{D}_{2}$	Excitation	0-200 eV	E/T	1020
e + 1	$\mathbf{D}_2^*$	Excitation	0-200 eV	E/T	1020
e + 1		Excitation	0-200 eV	E/T	1020
e + 1	DT*	Excitation	0-200 eV	E/T	1020
e + 2	$\Gamma_2$	Excitation	0-200 eV	E/T	1020
e + 7	$\Gamma_2^*$	Excitation	0-200 eV	_, _ Е/Т	1020
e + ]	$\tilde{\mathbf{H}_{2}}$	Ionization	0-200 eV	E/T	1020
e + ]	$\mathbf{H}_{2}^{\mathbf{z}}$ *	Ionization	0-200 eV	E/T	1020
e + 1	$D_2^2$	Ionization	0-200 eV	$\dot{\mathrm{E/T}}$	1020
e + 1	$D_2^{2^*}$	Ionization	0-200 eV	$\dot{\mathrm{E/T}}$	1020
$e + \lambda$	$\mathbf{Ar}^{7+}$	Ionization	$10^2 - 10^7 \text{ K}$	Th	1021
e + I	$\mathbf{Ar}^{7+*}$	Ionization	$10^2 - 10^7 {\rm K}$	$\mathrm{Th}$	1021
e + '	$\Gamma i^{11+}$	Ionization	$10^2 - 10^7 {\rm K}$	$\mathrm{Th}$	1021
e + '	$\mathbf{\Gamma}\mathbf{i}^{11+*}$	Ionization	$10^2 - 10^7 {\rm K}$	$\mathrm{Th}$	1021
e + (	$\mathbf{C}\mathbf{r}^{13+}$	Ionization	$10^2 - 10^7 {\rm K}$	Th	1021
$\mathbf{e} + 0$	$\mathbf{Cr}^{13+*}$	Ionization	$10^2 - 10^7 {\rm K}$	Th	1021
e + 1	$\mathbf{Fe}^{15+}$	Ionization	$10^2 - 10^7 {\rm K}$	Th	1021
e + 1	${ m Fe}^{15+*}$	Ionization	$10^2 - 10^7 {\rm K}$	Th	1021
e + 2	$\mathbf{Zn}^{19+}$	Ionization	$10^2 - 10^7 {\rm K}$	Th	1021

$e + Ge^{21++}$ Ionization $10^2 - 10^7 \text{ K}$ $e + Se^{23++}$ Ionization $10^2 - 10^7 \text{ K}$ $e + Se^{23++}$ Ionization $10^2 - 10^7 \text{ K}$ $e + Y^{28++}$ Ionization $10^2 - 10^7 \text{ K}$ $e + Y^{28++}$ Ionization $10^2 - 10^7 \text{ K}$ $e + QO$ Dissociation $1-10,000 \text{ eV}$ $e + CO$ Dissociation $1-10,000 \text{ eV}$ $e + CO_2$ Elastic Scattering $1-10,000 \text{ eV}$ $e + CO_2$ Total Scattering $1-10,000 \text{ eV}$ $e + CO_2$ Total Scattering $1-10,000 \text{ eV}$ $e + CO_2$ Excitation $1-10,000 \text{ eV}$ $e + CO_2$ Excitation $1-10,000 \text{ eV}$ $e + CO_2$ Excitation $1-10,000 \text{ eV}$ $e + CO_2$ Ionization $1-10,000 \text{ eV}$ $e + CO_2$ Ionization $1-10,000 \text{ eV}$ $e + CO_2$ Ionization $0.001-1.5 $	$\begin{array}{c} {\rm Th} \\ {\rm E}/{\rm T} \\ {\rm E}/{\rm T}$	1021 1021 1021 1021 1021 1022 1022 1022
$e + 6e^{21+*}$ Ionization $10^2 - 10^7$ K $e + Se^{32+*}$ Ionization $10^2 - 10^7$ K $e + Y^{28+}$ Ionization $10^2 - 10^7$ K $e + Y^{28+*}$ Ionization $10^2 - 10^7$ K $e + Y^{28+*}$ Ionization $10^2 - 10^7$ K $e + Y^{28+*}$ Ionization $10^2 - 10^7$ K $e + CO$ Dissociation $1-10,000$ eV $e + CO_2$ Dissociation $1-10,000$ eV $e + CO_2$ Elastic Scattering $1-10,000$ eV $e + CO_2$ Elastic Scattering $1-10,000$ eV $e + CO_2$ Elastic Scattering $1-10,000$ eV $e + CO_2$ Total Scattering $1-10,000$ eV $e + CO_2$ Total Scattering $1-10,000$ eV $e + CO_2$ Excitation $1-0,000$ eV $e + CO_2$ Excitation $0.001 - 1.5$ MeV $e + CO_3$ Ionization	$\begin{array}{c} {\rm Th} \\ {\rm Th} \\ {\rm Th} \\ {\rm Th} \\ {\rm E}/{\rm T} \\ {$	1021 1021 1021 1021 1022 1022 1022 1022
e + Se <sup>23+</sup> Ionization $10^2 - 10^7$ K         e + Y <sup>8++</sup> Ionization $10^2 - 10^7$ K         e + Y <sup>28++</sup> Ionization $10^2 - 10^7$ K         e + Y <sup>28++</sup> Ionization $10^2 - 10^7$ K         e + Y <sup>28++</sup> Ionization $10^2 - 10^7$ K         e + H <sub>2</sub> O       Dissociation $1-10,000$ eV         e + CO       Dissociation $1-10,000$ eV         e + H <sub>2</sub> O       Elastic Scattering $1-10,000$ eV         e + CO       Elastic Scattering $1-10,000$ eV         e + CO       Elastic Scattering $1-10,000$ eV         e + CO       Total Scattering $1-10,000$ eV         e + CO       Total Scattering $1-10,000$ eV         e + CO       Total Scattering $1-10,000$ eV         e + CO       Excitation $1-10,000$ eV         e + CO       Excitation $1-10,000$ eV         e + CO       Ionization $0.001-1.5$ MeV         e + CO       Ionization $0.001-1.5$ MeV         e +	$\begin{array}{c} {\rm Th} \\ {\rm Th} \\ {\rm Th} \\ {\rm E}/{\rm T} \\ {\rm E}/{\rm T$	1021 1021 1021 1022 1022 1022 1022 1022
e + Se <sup>23++</sup> Ionization $10^2 - 10^7$ K           e + Y <sup>28+</sup> Ionization $10^2 - 10^7$ K           e + H <sub>2</sub> O         Dissociation $1-0,000$ eV           e + CO         Dissociation $1-10,000$ eV           e + CO         Dissociation $1-10,000$ eV           e + CO         Dissociation $1-10,000$ eV           e + CO         Elastic Scattering $1-10,000$ eV           e + CO         Total Scattering $1-10,000$ eV           e + CO         Total Scattering $1-10,000$ eV           e + CO         Excitation $1-10,000$ eV           e + CO         Excitation $1-10,000$ eV           e + CO         Excitation $1-10,000$ eV           e + CO         Ionization $1-10,000$ eV           e + CO         Ionization $1-10,000$ eV           e + CO         Ionization $0.001-1.5$ MeV           e + CO         Ionization $0.001-1.5$ MeV           e + Ar <sup>36+</sup> <	$\begin{array}{c} {\rm Th} \\ {\rm Th} \\ {\rm E/T} \end{array}$	1021 1021 1021 1022 1022 1022 1022 1022
$e + Y^{28+}$ Ionization $10^2 - 10^7$ K $e + H_2O$ Dissociation $110,000$ eV $e + CO$ Dissociation $110,000$ eV $e + CO$ Dissociation $110,000$ eV $e + CO$ Elastic Scattering $110,000$ eV $e + CO$ Total Scattering $110,000$ eV $e + CO$ Total Scattering $110,000$ eV $e + CO$ Total Scattering $110,000$ eV $e + CO$ Excitation $110,000$ eV $e + H_2O$ Excitation $110,000$ eV $e + CO$ Excitation $110,000$ eV $e + CO$ Excitation $110,000$ eV $e + CO$ Ionization $110,000$ eV $e + CO$ Ionization $110,000$ eV $e + CO$ Ionization $100,000$ eV $e + CO$ Ionization $100,000$ eV $e + CO$ Ionization $0.001-1.5$ MeV $e + CO$ Ionization $0.001-1.5$ MeV $e + CO$ Ionization $0.001-1.5$ MeV $e + CA^{54+}$ Recombination $0.001-1.5$ MeV $e + Dy^{66+}$ Recombination $0.001-1.5$ MeV $e + Dy^{62+}$ Recombination $0.001-1.5$ MeV $e + CAH_2$ Attachment $e + C_2H_2$ Attachment $e + C_2H_2$ Attachment $e + C_2H_2$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_4$ <	$\begin{array}{c} {\rm Th} \\ {\rm E}/{\rm T} \end{array}$	1021 1021 1022 1022 1022 1022 1022 1022
$e + Y^{28+*}$ Ionization $10^2 - 10^7$ K $e + H_2O$ Dissociation $1-10,000 eV$ $e + CO$ Dissociation $1-10,000 eV$ $e + CO_2$ Dissociation $1-10,000 eV$ $e + CO_2$ Elastic Scattering $1-10,000 eV$ $e + CO_2$ Total Scattering $1-10,000 eV$ $e + CO_2$ Total Scattering $1-10,000 eV$ $e + CO_2$ Excitation $1-10,000 eV$ $e + CO_2$ Ionization $1-10,000 eV$ $e + CO_2$ Ionization $1-10,000 eV$ $e + Ka^{30+}$ Recombination $0.001-1.5$ MeV $e + CO_2$ Ionization $0.001-1.5$ MeV $e + Xa^{54+}$ Recombination $0.001-1.5$ MeV $e + Dy^{6+}$ Recombination $0.001-1.5$ MeV $e + Dy^{6+}$ Recombination $0.001-1.5$ MeV $e + CyH_4$ Attachment $e + C_2H_2$ Attachment $e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_2H_6$ Attachment $e + C_2H_6$ Dissociation $e + C_2H_6$ Dissociation $e + C_2H_6$ Dissociation $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scatter	$\begin{array}{c} {\rm Th} \\ {\rm E}/{\rm T} \end{array}$	1021 1022 1022 1022 1022 1022 1022 1022
$\mathbf{e} + \mathbf{H}_2\mathbf{O}$ Dissociation1-10,000 eV $\mathbf{e} + \mathbf{CO}$ Dissociation1-10,000 eV $\mathbf{e} + \mathbf{H}_2\mathbf{O}$ Elastic Scattering1-10,000 eV $\mathbf{e} + \mathbf{H}_2\mathbf{O}$ Elastic Scattering1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Elastic Scattering1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Elastic Scattering1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Total Scattering1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Total Scattering1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Total Scattering1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Excitation1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Ionization1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Ionization1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Ionization1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Ionization0.001-1.5 MeV $\mathbf{e} + \mathbf{A}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{A}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{A}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{D}^{96+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{D}^{96+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{D}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{D}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{C}^{3}\mathbf{H}_{0}$ Attachment $\mathbf{e} + \mathbf{C}^{2}\mathbf{H}_{0}$ Attachment $\mathbf{e} + \mathbf{C}^{2}\mathbf{H}_{0}$	E/T E/T E/T E/T E/T E/T E/T E/T E/T E/T E/T	1022 1022 1022 1022 1022 1022 1022 1022
e + CODissociation1-10,000 eVe + CO2Dissociation1-10,000 eVe + H2OElastic Scattering1-10,000 eVe + COElastic Scattering1-10,000 eVe + CO2Elastic Scattering1-10,000 eVe + CO2Total Scattering1-10,000 eVe + CO2Total Scattering1-10,000 eVe + CO2Total Scattering1-10,000 eVe + CO2Total Scattering1-10,000 eVe + CO2Excitation1-10,000 eVe + CO2Excitation1-10,000 eVe + CO2Excitation1-10,000 eVe + CO2Ionization1-10,000 eVe + CO2Ionization0.001-1.5 MeVe + CO3Ionization0.001-1.5 MeVe + Au <sup>18+</sup> Recombination0.001-1.5 MeVe + Au <sup>79+</sup> Recombination0.001-1.5 MeVe + Ab <sup>92+</sup> Recombination0.001-1.5 MeVe + CyH4AttachmentEe + CyH4Attachmente + CyH6Attachmente + CyH6Attachmente + CyH6Attachmente + CyH6Dissociatione + CyH6Dissociatione + CyH6Dissociatione + CyH6Dissociatione + CyH6Elastic Scatteringe + CyH6Elastic Scatteringe + CyH6 <td>E/T E/T E/T E/T E/T E/T E/T E/T E/T E/T E/T</td> <td>1022 1022 1022 1022 1022 1022 1022</td>	E/T E/T E/T E/T E/T E/T E/T E/T E/T E/T E/T	1022 1022 1022 1022 1022 1022 1022
$\mathbf{e} + \mathbf{CO}_2$ Dissociation1-10,000 eV $\mathbf{e} + \mathbf{CO}$ Elastic Scattering1-10,000 eV $\mathbf{e} + \mathbf{CO}$ Elastic Scattering1-10,000 eV $\mathbf{e} + \mathbf{CO}$ Total Scattering1-10,000 eV $\mathbf{e} + \mathbf{CO}$ Excitation1-10,000 eV $\mathbf{e} + \mathbf{CO}$ Excitation1-10,000 eV $\mathbf{e} + \mathbf{CO}$ Ionization1-10,000 eV $\mathbf{e} + \mathbf{CO}$ Ionization0.001-1.5 MeV $\mathbf{e} + \mathbf{Ar}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Ar}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Ar}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Dy}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{C}^{3}_{4}$ Attachment $\mathbf{e} + \mathbf{C}_{4}$ Attachment $\mathbf{e} + \mathbf{C}_{4}$ Attachment $\mathbf{e} + \mathbf{C}_{2}_{4}$ Attachment $\mathbf{e} + \mathbf{C}_{2}_{4}$ Dissociation $\mathbf{e} + \mathbf{C}_{4}_{4}$ Dissociation $\mathbf{e} + \mathbf{C}_{4}_{4}$ <	$\begin{array}{c} {\rm E/T}\\ \end{array}$	$1022 \\ 1022 \\ 1022 \\ 1022 \\ 1022 \\ 1022$
e $H_2 \tilde{O}$ Elastic Scattering1-10,000 eVe+ COElastic Scattering1-10,000 eVe+ H_2 OTotal Scattering1-10,000 eVe+ H_2 OTotal Scattering1-10,000 eVe+ COTotal Scattering1-10,000 eVe+ COExcitation1-10,000 eVe+ COExcitation1-10,000 eVe+ COExcitation1-10,000 eVe+ COExcitation1-10,000 eVe+ COIonization1-10,000 eVe+ COIonization1-10,000 eVe+ COIonization1-10,000 eVe+ COIonization1-10,000 eVe+ Ar <sup>18+</sup> Recombination0.001-1.5 MeVe+ Ar <sup>18+</sup> Recombination0.001-1.5 MeVe+ Ar <sup>36+</sup> Recombination0.001-1.5 MeVe+ Au <sup>79+</sup> Recombination0.001-1.5 MeVe+ Dy <sup>66+</sup> Recombination0.001-1.5 MeVe+ Dy <sup>62+</sup> Recombination0.001-1.5 MeVe+ C <sup>3</sup> H <sub>2</sub> Attachmente+ C <sub>2</sub> H <sub>4</sub> Attachmente+ C <sub>2</sub> H <sub>4</sub> Attachmente+ C <sub>3</sub> H <sub>6</sub> Attachmente+ C <sub>3</sub> H <sub>6</sub> Attachmente+ C <sub>3</sub> H <sub>6</sub> Dissociatione+ C <sub>4</sub> H <sub>4</sub> Dissociatione+ C <sub>4</sub> H <sub>6</sub> Dissociatione+ C <sub>3</sub> H <sub>6</sub> Elastic Scatteringe+ C <sub>2</sub> H <sub>6</sub> Elastic Scattering	$\begin{array}{c} {\rm E/T}\\ \end{array}$	$1022 \\ 1022 \\ 1022 \\ 1022 \\ 1022$
e + $CO$ Elastic Scattering1-10,000 eVe + $CO_2$ Elastic Scattering1-10,000 eVe + $H_2O$ Total Scattering1-10,000 eVe + $CO$ Total Scattering1-10,000 eVe + $CO_2$ Total Scattering1-10,000 eVe + $CO$ Excitation1-10,000 eVe + $CO$ Excitation1-10,000 eVe + $CO$ Excitation1-10,000 eVe + $CO$ Excitation1-10,000 eVe + $CO_2$ Excitation1-10,000 eVe + $CO_2$ Ionization1-10,000 eVe + $CO_2$ Ionization1-10,000 eVe + $Ar^{18+}$ Recombination0.001-1.5 MeVe + $Kr^{36+}$ Recombination0.001-1.5 MeVe + $Kr^{36+}$ Recombination0.001-1.5 MeVe + $Ar^{19+}$ Recombination0.001-1.5 MeVe + $Ar^{19+}$ Recombination0.001-1.5 MeVe + $Pb^{52+}$ Recombination0.001-1.5 MeVe + $C_2H_2$ Attachmentee + $C_2H_4$ Attachmente + $C_2H_4$ Attachmente + $C_2H_4$ Attachmente + $C_2H_6$ Dissociatione + $C_2H_6$ Dissociatione + $C_3H_6$ Dissociatione + $C_3H_6$ Dissociatione + $C_2H_4$ Elastic Scatteringe + $C_2H_6$ Dissociatione + $C_2H_6$ Elastic Scatteringe + $C_2H_6$ Elastic Scatteringe + $C_2H_6$ Elastic Scatteringe + $C_2H_6$ Elastic Scatteringe	É/T E/T E/T E/T E/T E/T E/T E/T	$1022 \\ 1022 \\ 1022 \\ 1022$
$\mathbf{e} + \mathbf{CO}_2$ Elastic Scattering1-10,000 eV $\mathbf{e} + \mathbf{H}_2\mathbf{O}$ Total Scattering1-10,000 eV $\mathbf{e} + \mathbf{CO}$ Total Scattering1-10,000 eV $\mathbf{e} + \mathbf{H}_2\mathbf{O}$ Excitation1-10,000 eV $\mathbf{e} + \mathbf{H}_2\mathbf{O}$ Excitation1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Ionization1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Ionization1-10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Ionization0.001-1.5 MeV $\mathbf{e} + \mathbf{Ar}^{18+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Kr}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Ar}^{54+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Au}^{96+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Au}^{96+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Cu}^{92+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Cu}^{92+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Cu}^{94}$ Attachment $\mathbf{e} + \mathbf{Cu}^{94}$ $\mathbf{e} + \mathbf{Cu}^{94}$ Attachment $\mathbf{e} + \mathbf{Cu}^{94}$ $\mathbf{e} + \mathbf{Cu}^{94}$ Attachment $\mathbf{e} + \mathbf{Cu}^{94}$ $\mathbf{e} + \mathbf{Cu}^{94}$ Dissociation $\mathbf{e} + \mathbf{Cu}^{94}$ $\mathbf{e} + \mathbf{Cu}^{94}$ <td< td=""><td>E/T <math display="block">E/T</math> <math display="block">E/T</math> <math display="block">E/T</math> <math display="block">E/T</math> <math display="block">E/T</math> <math display="block">E/T</math> <math display="block">E/T</math></td><td><math>1022 \\ 1022</math></td></td<>	E/T $E/T$ $E/T$ $E/T$ $E/T$ $E/T$ $E/T$ $E/T$	$1022 \\ 1022$
e + H <sub>2</sub> O       Total Scattering       1-10,000 eV         e + CO       Total Scattering       1-10,000 eV         e + CO       Total Scattering       1-10,000 eV         e + H <sub>2</sub> O       Excitation       1-10,000 eV         e + CO       Ionization       0.001-1.5 MeV         e + Kr <sup>36+</sup> Recombination       0.001-1.5 MeV         e + Xe <sup>54+</sup> Recombination       0.001-1.5 MeV         e + Au <sup>79+</sup> Recombination       0.001-1.5 MeV         e + Pb <sup>82+</sup> Recombination       0.001-1.5 MeV         e + CP44       Attachment       e         e + C2H2       Attachment       e         e + C2H4       Attachment       e         e + C3H6       Attachment       e         e + C3	E/T $E/T$ $E/T$ $E/T$ $E/T$ $E/T$ $E/T$	1022
	E/T $E/T$ $E/T$ $E/T$ $E/T$	
	E/T E/T E/T E/T	1022
	E/T E/T E/T	1022
$e + CO$ Excitation $1 - 0,000 eV$ $e + CO_2$ Excitation $1 - 10,000 eV$ $e + CO_2$ Ionization $1 - 10,000 eV$ $e + CO_2$ Ionization $1 - 10,000 eV$ $e + CO_2$ Ionization $1 - 10,000 eV$ $e + Ar^{18+}$ Recombination $0.001 - 1.5 MeV$ $e + Kr^{36+}$ Recombination $0.001 - 1.5 MeV$ $e + Kr^{36+}$ Recombination $0.001 - 1.5 MeV$ $e + Xe^{54+}$ Recombination $0.001 - 1.5 MeV$ $e + Dy^{66+}$ Recombination $0.001 - 1.5 MeV$ $e + Dy^{66+}$ Recombination $0.001 - 1.5 MeV$ $e + Dy^{66+}$ Recombination $0.001 - 1.5 MeV$ $e + Dy^{62+}$ Recombination $0.001 - 1.5 MeV$ $e + C_2H_2$ Attachment $e + C_2H_4$ Attachment $e + C_2H_4$ Attachment $e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_2H_6$ Dissociation $e + C_2H_6$ Dissociation $e + C_2H_6$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_8$ Dissociation $e + C_3H_6$ Dissociation $e + C_2H_2$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_6$ Elastic S	E/T E/T	1022
$e + CO_2$ Excitation $1 - 10,000 eV$ $e + H_2O$ Ionization $1 - 10,000 eV$ $e + CO_2$ Ionization $0.001 - 1.5 MeV$ $e + Kr^{36+}$ Recombination $0.001 - 1.5 MeV$ $e + Kr^{36+}$ Recombination $0.001 - 1.5 MeV$ $e + Xe^{54+}$ Recombination $0.001 - 1.5 MeV$ $e + Dy^{66+}$ Recombination $0.001 - 1.5 MeV$ $e + C_2H_4$ Recombination $0.001 - 1.5 MeV$ $e + C_2H_2$ Attachment $e + C_2H_4$ $e + C_2H_4$ Attachment $e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_2H_6$ Dissociation $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering </td <td>E/T</td> <td>1022</td>	E/T	1022
	12/1	1022
$\mathbf{e} + \mathbf{CO}$ Ionization1 10,000 eV $\mathbf{e} + \mathbf{CO}_2$ Ionization1-10,000 eV $\mathbf{e} + \mathbf{Ar}^{18+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Kr}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Xe}^{54+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Dy}^{66+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Py}^{86+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Pb}^{82+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Pb}^{82+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{C2H}_4$ Attachment $\mathbf{e} + \mathbf{C2H}_4$ Attachment $\mathbf{e} + \mathbf{C2H}_4$ Attachment $\mathbf{e} + \mathbf{C2H}_6$ Attachment $\mathbf{e} + \mathbf{C3H}_6$ Attachment $\mathbf{e} + \mathbf{C3H}_6$ Dissociation $\mathbf{e} + \mathbf{C2H}_2$ Dissociation $\mathbf{e} + \mathbf{C3H}_6$ Elastic Scattering $\mathbf{e} + \mathbf{C3H}_6$ Elastic Scatter	E/T	1022
$\mathbf{c} + \mathbf{CO}$ Initiation1 10,000 eV $\mathbf{e} + \mathbf{Ar}^{18+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Kr}^{36+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Ke}^{54+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Au}^{79+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Au}^{79+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{Pb}^{82+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{U}^{92+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{U}^{92+}$ Recombination0.001-1.5 MeV $\mathbf{e} + \mathbf{C}_{2}\mathbf{H}_{2}$ Attachment $\mathbf{e} + \mathbf{C}_{2}\mathbf{H}_{4}$ Attachment $\mathbf{e} + \mathbf{C}_{3}\mathbf{H}_{6}$ Attachment $\mathbf{e} + \mathbf{C}_{3}\mathbf{H}_{6}$ Attachment $\mathbf{e} + \mathbf{C}_{2}\mathbf{H}_{2}$ Dissociation $\mathbf{e} + \mathbf{C}_{3}\mathbf{H}_{6}$ Dissociation $\mathbf{e} + \mathbf{C}_{3}\mathbf{H}_{6}$ Dissociation $\mathbf{e} + \mathbf{C}_{3}\mathbf{H}_{6}$ Dissociation $\mathbf{e} + \mathbf{C}_{4}\mathbf{H}_{4}$ Elastic Scattering $\mathbf{e} + \mathbf{C}_{2}\mathbf{H}_{4}$ Elastic Scattering $\mathbf{e} + \mathbf{C}_{3}\mathbf{H}_{8}$ Elastic Scattering $\mathbf{e} + \mathbf{C}_{3}\mathbf{H}_{8}$ Elastic Scattering $\mathbf{e} + \mathbf{C}_{3}\mathbf{H}_{8}$ Elastic Scattering $\mathbf{e} + \mathbf{C}_{2}\mathbf{H}_{4}$ Elastic Scattering $\mathbf{e} + \mathbf{C}_{3}\mathbf{H}_{8}$ Elastic Scattering $\mathbf{e} + \mathbf{C}_{2}\mathbf{H}_{4}$ Total Scattering $\mathbf{e} + \mathbf{C}_{3}\mathbf{H}_{8}$ <t< td=""><td>E/T</td><td>1022</td></t<>	E/T	1022
$e + Ar^{18+}$ Recombination $0.001-1.5 \text{ MeV}$ $e + Kr^{36+}$ Recombination $0.001-1.5 \text{ MeV}$ $e + Xe^{54+}$ Recombination $0.001-1.5 \text{ MeV}$ $e + Dy^{66+}$ Recombination $0.001-1.5 \text{ MeV}$ $e + Dy^{62+}$ Recombination $0.001-1.5 \text{ MeV}$ $e + Pb^{82+}$ Recombination $0.001-1.5 \text{ MeV}$ $e + Pb^{82+}$ Recombination $0.001-1.5 \text{ MeV}$ $e + C_2H_2$ Attachment $e$ $e + C_2H_2$ Attachment $e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_3H_6$ Attachment $e + C_2H_4$ Dissociation $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scatteri	E/T	1022
$e + Kr^{36+}$ Recombination0.001-1.5 MeV $e + Kr^{36+}$ Recombination0.001-1.5 MeV $e + Kr^{36+}$ Recombination0.001-1.5 MeV $e + Dy^{66+}$ Recombination0.001-1.5 MeV $e + Dy^{66+}$ Recombination0.001-1.5 MeV $e + Au^{79+}$ Recombination0.001-1.5 MeV $e + Pb^{82+}$ Recombination0.001-1.5 MeV $e + Pb^{82+}$ Recombination0.001-1.5 MeV $e + C_2H_2$ Recombination0.001-1.5 MeV $e + C_2H_4$ Attachment $e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_2H_6$ Attachment $e + C_2H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_4H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering <td><math>\frac{D}{T}</math></td> <td>1022</td>	$\frac{D}{T}$	1022
$e + Xe^{54+}$ Recombination0.001-1.5 MeV $e + Dy^{66+}$ Recombination0.001-1.5 MeV $e + Au^{79+}$ Recombination0.001-1.5 MeV $e + Pb^{82+}$ Recombination0.001-1.5 MeV $e + U^{92+}$ Recombination0.001-1.5 MeV $e + CH_4$ Attachment $e + C_2H_2$ Attachment $e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_3H_6$ Attachment $e + C_2H_2$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Dissociation $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering<	тп Тh	1023
$e + Ae$ Recombination $0.001$ -1.5 MeV $e + Au^{79+}$ Recombination $0.001$ -1.5 MeV $e + Pb^{82+}$ Recombination $0.001$ -1.5 MeV $e + Pb^{82+}$ Recombination $0.001$ -1.5 MeV $e + U^{92+}$ Recombination $0.001$ -1.5 MeV $e + C_2H_2$ Attachment $e + C_2H_2$ Attachment $e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_3H_6$ Attachment $e + C_4H_4$ Dissociation $e + C_2H_2$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_2H_4$ Elastic Scattering $e + C_2H_4$ Total Scattering $e + C_2H_2$ Total Scattering $e + C_2H_2$ Total Scattering	111 Th	1023
$e + Au^{79+}$ Recombination $0.001-1.5$ MeV $e + Au^{79+}$ Recombination $0.001-1.5$ MeV $e + Pb^{82+}$ Recombination $0.001-1.5$ MeV $e + U^{92+}$ Recombination $0.001-1.5$ MeV $e + CH_4$ Attachment $0.001-1.5$ MeV $e + C_2H_2$ Attachment $e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_3H_6$ Attachment $e + C_3H_8$ Attachment $e + C_2H_2$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_4H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_2H_2$ Total Scattering $e + C_2H_2$ Total Scattering	111 Th	1023
$e + Pb^{82+}$ Recombination $0.001-1.5$ MeV $e + U^{92+}$ Recombination $0.001-1.5$ MeV $e + CH_4$ Attachment $0.001-1.5$ MeV $e + C_2H_2$ Attachment $e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_3H_6$ Attachment $e + C_3H_8$ Attachment $e + C_2H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_8$ Dissociation $e + C_4H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_2H_2$ Total Scattering $e + C_2H_2$ Total Scattering	тп Тh	1023
$e + H^{32+}$ Recombination $0.001-1.5$ MeV $e + CH_4$ Attachment $0.001-1.5$ MeV $e + C_2H_2$ Attachment $e + C_2H_4$ Attachment $e + C_2H_4$ Attachment $e + C_3H_6$ Attachment $e + C_3H_8$ Attachment $e + C_4H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_8$ Dissociation $e + C_3H_8$ Dissociation $e + C_4H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_2$ Total Scattering $e + C_2H_2$ Total Scattering	111 Th	1020
$e + C$ Recombination $0.001$ - $1.3$ MeV $e + C_{2}H_{2}$ Attachment $e + C_{2}H_{2}$ Attachment $e + C_{2}H_{4}$ Attachment $e + C_{3}H_{6}$ Attachment $e + C_{3}H_{8}$ Attachment $e + C_{4}H_{4}$ Dissociation $e + C_{2}H_{2}$ Dissociation $e + C_{2}H_{4}$ Dissociation $e + C_{2}H_{4}$ Dissociation $e + C_{2}H_{4}$ Dissociation $e + C_{2}H_{6}$ Dissociation $e + C_{3}H_{8}$ Dissociation $e + C_{4}H_{4}$ Elastic Scattering $e + C_{2}H_{4}$ Elastic Scattering $e + C_{2}H_{6}$ Elastic Scattering $e + C_{2}H_{6}$ Elastic Scattering $e + C_{3}H_{6}$ Elastic Scattering $e + C_{3}H_{6}$ Elastic Scattering $e + C_{3}H_{8}$ Elastic Scattering $e + C_{4}H_{4}$ Total Scattering $e + C_{2}H_{2}$ Total Scattering	111 Th	1020
$e + C_{1}H_{4}$ Attachment $e + C_{2}H_{2}$ Attachment $e + C_{2}H_{4}$ Attachment $e + C_{2}H_{6}$ Attachment $e + C_{3}H_{6}$ Attachment $e + C_{3}H_{8}$ Attachment $e + C_{4}H_{4}$ Dissociation $e + C_{2}H_{2}$ Dissociation $e + C_{2}H_{4}$ Dissociation $e + C_{2}H_{4}$ Dissociation $e + C_{2}H_{6}$ Dissociation $e + C_{3}H_{6}$ Dissociation $e + C_{4}H_{4}$ Elastic Scattering $e + C_{2}H_{4}$ Elastic Scattering $e + C_{2}H_{4}$ Elastic Scattering $e + C_{2}H_{4}$ Elastic Scattering $e + C_{2}H_{6}$ Elastic Scattering $e + C_{3}H_{6}$ Elastic Scattering $e + C_{3}H_{8}$ Elastic Scattering $e + C_{4}H_{4}$ Total Scattering $e + C_{4}H_{4}$ Total Scattering $e + C_{4}H_{4}$ Total Scattering		1023
$e + C_2H_2$ Attachment $e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_3H_6$ Attachment $e + C_3H_8$ Attachment $e + C_4H_4$ Dissociation $e + C_2H_2$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_8$ Dissociation $e + C_4H_4$ Elastic Scattering $e + C_2H_2$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_4H_4$ Total Scattering $e + C_4H_4$ Total Scattering $e + C_2H_2$ Total Scattering	E/1 E/T	1024
$e + C_2H_4$ Attachment $e + C_2H_6$ Attachment $e + C_3H_6$ Attachment $e + C_3H_8$ Attachment $e + C_4H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_8$ Dissociation $e + C_3H_8$ Dissociation $e + C_4H_4$ Elastic Scattering $e + C_2H_2$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_4H_4$ Total Scattering $e + C_4H_4$ Total Scattering	E/1 E/T	1024
$e + C_2H_6$ Attachment $e + C_3H_6$ Attachment $e + C_3H_8$ Attachment $e + C_2H_4$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_8$ Dissociation $e + C_2H_2$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_4H_4$ Total Scattering $e + C_2H_2$ Total Scattering	E/1 E/T	1024
$e + C_3 H_6$ Attachment $e + C_3 H_8$ Attachment $e + C_1 H_4$ Dissociation $e + C_2 H_2$ Dissociation $e + C_2 H_4$ Dissociation $e + C_2 H_6$ Dissociation $e + C_3 H_6$ Dissociation $e + C_3 H_8$ Dissociation $e + C_1 H_4$ Elastic Scattering $e + C_2 H_4$ Elastic Scattering $e + C_2 H_4$ Elastic Scattering $e + C_2 H_6$ Elastic Scattering $e + C_2 H_6$ Elastic Scattering $e + C_2 H_6$ Elastic Scattering $e + C_3 H_6$ Elastic Scattering $e + C_3 H_8$ Elastic Scattering $e + C_3 H_8$ Elastic Scattering $e + C_1 H_4$ Total Scattering $e + C_1 H_4$ Total Scattering	E/I E/T	1024
$e + C_3 H_8$ Attachment $e + C_4 H_4$ Dissociation $e + C_2 H_2$ Dissociation $e + C_2 H_4$ Dissociation $e + C_2 H_6$ Dissociation $e + C_3 H_6$ Dissociation $e + C_3 H_8$ Dissociation $e + C_4 H_4$ Elastic Scattering $e + C_2 H_2$ Elastic Scattering $e + C_2 H_4$ Elastic Scattering $e + C_2 H_6$ Elastic Scattering $e + C_2 H_6$ Elastic Scattering $e + C_3 H_6$ Elastic Scattering $e + C_3 H_6$ Elastic Scattering $e + C_3 H_8$ Elastic Scattering $e + C_4 H_4$ Total Scattering $e + C_4 H_4$ Total Scattering	E/T	1024
$e + CH_4$ Dissociation $e + C_2H_2$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_8$ Dissociation $e + C_4H_4$ Elastic Scattering $e + C_2H_2$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_4H_4$ Total Scattering $e + C_2H_2$ Total Scattering	E/T	1024
$e + C_2H_2$ Dissociation $e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_8$ Dissociation $e + CH_4$ Elastic Scattering $e + C_2H_2$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + CH_4$ Total Scattering $e + C_2H_2$ Total Scattering	E/T	1024
$e + C_2H_4$ Dissociation $e + C_2H_6$ Dissociation $e + C_3H_6$ Dissociation $e + C_3H_8$ Dissociation $e + CH_4$ Elastic Scattering $e + C_2H_2$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_4H_4$ Total Scattering $e + C_4H_4$ Total Scattering	E/T	1024
$e + C_2 H_6$ Dissociation $e + C_3 H_6$ Dissociation $e + C_3 H_8$ Dissociation $e + C_4 H_4$ Elastic Scattering $e + C_2 H_2$ Elastic Scattering $e + C_2 H_4$ Elastic Scattering $e + C_2 H_6$ Elastic Scattering $e + C_3 H_6$ Elastic Scattering $e + C_3 H_8$ Elastic Scattering $e + C_4 H_4$ Total Scattering $e + C_4 H_4$ Total Scattering	E/T	1024
$e + C_3H_6$ Dissociation $e + C_3H_8$ Dissociation $e + CH_4$ Elastic Scattering $e + C_2H_2$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + C_1H_4$ Total Scattering $e + C_2H_2$ Total Scattering	E/T	1024
$e + C_3 H_8$ Dissociation $e + CH_4$ Elastic Scattering $e + C_2 H_2$ Elastic Scattering $e + C_2 H_4$ Elastic Scattering $e + C_2 H_6$ Elastic Scattering $e + C_3 H_6$ Elastic Scattering $e + C_3 H_8$ Elastic Scattering $e + C_3 H_8$ Elastic Scattering $e + C_4 H_4$ Total Scattering $e + C_4 H_4$ Total Scattering $e + C_4 H_4$ Total Scattering	E/T	1024
$e + CH_4$ Elastic Scattering $e + C_2H_2$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + CH_4$ Total Scattering $e + C_2H_2$ Total Scattering	E/T	1024
$e + C_2H_2$ Elastic Scattering $e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + CH_4$ Total Scattering $e + C_2H_2$ Total Scattering	E/T	1024
$e + C_2H_4$ Elastic Scattering $e + C_2H_6$ Elastic Scattering $e + C_3H_6$ Elastic Scattering $e + C_3H_8$ Elastic Scattering $e + CH_4$ Total Scattering $e + C_2H_2$ Total Scattering	E/T	1024
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$ Elastic Scattering $\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$ Elastic Scattering $\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$ Elastic Scattering $\mathbf{e} + \mathbf{C}\mathbf{H}_4$ Total Scattering $\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$ Total Scattering	E/T	1024
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$ Elastic Scattering $\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$ Elastic Scattering $\mathbf{e} + \mathbf{C} \mathbf{H}_4$ Total Scattering $\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$ Total Scattering	E/T	1024
$e + C_3 H_8$ Elastic Scattering $e + CH_4$ Total Scattering $e + C_2 H_2$ Total Scattering	E/T	1024
$e + CH_4$ Total Scattering $e + C_2H_2$ Total Scattering	E/T	1024
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$ Total Scattering	E/T	1024
	E/T	1024
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$ Total Scattering	E/T	1024
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$ Total Scattering	E/T	1024
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$ Total Scattering	E/T	1024
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$ Total Scattering	E/T	1024
$e + CH_4$ Excitation	E/T	1024
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$ Excitation	<b>D</b> / <del>C</del>	1024
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$ Excitation	$\mathrm{E}/\mathrm{T}$	1024
	${ m E/T} { m E/T}$	100 .

$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$	Excitation		E/T	1024
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$	Excitation		E/T	1024
$\mathbf{e} + \mathbf{CH}_4$	Ionization		E/T	1024
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$	Ionization		E/T	1024
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Ionization		E/T	1024
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$	Ionization		E/T	1024
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$	Ionization		E/T	1024
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$	Ionization		E/T	1024
$\mathbf{e} + \mathbf{F} \mathbf{e}^{10+}$	Excitation	1-75 Ry	Th	1025
$\mathbf{e} + \mathbf{C}\mathbf{u}^+$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{2+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{3+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{4+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{5+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{6+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{7+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{8+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{9+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{10+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{11+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{12+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{13+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{14+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{15+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{16+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{17+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{18+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{19+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{20+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{21+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{22+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{23+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{24+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{25+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{26+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{27+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{28+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{29+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z}\mathbf{n}^+$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{2+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{3+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{4+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{5+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{6+}$	Recombination	0-10,000 K	Th	1026
$e + Zn^{7+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{8+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{9+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{10+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{11+}$	Recombination	0-10,000 K	Th	1026
$e + Zn^{12+}$	Recombination	0-10,000 K	Th	1026
$e + Zn^{13+}$	Recombination	0-10,000 K	Th	1026
$e + Zn^{14+}$	Recombination	0-10,000 K	Th	1026
$e + Zn^{15+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{16+}$	Recombination	0-10,000 K	Th	1026
$e + Zn^{17+}$	Recombination	0-10,000 K	Th	1026
$e + Zn^{18+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{19+}$	Recombination	0-10,000 K	Th	1026

$\mathbf{e} + \mathbf{Z} \mathbf{n}^{20+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{21+}$	Recombination	0-10,000 K	Th 102	26
$e + Zn^{22+}$	Recombination	0-10,000 K	Th 102	26
$e + Zn^{23+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{24+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{25+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{26+}$	Recombination	0-10,000 K	Th 102	26
$e + Zn^{27+}$	Recombination	0-10,000 K	Th 102	26
$e + Zn^{28+}$	Recombination	0-10,000 K	Th 102	26
$e + Zn^{29+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{30+}$	Recombination	0-10,000 K	Th 102	26
$e + Ga^+$	Recombination	0-10,000 K	Th 102	26
$e + Ga^{2+}$	Recombination	0-10,000 K	Th 102	26
$e + Ga^{3+}$	Recombination	0-10,000 K	Th 102	26
$e + Ga^{4+}$	Recombination	0-10,000 K	Th 102	26
$e + Ga^{5+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{6+}$	Recombination	0-10,000 K	Th 102	26
$e + Ga^{7+}$	Recombination	0-10,000 K	Th 102	26
$e + Ga^{8+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{9+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{10+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{11+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{12+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{13+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{14+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{G} \mathbf{a}^{15+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{G} \mathbf{a}^{16+}$	Recombination	0-10,000 K	Th 102	26
$\mathbf{e} + \mathbf{G} \mathbf{a}^{17+}$	Recombination	0-10,000 K	Th 102	26
$e + Ga^{18+}$	Recombination	$0-10,000 {\rm K}$	Th 102	26
$\mathbf{e} + \mathbf{G} \mathbf{a}^{19+}$	Recombination	$0-10,000 {\rm K}$	Th 102	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{20+}$	Recombination	$0-10,000 {\rm K}$	Th 102	26
$\mathbf{e} + \mathbf{G} \mathbf{a}^{21+}$	Recombination	0-10,000 K	Th $102$	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{22+}$	Recombination	0-10,000 K	Th $102$	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{23+}$	Recombination	0-10,000 K	Th $102$	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{24+}$	Recombination	0-10,000 K	Th $102$	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{25+}$	Recombination	0-10,000 K	Th $102$	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{26+}$	Recombination	0-10,000 K	Th $102$	26
$e + Ga^{27+}$	Recombination	0-10,000 K	Th $102$	26
$e + Ga^{28+}$	Recombination	0-10,000 K	Th $102$	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{29+}$	Recombination	0-10,000 K	Th $102$	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{30+}$	Recombination	0-10,000 K	Th $102$	26
$\mathbf{e} + \mathbf{G}\mathbf{a}^{31+}$	Recombination	0-10,000 K	Th $102$	26
$e + Ge^+$	Recombination	0-10,000 K	Th $102$	26
$e + Ge^{2+}$	Recombination	0-10,000 K	Th $102$	26
$e + Ge^{3+}$	Recombination	0-10,000 K	Th $102$	26
$e + Ge^{4+}$	Recombination	0-10,000 K	Th $102$	26
$e + Ge^{5+}$	Recombination	0-10,000 K	Th $102$	26
$\mathbf{e} + \mathbf{G}\mathbf{e}^{6+}$	Recombination	0-10,000 K	Th $102$	26
$\mathbf{e} + \mathbf{G}\mathbf{e}^{7+}$	Recombination	0-10,000 K	Th $102$	26
$e + Ge^{8+}$	Recombination	0-10,000 K	Th $102$	26
$e + Ge^{9+}$	Recombination	0-10,000 K	Th 105	26
$e + Ge^{10+}$	Recombination	0-10,000 K	Th 102	26
$e + Ge^{11+}$	Recombination	0-10,000 K	Th 102	26
$e + Ge^{12+}$	Recombination	0-10,000 K	Th 102	26
$e + Ge^{10+}$	Recombination	0-10,000 K	Th 102	26
$e + Ge^{14+}$	Recombination	0-10,000 K	Th 102	26
$e + Ge^{10+}$	Recombination	0-10,000 K	Th 102	26

$\mathbf{e} + \mathbf{G}\mathbf{e}^{16+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{e}^{17+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{18+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{G} \mathbf{e}^{19+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{20+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{21+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{22+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{23+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{24+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{25+}$	Recombination	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{26+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{27+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{28+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{29+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{30+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{31+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{32+}$	Recombination	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{4+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{5+}$	Ionization	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{6+}$	Ionization	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{\prime +}$	Ionization	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{C}\mathbf{u}^{8+}$	Ionization	0-10,000 K	Th	1026
$e + Cu^{9+}$	Ionization	0-10,000 K	Th	1026
$e + Cu^{10+}$	Ionization	0-10,000 K	Th	1026
$e + Cu^{11+}$	Ionization	0-10,000 K	Th	1026
$e + Cu^{12+}$	Ionization	0-10,000 K	Th	1026
$e + Cu^{13+}$	Ionization	0-10,000 K	Th	1026
$e + Cu^{14+}$	Ionization	0-10,000 K	Th	1026
$e + Cu^{15+}$	Ionization	0-10,000 K	Th	1026
$e + Cu^{10+}$	Ionization	0-10,000 K	Th	1026
$e + Cu^{1+}$		0-10,000 K	Th	1026
$e + Cu^{10+}$		0-10,000 K		1026
$e + Cu^{20+}$		0-10,000 K		1020
$e + Cu^{21+}$	Ionization	0-10,000 K	111 Th	1020
$e + Cu^{22+}$	Ionization	0-10,000 K	1 fl Th	1020
$e + Cu^{-1}$	Ionization	0-10,000 K	111 Th	1020
e + Cu	Ionization	0-10,000 K	111 Th	1020
$e + Cu^{25+}$	Ionization	0-10,000 K	111 Th	1020
e + Cu	Ionization	0.10.000 K	тн Тh	1020
$e + Cu^{27+}$	Ionization	0 10 000 K	Th	1020
$e + Cu^{28+}$	Ionization	0 10 000 K	Th	1020
e + Cu $e + Zn^{5+}$	Ionization	0-10,000 K	Th	1020
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{6+}$	Ionization	0-10,000 K	Th	1020
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{7+}$	Ionization	0-10,000 K	Th	1020
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{8+}$	Ionization	0-10,000 K	Th	1026
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{9+}$	Ionization	0-10 000 K	Th	1026
$e + Zn^{10+}$	Ionization	0-10 000 K	Th	1026
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{11+}$	Ionization	0-10.000 K	Th	1026
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{12+}$	Ionization	0-10.000 K	Th	1026
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{13+}$	Ionization	0-10.000 K	Th	1026
$\mathbf{e} + \mathbf{Z}\mathbf{n}^{14+}$	Ionization	0-10.000 K	Th	1026
$\dot{\mathbf{e}} + \mathbf{Z} \mathbf{n}^{15+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\dot{\mathbf{e}} + \mathbf{Z} \mathbf{n}^{16+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{17+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Zn^{18+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{19+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026

$\mathbf{e} + \mathbf{Z} \mathbf{n}^{20+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{21+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Zn^{22+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Zn^{23+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Zn^{24+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Zn^{25+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{26+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Zn^{27+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Zn^{28+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{29+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{a}^{6+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{a}^{7+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{a}^{8+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{9+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{10+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{11+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{12+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{13+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{14+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{15+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{16+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{17+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{18+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{19+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{20+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{21+}$	Ionization	$0-10,000 {\rm K}$	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G} \mathbf{a}^{22+}$	Ionization	$0-10,000 {\rm K}$	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{a}^{23+}$	Ionization	$0-10,000 {\rm K}$	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{a}^{24+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{a}^{25+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Ga^{26+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Ga^{27+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Ga^{28+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{a}^{29+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Ga^{30+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Ge^{7+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Ge^{8+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Ge^{9+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{10+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Ge^{11+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Ge^{12+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$e + Ge^{13+}$	Ionization	0-10,000 K	$\frac{\mathrm{Th}}{\mathrm{-}}$	1026
$e + Ge^{14+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{15+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{16+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{1/+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{18+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{19+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{20+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{21+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{22+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{23+}$	Ionization	0-10,000 K	'I'h	1026
$e + Ge^{4+\tau}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{26+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{20+}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{2'}$	Ionization	0-10,000 K	Th	1026
$e + Ge^{20+}$	Ionization	0-10,000 K	Th	1026

$\mathbf{e} + \mathbf{G}\mathbf{e}^{29+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{30+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
$\mathbf{e} + \mathbf{G}\mathbf{e}^{31+}$	Ionization	0-10,000 K	$\mathrm{Th}$	1026
e + He	Excitation	$3x10^{-5} - 1.4 \text{ MeV}$	E/T	1028
$\mathbf{e} + \mathbf{N}\mathbf{i}^{20+}$	Excitation	85-425 Ry	Th	1029
$\mathbf{e} + \mathbf{N}\mathbf{e}^{2+}$	Excitation	5-45 Ry	$\mathrm{Th}$	1030
$\mathbf{e} + \mathbf{F} \mathbf{e}^{16+}$	Excitation	58.5-425 Ry	$\mathrm{Th}$	1031
$e + Si^{7+}$	Excitation	$10^4 - 10^7 { m K}$	$\mathrm{Th}$	1032
$e + S^{8+}$	Excitation	25-125 Ry	$\mathrm{Th}$	1033
$e + Cl^+$	Excitation	1000-1,000,000 K	$\mathrm{Th}$	1034
e + Ag	Line Broadening	$2500-50,000 { m K}$	$\mathrm{Th}$	1035
$e + Si^{7+}$	Excitation	20-80 Ry	$\mathrm{Th}$	1036
e + H	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + He	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Li	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Be	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + B	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + C	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + N	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + O	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + F	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Ne	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Na	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Mg	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Al	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Si	Ionization	5-10,000  eV	Th	1037
e + P	Ionization	5-10,000  eV	Th	1037
e + S	Ionization	5-10,000 eV	Th	1037
e + Cl	Ionization	5-10,000 eV	Th	1037
e + Ar	Ionization	5-10,000 eV	Th	1037
e + Ca	Ionization	5-10,000 eV	Th	1037
e + Sc	Ionization	5-10,000 eV	Th	1037
$e + T_1$		5-10,000 eV	Th	1037
e + v		5-10,000 eV		1037
e + Cr		5-10,000 eV		1037
e + Mn		5-10,000 eV		1037
e + fe	Ionization	5-10,000 eV	1 II Th	1037
e + Co	Ionization	5-10,000 eV	1 II Th	1037
e + Ni e + Cu	Ionization	5 10,000 eV	111 Th	1037
e + Cu $e \pm Zn$	Ionization	5.10,000  eV	111 Th	1037
e + Zn	Ionization	5-10,000 eV	Th	1037
e + Ge	Ionization	5-10,000 eV	Th	1037
e + As	Ionization	5-10,000 eV	Th	1037
e + Se	Ionization	5-10,000 eV	Th	1037
e + Br	Ionization	5 - 10,000  eV	Th	1037
e + Kr	Ionization	5-10,000  eV	Th	1037
e + Rb	Ionization	5-10.000 eV	Th	1037
e + Sr	Ionization	5-10.000  eV	$\mathrm{Th}$	1037
e + Y	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Zr	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Nb	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Mo	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Tc	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Ru	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Rh	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Pd	Ionization	5-10,000  eV	$\mathrm{Th}$	1037

e + Ag	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Cd	Ionization	5-10,000 eV	$\mathrm{Th}$	1037
e + In	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Sn	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Sb	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Te	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + I	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
e + Xe	Ionization	5-10,000  eV	$\mathrm{Th}$	1037
$\mathbf{e} + \mathbf{A} \mathbf{r}^{12+}$	Excitation	$10^5 - 10^7 { m K}$	$\mathrm{Th}$	1038
$\mathbf{e} + \mathbf{Ta}^{45+}$	Excitation	4-600 Ry	$\mathrm{Th}$	1039
$\mathbf{e} + \mathbf{A}\mathbf{r}^{11+}$	Excitation	$35-175 \mathrm{Ry}$	$\mathrm{Th}$	1040
$e + Ne^{2+}$	Excitation	5.2-25 Ry	$\mathrm{Th}$	1041
$e + O^{3+}$	Recombination	0.1-120 eV	$\mathrm{Th}$	1042
$\mathbf{e} + \mathbf{C}\mathbf{a}^{13+}$	Excitation	45-255 Ry	$\mathrm{Th}$	1043
$\mathbf{e} + \mathbf{N} \mathbf{d}^{32+}$	Excitation	5-20,000  eV	$\mathrm{Th}$	1044
$\mathbf{e} + \mathbf{Sm}^{34+}$	Excitation	5-20,000  eV	$\mathrm{Th}$	1044
$\mathbf{e} + \mathbf{E} \mathbf{u}^{35+}$	Excitation	5-20,000  eV	$\mathrm{Th}$	1044
$\mathbf{e} + \mathbf{G} \mathbf{d}^{36+}$	Excitation	5-20,000  eV	$\mathrm{Th}$	1044
$\mathbf{e} + \mathbf{T} \mathbf{a}^{45+}$	Excitation	5-20,000  eV	$\mathrm{Th}$	1044
$\mathbf{e} + \mathbf{W}^{46+}$	Excitation	5-20,000  eV	$\mathrm{Th}$	1044
e + He	Elastic Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Ne	Elastic Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Ar	Elastic Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Kr	Elastic Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Xe	Elastic Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + He	Angular Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Ne	Angular Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Ar	Angular Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Kr	Angular Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Xe	Angular Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + He	Total Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Ne	Total Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Ar	Total Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Kr	Total Scattering	1-1000  eV	$\mathrm{Th}$	1045
e + Xe	Total Scattering	1-1000  eV	$\mathrm{Th}$	1045
$e + Mg^{4+}$	Excitation	10-50 Ry	$\mathrm{Th}$	1046
$\mathbf{e} + \mathbf{A} \mathbf{r}^{10+}$	Excitation	30-150 Ry	$\mathrm{Th}$	1047
$\mathbf{e} + \mathbf{N}_2$	Dissociation	$10^{-2} - 10^4 \text{ eV}$	E/T	1048
$\mathbf{e} + \mathbf{N}_2^+$	Dissociation	$10^{-2} - 10^4 \text{ eV}$	E/T	1048
$\mathbf{e} + \mathbf{N}_2$	Elastic Scattering	$10^{-2} - 10^4 \text{ eV}$	E/T	1048
$\mathbf{e} + \mathbf{N}_2$	Total Scattering	$10^{-2} - 10^4 \text{ eV}$	E/T	1048
$\mathbf{e} + \mathbf{N}_2$	Excitation	$10^{-2} - 10^4 \text{ eV}$	E/T	1048
$\mathbf{e} + \mathbf{N}_2^+$	Excitation	$10^{-2} - 10^4 \text{ eV}$	E/T	1048
$\mathbf{e} + \mathbf{N}_2$	Ionization	$10^{-2} - 10^4 \text{ eV}$	E/T	1048
$\mathbf{e} + \mathbf{N}_2^+$	Ionization	$10^{-2} - 10^4 \text{ eV}$	E/T	1048
e + C	Excitation	$10^{-1} - 10^7 \text{ eV}$	E/T	1049
$e + C^+$	Excitation	$10^{-1} - 10^7 \text{ eV}$	E/T	1049
$\mathbf{e} + \mathbf{C}^{2+}$	Excitation	$10^{-1} - 10^7 \text{ eV}$	E/T	1049
$e + C^{3+}$	Excitation	$10^{-1} - 10^7 \text{ eV}$	E/T	1049
$e + C_{+}^{4+}$	Excitation	$10^{-1} - 10^7 \text{ eV}$	E/T	1049
$e + C^{5+}$	Excitation	$10^{-1} - 10^7 \text{ eV}$	E/T	1049
e + C	Ionization	$10^{-1} - 10^{7}$ eV	E/T	1049
$\mathbf{e} + \mathbf{C}^+$	Ionization	$10^{-1} - 10^{7} \text{ eV}$	E/T	1049
$e + C^{2+}$	Ionization	$10^{-1} - 10^{7} \text{ eV}$	E/T	1049
$e + C^{3+}$	Ionization	$10^{-1} - 10^7 \text{ eV}$	E/T	1049
$e + C^{4+}$	Ionization	$10^{-1} - 10^{7} \text{ eV}$	E/T	1049
$\mathbf{e} + \mathbf{C}^{\mathrm{o}+}$	Ionization	$10^{-1} - 10^7 \text{ eV}$	E/T	1049

$\mathbf{e} + \mathbf{L} \mathbf{a}^{29+}$	Excitation	10-10,000  eV	$\mathrm{Th}$	1050
$e + Li^+$	Recombination	0.1 -10,000  eV	$\mathrm{Th}$	1051
$e + Li^{2+}$	Recombination	0.1-10,000  eV	$\mathrm{Th}$	1051
e + Li	Excitation	0.1-10,000  eV	$\mathrm{Th}$	1051
${ m e} + { m Li}^+$	Excitation	0.1 -10,000  eV	$\mathrm{Th}$	1051
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Excitation	0.1 -10,000  eV	$\mathrm{Th}$	1051
e + Li	Ionization	0.1 -10,000  eV	$\mathrm{Th}$	1051
$e + Li^+$	Ionization	0.1-10,000  eV	$\mathrm{Th}$	1051
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Ionization	0.1-10,000  eV	$\mathrm{Th}$	1051
$\mathbf{e} + \mathbf{M} \mathbf{g}^{5+}$	Excitation	12-60 Ry	$\mathrm{Th}$	1052
$\mathbf{e} + \mathbf{F}\mathbf{e}^{2+}$	Excitation	$2000 - 10^6 \text{ K}$	$\mathrm{Th}$	1053
$\mathbf{e} + \mathbf{A} \mathbf{u}^{47+}$	Excitation	5-40,000  eV	$\mathrm{Th}$	1054
$\mathbf{e} + \mathbf{A}\mathbf{u}^{48+}$	Excitation	5-40,000  eV	$\mathrm{Th}$	1054
$\mathbf{e} + \mathbf{A}\mathbf{u}^{49+}$	Excitation	5-40,000  eV	$\mathrm{Th}$	1054
$\mathbf{e} + \mathbf{A} \mathbf{u}^{50+}$	Excitation	5-40,000  eV	$\mathrm{Th}$	1054
$\mathbf{e} + \mathbf{A} \mathbf{u}^{51+}$	Excitation	5-40,000  eV	$\mathrm{Th}$	1054
$\mathbf{e} + \mathbf{A}\mathbf{u}^{52+}$	Excitation	5-40,000  eV	$\mathrm{Th}$	1054
$\mathbf{e} + \mathbf{Si}^{10+}$	Excitation	$35-175 \mathrm{Ry}$	$\mathrm{Th}$	1055
$e + Si^{8+}$	Excitation	10-2000  eV	$\mathrm{Th}$	1056
$e + Si^{9+}$	Excitation	10-2000  eV	$\mathrm{Th}$	1056
$\mathbf{e} + \mathbf{Si}^{10+}$	Excitation	10-2000  eV	$\mathrm{Th}$	1056
$\mathbf{e} + \mathbf{M} \mathbf{g}^{8+}$	Excitation	$25-125 \mathrm{~Ry}$	$\mathrm{Th}$	1057

## 2.2.3 Heavy Particles Collisions

$\mathbf{H}^+ + \mathbf{H}_2$	Ionization	$1-5 { m MeV}$	$\operatorname{Exp}$	1058
$H^+ + He$	Charge Transfer	$1.4-5.8 { m MeV}$	E/T	1061
$H^+ + He$	Ionization	$1.4-5.8 { m MeV}$	E/T	1061
H + OH	Interaction Potentials		$\mathrm{Th}$	1065
$H^+ + H$	Charge Transfer	1-1000  eV	$\mathrm{Th}$	1066
$H^+ + H$	Ionization	1-1000  eV	$\mathrm{Th}$	1066
$H^+ + He$	Excitation	25  keV/u	$\mathrm{Th}$	1069
$H^+ + He$	Ionization	25  keV/u	$\mathrm{Th}$	1069
$\mathbf{H}^+ + \mathbf{H}_2^+$	Charge Transfer	4-25  keV/u	$\mathrm{Th}$	1070
$\mathbf{H}^+ + \mathbf{H}_2^+$	Excitation	4-25  keV/u	$\mathrm{Th}$	1070
$H^+ + CO$	Dissociation	$10-14,000 { m ~keV}$	$\operatorname{Exp}$	1071
$H^+ + CO$	Charge Transfer	$10-14,000 { m ~keV}$	$\operatorname{Exp}$	1071
$H^+ + CO$	Ionization	$10-14,000 { m ~keV}$	$\operatorname{Exp}$	1071
H + F	Interaction Potentials		$\mathrm{Th}$	1073
$\mathrm{H^{+}}$ + He	Interaction Potentials	0-2  eV	$\mathrm{Th}$	1074
$\mathbf{H}^+ + \mathbf{H}_2$	Charge Transfer	1-1.3  MeV	E/T	1083
$\mathbf{H}^+ + \mathbf{H}_2$	Excitation	1-1.3  MeV	E/T	1083
$\mathbf{H}^+ + \mathbf{H}_2$	Ionization	$4 { m MeV}$	$\operatorname{Exp}$	1085
H + H	Interaction Potentials	0-4 a.u.	$\mathrm{Th}$	1087
$\mathbf{H} + \mathbf{H}_2$	Interaction Potentials	2-8 $a_0$	E/T	1089
$H^+ + H$	Charge Transfer	1-100  keV	$\mathrm{Th}$	1090
$H^+ + H$	Excitation	1-100  keV	$\mathrm{Th}$	1090
$H^+ + Si$	Ionization	$1-3 { m MeV}$	$\operatorname{Exp}$	1091
$H^+ + He$	Total Scattering	$75 \ \mathrm{keV}$	$\mathrm{Th}$	1093
$\mathrm{H^{+}}$ + He	Ionization	$75 \ \mathrm{keV}$	$\mathrm{Th}$	1093
$\rm H^- + He$	Detachment	200  keV	$\operatorname{Exp}$	1094
$\rm H^- + He$	Ionization	200  keV	$\operatorname{Exp}$	1094
$\mathrm{H^{+}}$ + Na	Charge Transfer	2-100  keV	E/T	1100
$H^+ + Na$	Excitation	2-100  keV	E/T	1100
$H^+ + Na$	Ionization	2-100  keV	E/T	1100
$H^{+} + S^{3+}$	Excitation	100-40,000  eV	Th	1102

$H^{+} + Ar^{13+}$	Excitation	100-40,000  eV	Th 11	.02
$\mathbf{H}^+ + \mathbf{F} \mathbf{e}^{13+}$	Excitation	100-40,000  eV	Th 11	.02
$\mathrm{H^{+}}+\mathrm{CO}_{2}$	Dissociation	$6 { m MeV}$	E/T 11	.08
$\mathrm{H^{+}}+\mathrm{CO}_{2}$	Ionization	$6 { m MeV}$	Е/Т 11	.08
$H^+ + H$	Charge Transfer	1-1000  keV	Е/Т 11	13
$H^+ + H$	Excitation	1-1000  keV	E/T 11	13
$\mathbf{H}^+ + \mathbf{H}_2 \mathbf{O}$	Dissociation	3-24  keV	Exp 11	.14
$\mathbf{H}^+ + \mathbf{H}_2 \mathbf{O}$	Ionization	3-24  keV	Exp 11	14
$\mathrm{H^{+}}$ + Na	Excitation	0.5-50  keV	E/T 11	15
H + D	Association	10-1000  deg K	Th 11	.16
H + D	Interaction Potentials	10-1000  deg K	Th 11	.16
H + D	Fluorescence	10-1000  deg K	Th 11	.16
H + SiO	Excitation	$2000-4000 {\rm K}$	Th 11	24
$\mathbf{H}^+ + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	10-10,000  eV	Th 11	.26
$\mathbf{H}^+ + \mathbf{H}_2$	Interchange reaction	0.0-2.0  eV	Th 11	28
$\mathbf{H}^+ + \mathbf{D}_2$	Interchange reaction	$0.0-2.0 \ eV$	Th 11	28
$\mathrm{H^{+}+CO}$	Elastic Scattering	$9.5 \ \mathrm{eV}$	Th 11	.34
$H^+ + CO$	Charge Transfer	$9.5 \ \mathrm{eV}$	Th 11	.34
$H^+ + H$	Ionization	$10^{-3} - 10 \text{ MeV}$	Th 11	.46
$\mathrm{H^{+}+He}$	Ionization	$10^{-3} - 10 \text{ MeV}$	Th 11	.46
$ m H^+ + Ti$	Ionization	$10^{-3} - 10 \text{ MeV}$	Th 11	.46
$H^+ + Cu$	Ionization	$10^{-3} - 10 \text{ MeV}$	Th 11	.46
$H^+ + Se$	Ionization	$10^{-3} - 10 \text{ MeV}$	Th 11	.46
$H^+ + Nb$	Ionization	$10^{-3} - 10 \text{ MeV}$	Th 11	.46
$H^+ + Au$	Ionization	$10^{-3} - 10 \text{ MeV}$	Th 11	.46
$H^+ + H$	Charge Transfer	0.5-145  keV	Th 11	.47
$H^+ + H$	Ionization	20  keV	Th 11	.48
$\mathbf{H}^+ + \mathbf{H}_2$	Charge Transfer	0.5-100  eV	Th 11	.49
$\mathbf{H}^+ + \mathbf{H}_2^+$	Charge Transfer	0.5-100 eV	Th 11	.49
$H^- + He$	Ionization	5-25  keV	Th 11	.52
H + He	Ionization	5-25 keV	Th 11	.52
$H^+ + In$ $H^+ + G$	Ionization	1-10 MeV	Exp 11	.54
$H^+ + Sn$ $H^+ + N$		1-10 MeV	Exp 11	.54
$\mathbf{H}' + \mathbf{Y}$ $\mathbf{H}^+ + \mathbf{Z}$	Excitation	75-300 keV	Exp 11	.59
$\mathbf{H}' + \mathbf{Z}\mathbf{r}$	Excitation	75-300 KeV	Exp 11	.59
$\Pi' + \Pi D$ $\Pi^+ + M_0$	Excitation	75-300 KeV	Exp 11 Even 11	.39
$\mathbf{\Pi}^+ + \mathbf{M}\mathbf{O}$ $\mathbf{\Pi}^+ + \mathbf{D}\mathbf{h}$	Excitation	75-200 kev	Exp 11 Evp 11	.59
$\Pi^+ + \Pi^-$ $\Pi^+ + DA^-$	Excitation	75-200 kev	Exp 11 Even 11	.59
$H^+ + \Lambda q$	Excitation	75-300 keV	Exp 11 Evp 11	150
$H^+ + Ag$ $H^+ + Sn$	Excitation	75-300 keV	Exp 11 Evn 11	150
$\mathbf{H}^+ \perp \mathbf{V}$	Ionization	75-300 keV	Exp 11 Evn 11	50
$H^+ + Zr$	Ionization	75-300 keV	Exp 11 Exp 11	59
$H^+ + Nh$	Ionization	75-300 keV	Exp 11 Exp 11	59
$H^+ + M_0$	Ionization	75-300 keV	Exp 11 Exp 11	59
$H^+ + Bh$	Ionization	75-300 keV	Exp 11 Exp 11	59
$H^+ + Pd$	Ionization	75-300 keV	Exp 11 Exp 11	59
$H^+ + A\sigma$	Ionization	75-300 keV	Exp 11 Exp 11	59
$H^+ + Sn$	Ionization	75-300  keV	Exp 11	59
$H^+ + A$	Excitation	$0.5-3.0 { m MeV}$	Exp 11	66
$H^+ + A$	Ionization	0.5- $3.0  MeV$	$E_{\rm XD}$ 11	66
$H^+ + Ta$	Excitation	$0.7-2.4 \mathrm{MeV}$	Exp 11	67
$\mathbf{H}^+ + \mathbf{W}$	Excitation	$0.7-2.4 { m MeV}$	Exp 11	67
$H^+ + Pt$	Excitation	$0.7-2.4 { m MeV}$	Exp 11	67
$H^+ + Au$	Excitation	$0.7-2.4 { m MeV}$	Exp 11	.67
$H^+ + Pb$	Excitation	$0.7-2.4 { m MeV}$	Exp 11	.67
$H^+ + Bi$	Excitation	$0.7\text{-}2.4~\mathrm{MeV}$	Exp 11	.67

$\mathrm{H^{+}+Ta}$	Ionization	$0.7-2.4 { m MeV}$	Exp	1167
$\mathbf{H}^+ + \mathbf{W}$	Ionization	$0.7-2.4 { m MeV}$	Exp	1167
$H^+ + Pt$	Ionization	$0.7-2.4 { m MeV}$	Exp	1167
$H^+ + Au$	Ionization	$0.7-2.4 { m MeV}$	Exp	1167
$H^+ + Pb$	Ionization	$0.7-2.4 { m MeV}$	Exp	1167
$H^+ + Bi$	Ionization	$0.7-2.4 { m MeV}$	Exp	1167
$H^+ + C$	Elastic Scattering	$1.8-6.0 { m MeV}$	Exp	1168
$H^+ + Si$	Elastic Scattering	$1.8-6.0 { m MeV}$	Exp	1168
$H^+ + C$	Interaction Potentials	$1.8-6.0 { m MeV}$	Exp	1168
$H^+ + Si$	Interaction Potentials	$1.8-6.0 { m MeV}$	Exp	1168
$H^+ + Sm$	Excitation	$1-2.5 { m MeV}$	E/T	1169
$H^+ + Yb$	Excitation	$1-2.5 { m MeV}$	E/T	1169
$H^+ + Sm$	Ionization	$1-2.5 { m MeV}$	E/T	1169
$H^+ + Yb$	Ionization	$1-2.5 { m MeV}$	E/T	1169
$\mathbf{H}^{+} + \mathbf{Cr}$	Excitation	$0.3-3.5 { m MeV}$	Exp	1171
$H^+ + Cu$	Excitation	$0.3-3.5 { m MeV}$	Exp	1171
$\mathrm{H^{+}+Ge}$	Excitation	$0.3-3.5 { m MeV}$	Exp	1171
$\mathrm{H^{+}}+\mathrm{Ag}$	Excitation	$0.3-3.5 { m MeV}$	Exp	1171
$\mathbf{H}^+ + \mathbf{W}$	Excitation	$0.3-3.5 { m MeV}$	Exp	1171
$H^+ + Au$	Excitation	$0.3-3.5 { m MeV}$	Exp	1171
$H^+ + Cr$	Ionization	$0.3-3.5 { m MeV}$	Exp	1171
$H^+ + Cu$	Ionization	$0.3-3.5 { m MeV}$	Exp	1171
$\mathrm{H^{+}}$ + Ge	Ionization	$0.3-3.5 { m MeV}$	Exp	1171
$\mathbf{H}^+ + \mathbf{A}\mathbf{g}$	Ionization	$0.3-3.5 { m MeV}$	Exp	1171
$\mathbf{H}^+ + \mathbf{W}$	Ionization	$0.3-3.5 { m MeV}$	Exp	1171
$\mathbf{H}^+ + \mathbf{A}\mathbf{u}$	Ionization	$0.3-3.5 { m MeV}$	$\operatorname{Exp}$	1171
$H^+ + Li$	Elastic Scattering	$3-7 { m MeV}$	Exp	1172
$\mathbf{H}^+ + \mathbf{C}$	Elastic Scattering	$3-7 { m MeV}$	$\operatorname{Exp}$	1172
$\mathbf{H}^+ + \mathbf{F}$	Elastic Scattering	$3-7 { m MeV}$	$\operatorname{Exp}$	1172
$H^+ + Li$	Excitation	$3-5.7 { m MeV}$	$\operatorname{Exp}$	1173
$H^+ + F$	Excitation	$3-5.7 \mathrm{MeV}$	$\operatorname{Exp}$	1173
$H^+ + Li$	Ionization	3-5.7 MeV	Exp	1173
$\mathbf{H}^+ + \mathbf{F}$	Ionization	3-5.7 MeV	Exp	1173
$H^+ + Si$	Ionization	100 keV	E/T	1175
$H^+ + Y$	Ionization	100 keV	E/T	1175
H + Ta	Ionization	0.1-1 MeV/u	E/T	1180
H + W	Ionization	0.1-1 MeV/u	E/T	1180
H + Re	Ionization	0.1-1  MeV/u	E/T D/T	1180
H + Os		0.1-1  MeV/u	E/I E/T	1180
H + Ir		0.1-1  MeV/u	E/1 E/T	1180
$\Pi + Pt$	Ionization	0.1-1  MeV/u	<b>Б/ I</b> Б/Т	1100
$\mathbf{H} + \mathbf{A}\mathbf{u}$	Ionization	0.1-1  MeV/u	£/1 Е/Т	1100
H + DI	Ionization	0.1-1  MeV/u	Ľ/ 1 F /T	1100
$\mathbf{H}^+ \perp \mathbf{H}$	Electic Scattoring	$1 - 2x 10^6 \text{ oV}/\text{u}$	D/ I Th	1181
$\mathbf{H}^+ \mathbf{H}$	Charge Transfer	$1 - 2x10^{6} \text{ eV/u}$	Th	1181
H + Li	Interaction Potentials	Illtracold	Th	1101
H + K	Interaction Potentials	Ultracold	Th	1190
$H^{+} + H_{2}$	Charge Transfer		Th	1192
$H^+ + Pb$	Dissociation	$20-102 {\rm ~MeV}$	Exp	1193
$H^+ + Bi$	Dissociation	20-102  MeV	Exp	1193
$H^+ + Pb$	Ionization	$20-102 {\rm ~MeV}$	Exp	1193
$H^+ + Bi$	Ionization	20-102 MeV	Exp	1193
$\mathrm{H^{+}}$ + Ca	Charge Transfer	200-10,000  eV/u	Th	1195
$H^+ + H$	Charge Transfer	1.21  keV	$\mathrm{Th}$	1200
$H^+ + H$	Ionization	$1.21 \ \mathrm{keV}$	$\mathrm{Th}$	1200
$H^+ + He$	Total Scattering	75  keV	$\mathrm{E}/\mathrm{T}$	1207

$H^+ + He$	Ionization	$75 \ \mathrm{keV}$	E/T	1207
H + H	Interaction Potentials	$0-200 \ a_0$	Th	1208
$H + H^*$	Interaction Potentials	$0-200 \ a_0$	$\mathrm{Th}$	1208
$H^* + H^*$	Interaction Potentials	$0-200 \ a_0$	$\mathrm{Th}$	1208
$H^+ + He$	Interaction Potentials		$\mathrm{Th}$	1210
$H^+ + NH_2$	Charge Transfer	$0.5-1.5 \mathrm{~keV}$	$\mathrm{Th}$	1212
$H^+ + NH_2$	Total Scattering	$0.5-1.5 \mathrm{~keV}$	$\mathrm{Th}$	1212
H + H	Excitation	$1-10,000 { m MeV}$	$\mathrm{Th}$	1213
$H + H^*$	Excitation	$1-10,000 { m MeV}$	$\mathrm{Th}$	1213
$H^+ + H$	Excitation	40-7000  keV/u	$\mathrm{Th}$	1215
$H^+ + H$	Ionization	40-7000  keV/u	$\mathrm{Th}$	1215
$H + H_2$	Association	0.08-1.4  eV	$\mathrm{Th}$	1218
$H + H_2$	Interchange reaction	0.08-1.4  eV	$\mathrm{Th}$	1218
$H + H_2$	Total Scattering	0.08-1.4  eV	$\mathrm{Th}$	1218
$\mathrm{H}^- + \mathrm{He}$	Total Scattering	200  keV	Exp	1223
$\mathrm{H}^- + \mathrm{He}$	Detachment	200  keV	Exp	1223
$\mathrm{H}^- + \mathrm{He}$	Ionization	200  keV	Exp	1223
$H^+ + He$	Elastic Scattering	$10^{-4} - 1 \text{ eV}$	$\mathrm{Th}$	1224
$H^+ + Ne$	Elastic Scattering	$10^{-4} - 1 \text{ eV}$	$\mathrm{Th}$	1224
$H^+ + Ar$	Elastic Scattering	$10^{-4} - 1 \text{ eV}$	$\mathrm{Th}$	1224
$\rm H^- + He$	Detachment	1-10  keV	E/T	1226
$\mathrm{H}^- + \mathrm{He}$	Ionization	1-10  keV	E/T	1226
H + H	Interaction Potentials		Th	1228
$H^+ + He$	Charge Transfer	100-6000  keV	$\mathrm{Th}$	1232
$H^+ + He$	Ionization	100-6000  keV	$\mathrm{Th}$	1232
$\mathrm{H^{+}} + \mathrm{H_{2}O}$	Dissociation	1-14  MeV/u	E/T	1236
$\rm H^+$ + HDO	Dissociation	1-14  MeV/u	E/T	1236
$\mathbf{H}^+ + \mathbf{H}_2 \mathbf{O}$	Ionization	1-14  MeV/u	E/T	1236
$\rm H^+$ + HDO	Ionization	1-14  MeV/u	E/T	1236
$\rm H^+$ + He	Ionization	50-2000  keV/u	$\mathrm{Th}$	1237
$\mathrm{H^{+}+He^{+}}$	Ionization	50-2000  keV/u	$\mathrm{Th}$	1237
$H^+ + Li$	Ionization	50-2000  keV/u	$\mathrm{Th}$	1237
$H^+ + H$	Interaction Potentials		$\mathrm{Th}$	1241
$H^+ + D$	Interaction Potentials		$\mathrm{Th}$	1241
$\mathbf{H} + \mathbf{H}_2$	Energy Transfer	0-10,000 K	$\mathrm{Th}$	1248
$\mathbf{H} + \mathbf{H}_2$	Interaction Potentials	0-10,000 K	$\mathrm{Th}$	1248
$H + Li^*$	Association	1  mK	$\mathrm{Th}$	1264
$H^+ + H$	Charge Transfer	1-2 a.u.; 1 $\mu$ m	$\mathrm{Th}$	1276
$H^+ + H$	Ionization	1-2 a.u.; 1 $\mu$ m	$\mathrm{Th}$	1276
$H^+ + H$	Total Scattering	10 a.u.	$\mathrm{Th}$	1277
$H^+ + H$	Ionization	10 a.u.	Th	1277
$H^+ + H$	Interaction Potentials	0.007-4 nm	Th	1279
$H^+ + He$	Interaction Potentials	0.007-4 nm	Th	1279
$H^+ + Ne$	Interaction Potentials	0.007-4 nm	Th	1279
$H^+ + He$	Charge Transfer	7.5-12.5 MeV	E/T	1287
$H^+ + He$	Total Scattering	7.5-12.5 MeV	E/T	1287
H + C	Excitation	0-1000 K	Th	1294
H + O	Excitation	0-1000 K	Th	1294
$H^+ + Mg$	Charge Transfer	1-100 keV	Th	1298
$H^{+} + Ca$	Charge Transfer	1-100 keV	Th	1298
$\mathbf{H}^{+} + \mathbf{M}\mathbf{g}$	Total Scattering	1-100 keV	Th	1298
$H^{+} + Ca$	Iotal Scattering	1-100 keV	Th	1298
$\mathbf{H}^{r} + \mathbf{H}_{2}$	Interchange reaction	0.0-1.0 eV	Th	1301
$\mathbf{H} + \mathbf{H}_2 \mathbf{O}$	Interchange reaction	1.4 eV	Th	1303
$\mathbf{H} + \mathbf{H}_2$	Interchange reaction	1.49-1.85 eV	Th	1305
$\mathbf{H} + \mathbf{D}_2$	Interchange reaction	1.49-1.85 eV	Th	1305
$\mathbf{H} + \mathbf{C}\mathbf{H}_4$	Interchange reaction	2.0 eV	Th	1307

$H + H_2$	Interchange reaction	0.4-1.2  eV	$\mathrm{Th}$	1308
H + NH	Interchange reaction	0-1000 K	E/T	1310
H + ND	Interchange reaction	0-1000 K	É/T	1310
$H + CH_4$	Interchange reaction	250-400 K	Th	1311
$H + H_2$	Interchange reaction	0.4-1.2  eV	Th	1318
$H + D_2$	Interchange reaction	0.4-1.2  eV	Th	1318
$H + NH_3$	Interchange reaction	200-2000 K	Th	1319
$H + NH_3$	Interchange reaction	0.4-1.6  eV	Th	1320
$\mathbf{H}^+ + \mathbf{V}_2 \mathbf{O}_3$	Fluorescence	$3 { m MeV}$	Exp	1329
$\mathbf{H}^+ + \mathbf{VO}_2$	Fluorescence	$3 { m MeV}$	Exp	1329
$\mathbf{H}^+ + \mathbf{V}_2 \mathbf{O}_5$	Fluorescence	$3 { m MeV}$	Exp	1329
$H^+ + VC$	Fluorescence	$3 { m MeV}$	Exp	1329
$\mathbf{H}^+ + \mathbf{VN}$	Fluorescence	$3 { m MeV}$	Exp	1329
$\mathbf{H}^+ + \mathbf{VCl}_2$	Fluorescence	$3 { m MeV}$	Exp	1329
$\mathbf{H}^+ + \mathbf{N}\mathbf{H}_4\mathbf{VO}_3$	Fluorescence	$3 { m MeV}$	Exp	1329
$\mathbf{H}^+ + \mathbf{VOSO}_4({}_5\mathbf{H}_2\mathbf{O})$	Fluorescence	$3 { m MeV}$	Exp	1329
$\mathbf{H}^- + \mathbf{H}_2$	Interchange reaction	0.2-2.4  eV	Th	1332
$\mathbf{H}^- + \mathbf{D}_2$	Interchange reaction	0.2-2.4  eV	Th	1332
$H^+ + K$	Elastic Scattering	100  keV	E/T	1335
$H^+ + Rb$	Elastic Scattering	100  keV	E/T	1335
$H^+ + Cs$	Elastic Scattering	100  keV	E/T	1335
$H^+ + K$	Excitation	100  keV	E/T	1335
$H^+ + Rb$	Excitation	100  keV	E/T	1335
$H^+ + Cs$	Excitation	100  keV	E/T	1335
$H^+ + He$	Excitation	$10 - 10^5$ ; $10 - 10^3 \text{ eV}$	Th	1336
$\mathbf{H}^+ + \mathbf{H}\mathbf{e}^*$	Excitation	$10 - 10^5$ ; $10 - 10^3 \text{ eV}$	$\mathrm{Th}$	1336
$\mathbf{H}^+ + \mathbf{H}\mathbf{e}$	Ionization	0.075-100  MeV/u	Exp	1338
H + H	De-excitation	$5x10^{-10} - 10^{-6}$ a.u.	$\mathrm{Th}$	1340
H + H	Elastic Scattering	$5x10^{-10} - 10^{-6}$ a.u.	$\mathrm{Th}$	1340
H + H	Excitation	$5x10^{-10} - 10^{-6}$ a.u.	$\mathrm{Th}$	1340
H + H	Ionization	$5x10^{-10} - 10^{-6}$ a.u.	$\mathrm{Th}$	1340
$H^+ + CO$	Charge Transfer	$10^{-1} - 10^4 \text{ eV}$	Th	1342
$H^- + He$	Detachment	2-10 keV	E/T	1346
$\mathbf{H}^- + \mathbf{H}_2$	Detachment	2-10 keV	E/T	1346
$\mathbf{H}^- + \mathbf{H}_2$	Excitation	1.66-2.79 eV	Th	1351
$H^+ + He$	Charge Transfer	25-75 keV	E/T	1354
$H^+ + He$	Excitation	25-75 keV	E/T	1354
$\mathbf{H}^- + \mathbf{H}_2$	Dissociation	$10^{-2} - 10^{5} \text{ eV}$	E/T	1358
$\mathbf{H} + \mathbf{H}_2$	Dissociation	$10^{-2} - 10^{3} \text{ eV}$	E/T	1358
$\mathbf{H}^- + \mathbf{H}_2$	Elastic Scattering	$10^{-2} - 10^{5} \text{ eV}$	E/T	1358
$\mathbf{H} + \mathbf{H}_2$	Elastic Scattering	$10^{-2} - 10^{5} \text{ eV}$	E/T	1358
$\mathbf{H}' + \mathbf{H}_2$	Elastic Scattering	$10^{-2} - 10^{5} \text{ eV}$ $10^{-2} - 10^{5} \text{ W}$	E/T E/T	1358
$\mathbf{H}^{+} + \mathbf{H}_{2}^{*}$	Elastic Scattering	$10^{-2} - 10^{5} \text{ eV}$	E/I E/T	1358
$\mathbf{H} + \mathbf{H}_2$	Charge Transfer	$10^{-2} - 10^{\circ} \text{ eV}$ $10^{-2} - 10^{5} \text{ eV}$	E/I E/T	1338
$\mathbf{H}' + \mathbf{H}_2$	Unarge Transfer	$10^{-2} - 10^{\circ} \text{ eV}$ $10^{-2} - 10^{5} \text{ eV}$	E/I E/T	1338
$\mathbf{n}$ + $\mathbf{n}_2$ $\mathbf{n}$ + $\mathbf{n}_2$	Dete element	$10^{-2} - 10^{5} eV$	<b>Б/ I</b> Б/Т	1000
$\mathbf{n} + \mathbf{n}_2$	Excitation	$10^{-2} - 10^{5} eV$	<b>Б/ I</b> Б/Т	1000
$\mathbf{n} + \mathbf{n}_2$ $\mathbf{n}_+ + \mathbf{n}_2$	Excitation	$10 - 10^{-2} \text{ eV}$ $10^{-2} - 10^{5} \text{ eV}$	<b>Б/ I</b> Б/Т	1000
$\mathbf{H}^+ + \mathbf{H}_2$ $\mathbf{H}^+ + \mathbf{H}_*$	Excitation	$10^{-2} - 10^{5} eV$	Б/ I Б / Т	1000
$\mathbf{H}^{-} + \mathbf{H}_{2}$	Lonization	$10^{-2} - 10^{5} eV$	Б/ I Б / Т	1000
$\mathbf{H} \perp \mathbf{H}_{2}$	Ionization	$10^{-2} - 10^{5} eV$	E/T	1320 1328
$\mathbf{H}^+ \mathbf{H}_2$	Ionization	$10^{-2} - 10^{5} eV$	E/T	1358
$\mathbf{H}^+ \mathbf{H}^- \mathbf{H}^-$	Excitation	$3r10^{-5} - 14$ MeV	E/T	1350
$H^+ \pm \Delta \sigma$	Line Broadening	2500-50 000 K	тр Тр	1360
$He^{2+} + C^{5+}$	Charge Transfer	$30-10\ 000\ \text{keV}/\text{m}$	Th	1063
$He^{2+} + C^{5+}$	Ionization	30-10,000  keV/u	Th	1063
	101112/001011	00 10,000 nov/u	<b>T</b> 11	1000

$\mathrm{He}^{2+} + \mathrm{H}_2^+$	Charge Transfer	6 keV/u	Th	1064
$\mathrm{He^{+} + He}$	Excitation	25  keV/u	Th	1069
$\mathrm{He^{+} + He}$	Ionization	25  keV/u	$\mathrm{Th}$	1069
$\mathrm{He}^{2+} + \mathrm{H}_2^+$	Charge Transfer	4-25 keV/u	Th	1070
$He^{2+} + H_2^+$	Excitation	4-25 keV/u	$\mathrm{Th}$	1070
$He^{2+} + CO_2$	Charge Transfer	25-400 eV/amu	Exp	1080
$He^{2+} + N_2$	Charge Transfer	25-400 eV/amu	Exp	1080
$He^{2+} + NH_3$	Charge Transfer	25-400 eV/amu	Exp	1080
$He^{2+} + O_2$	Charge Transfer	25-400 eV/amu	Exp	1080
$He^+ + He$	Ionization	20-40  keV	Exp	1084
$He^{2+} + He$	Ionization	20-40  keV	Exp	1084
$He^{2+} + H_2O$	Ionization	6-10 MeV/u	Exp	1095
$He^{2+} + H_2$	Dissociation	1-2 a.u.	Exp	1097
$He^{2+} + H_2$	Total Scattering	1-2 a.u.	Exp	1097
$He^{2+} + H_2O$	Dissociation	1-5  keV	Th	1101
$He^+ + CF_4$	Fluorescence	1-5000  eV	Exp	1110
$He^+ + H_2O$	Dissociation	3-24  keV	Exp	1114
$\mathrm{He}^{2+} + \mathrm{H}_2\mathrm{O}$	Dissociation	3-24  keV	$\operatorname{Exp}$	1114
$He^+ + H_2O$	Ionization	3-24  keV	$\operatorname{Exp}$	1114
$He^{2+} + H_2O$	Ionization	3-24  keV	$\operatorname{Exp}$	1114
He + SO	Excitation	50-300 K	$\mathrm{Th}$	1119
He + CS	Interchange reaction	10-300 K	$\mathrm{Th}$	1120
$\mathrm{He}^{2+} + \mathrm{H}_2\mathrm{O}$	Charge Transfer	0.2-10.0  keV/amu	Exp	1125
$\mathrm{He}^{2+} + \mathrm{CH}_4$	Charge Transfer	0.2-10.0 keV/amu	$\operatorname{Exp}$	1125
$He^{2+} + CO$	Charge Transfer	0.2-10.0 keV/amu	Exp	1125
$\mathrm{He}^{2+} + \mathrm{CO}_2$	Charge Transfer	0.2-10.0 keV/amu	Exp	1125
$He^{2+} + H_2$	Charge Transfer	0.5-145  keV	Th	1147
$He^{2+} + In$	Ionization	1-10 MeV	Exp	1154
$He^{2+} + Sn$	Ionization	1-10 MeV	Exp	1154
$He^+ + Er$	Ionization	0.75-6.0 MeV	E/T	1155
He' + Yb	Ionization	0.75-6.0 MeV	E/T	1155
He' + Lu	Ionization	0.75-6.0 MeV	E/I E	1155
$He^{-1} + C$	Elastic Scattering	8-11.7 MeV	Exp E	11/4
$He^{-1} + C$	Iotal Scattering	0.1.1  MeV	⊾хр Б/Т	11/4
He + Ia	Ionization	0.1-1  MeV/u	£/⊥ ⋤/┳	1100
He + W		0.1-1  MeV/u	Ľ/ I F /T	1100
$H_0 \pm \Omega_s$	Ionization	0.1-1  MeV/u	E/T	1180
He + Os $He \perp Ir$	Ionization	0.1-1  MeV/u	E/T	1180
$H_{0} \perp Pt$	Ionization	0.1-1  MeV/u	E/T	1180
He + Au	Ionization	0.1-1  MeV/u	E/T	1180
He + Bi	Ionization	0.1-1  MeV/u	E/T	1180
He + Th	Ionization	0.1-1  MeV/u	E/T	1180
$He^{2+} + H_2^+$	Charge Transfer	1-56  keV/u	Th	1183
$He^{2+} + H_2$	Charge Transfer	0.2-2.7  keV/u	Exp	1186
$He^{2+} + CO$	Charge Transfer	0.2-2.7  keV/u	Exp	1186
$He^{2+} + CO_2$	Charge Transfer	0.2-2.7  keV/u	Exp	1186
$He^{2+} + N_2$	Charge Transfer	0.2-2.7  keV/u	Exp	1186
$He^{2+} + O_2$	Charge Transfer	0.2-2.7  keV/u	Exp	1186
He + He	Interaction Potentials	,	Th	1187
$He^+ + H_2$	Charge Transfer		$\mathrm{Th}$	1192
$\mathbf{H}\mathbf{e}^{2+} + \mathbf{H}_2$	Charge Transfer		$\mathrm{Th}$	1192
He + He	Ionization	$10^{-2} - 10^2 \text{ mK}$	E/T	1194
$\mathrm{He}^{2+} + \mathrm{H}_2^+$	Charge Transfer	0.2-1.6 V(a.u.)	Th	1197
He + Ne	Interaction Potentials	95-295 K	$\mathrm{Th}$	1201
$He^{2+} + H$	Charge Transfer	1 keV	$\mathrm{Th}$	1204
$He^{2+} + Na$	Ionization	10  keV/u	Exp	1206

He + He	Interaction Potentials	0-120 Å	$\mathrm{Th}$	1209
$\mathrm{He^{+}} + \mathrm{H}$	Interaction Potentials		$\mathrm{Th}$	1210
$He^{2+} + H$	Excitation	40-7000  keV/u	$\mathrm{Th}$	1215
$He^{2+} + H$	Ionization	40-7000  keV/u	$\mathrm{Th}$	1215
He + He	Interaction Potentials		$\mathrm{Th}$	1216
$He^* + He$	Interaction Potentials		$\mathrm{Th}$	1216
$He^{2+} + He$	Charge Transfer	50-500  keV/amu	E/T	1227
$He^{2+} + He$	Charge Transfer	$100-6000 {\rm ~keV}$	$\mathrm{Th}$	1232
$He^{2+} + He$	Ionization	$100-6000 {\rm ~keV}$	$\mathrm{Th}$	1232
$He^{2+} + He$	Ionization	50-2000  keV/u	$\mathrm{Th}$	1237
$He^{2+} + Li$	Ionization	50-2000  keV/u	$\mathrm{Th}$	1237
$\mathrm{He^{+} + He}$	Charge Transfer		$\operatorname{Exp}$	1239
$\mathrm{He^{+} + He}$	Excitation		$\operatorname{Exp}$	1239
$He^{2+} + Na$	Ionization	2-10  keV/u	$\operatorname{Exp}$	1240
$\mathrm{He^+} + \mathrm{N}_2$	Dissociation	$0.75 - 3.5 { m MeV}$	$\operatorname{Exp}$	1253
$\mathrm{He^+} + \mathrm{N}_2$	Ionization	$0.75-3.5 { m MeV}$	$\operatorname{Exp}$	1253
$He^{2+} + Na$	Charge Transfer	2-20  keV	E/T	1254
$He^{2+} + Na$	Excitation	2-20  keV	E/T	1254
$He^{2+} + Na$	Ionization	2-20  keV	E/T	1254
He + He	Association	1.9-2.7 mK	E/T	1258
$He + He^*$	Association	1.9-2.7 mK	E/T	1258
He + He	Interaction Potentials	1.9-2.7 mK	E/T	1258
$He + He^*$	Interaction Potentials	1.9-2.7 mK	E/T	1258
He + Ne	Interaction Potentials		Th	1274
$He^{2+} + H$	Total Scattering	10 a.u.	Th	1277
$He^{2+} + H$	Ionization	10 a.u.	Th	1277
He + SO	Excitation	300-800 K	Th	1280
He + SiO	Excitation	10-300 K	Th	1281
$He + NH_3$	Excitation	0-100 K	Th	1283
$He + NH_2D$	Excitation	0-100 K	Th	1283
He + CS	Excitation	300-1500 K	Th	1284
$He + HC_3N$		5-100 K	In Th	1285
$He + NH_3$	Excitation	5-100 K	1 fl Th	1280
$He + ND_2H$		0-0001 1 eV	1 fi Th	1200
$\mathbf{He} + \mathbf{H}_2$ $\mathbf{He} + \mathbf{H}_2$	Dissociation	0.0001-1  eV	111 Th	1291
$He + H_2$	Energy Transfor	0.0001-1  eV	111 Th	1291
$He + H_2$ Ho + PN	Energy Transfer	$0.2500 \ cm^{-1}$	Th	1291
$H_{e} \perp H_{e}O$	Excitation	$10^{-6} - 10^3 \ cm^{-1}$	Th	1290 1315
$He^+ + H_2O$ $He^+ + Bh$	Charge Transfer	1-19 keV	Evn	$1310 \\ 1324$
$He^{2+} + Ti$	Excitation	5-10 MeV	Exp	1324
$He^{2+} + Cr$	Excitation	5-10 MeV	Exp	1327
$He^{2+} + Mn$	Excitation	5-10 MeV	Exp	1327
$He^{2+} + Fe$	Excitation	5-10 MeV	Exp	1327
$He^{2+} + Co$	Excitation	5-10 MeV	Exp	1327
$He^{2+} + Ni$	Excitation	5-10 MeV	Exp	1327
$He^{2+} + Cu$	Excitation	5-10 MeV	Exp	1327
$He^{2+} + Zn$	Excitation	5-10 MeV	Exp	1327
$He^{2+} + Ti$	Ionization	5-10 MeV	Exp	1327
$He^{2+} + Cr$	Ionization	5-10 MeV	Exp	1327
$He^{2+} + Mn$	Ionization	5-10 MeV	Exp	1327
$He^{2+} + Fe$	Ionization	5-10 MeV	Exp	1327
$He^{2+} + Co$	Ionization	5-10 MeV	Exp	1327
$He^{2+} + Ni$	Ionization	5-10 MeV	Exp	1327
$He^{2+} + Cu$	Ionization	5-10 MeV	Exp	1327
$He^{2+} + Zn$	Ionization	5-10 MeV	Exp	1327
$He^{2+} + He$	Charge Transfer	3.6-8  MeV/u; 1-100  eV; 2  keV	E/T	1337

$He^{2+} + He$	Charge Transfer	$0.35-20.0 { m ~keV}$	$\operatorname{Exp}$	1344
$He^{2+} + H_2O$	Charge Transfer	$0.35-20.0 {\rm ~keV}$	Exp	1344
$\mathrm{He^{+} + Ne}$	Charge Transfer	10-1000  keV/amu	$\mathrm{Th}$	1345
$\mathrm{He^{+} + Ne}$	Ionization	10-1000  keV/amu	$\mathrm{Th}$	1345
$He^{2+} + He$	Charge Transfer	6  keV	Exp	1348
$He^{2+} + He$	Ionization	6  keV	Exp	1348
He + He	Interaction Potentials		$\mathrm{Th}$	1352
He + K	Interaction Potentials		$\mathrm{Th}$	1352
$\mathrm{He^{+}}+\mathrm{Ag}$	Line Broadening	2500-50,000 K	$\mathrm{Th}$	1360
Li + Li	Association	600-1200 K	$\mathrm{Th}$	1068
Li + Li	Ionization	600-1200 K	$\mathrm{Th}$	1068
$\mathrm{Li}^{2+} + \mathrm{He}^{2+}$	Charge Transfer	6-148  keV	Exp	1098
$Li^{2+} + Li^{3+}$	Charge Transfer	6-148  keV	Exp	1098
$Li + H_2$	Interchange reaction	$0.0-2.0 \ eV$	$\mathrm{Th}$	1131
$Li^{2+} + In$	Ionization	$1-10 {\rm ~MeV}$	$\operatorname{Exp}$	1154
$Li^{2+} + Sn$	Ionization	$1-10 {\rm ~MeV}$	Exp	1154
$Li^{3+} + In$	Ionization	$1-10 {\rm ~MeV}$	Exp	1154
$Li^{3+} + Sn$	Ionization	$1-10 {\rm ~MeV}$	Exp	1154
Li + Li	Interaction Potentials	Ultracold	$\mathrm{Th}$	1190
Li + K	Interaction Potentials	Ultracold	$\mathrm{Th}$	1190
$\mathrm{Li}^{3+} + \mathrm{H}_2$	Charge Transfer		$\mathrm{Th}$	1192
$Li^{3+} + Pb$	Dissociation	20-102  MeV	Exp	1193
$Li^{3+} + Bi$	Dissociation	20-102  MeV	Exp	1193
$Li^{3+} + Pb$	Ionization	20-102  MeV	Exp	1193
$Li^{3+} + Bi$	Ionization	20-102  MeV	Exp	1193
$\mathrm{Li}^{3+} + \mathrm{H}_2^+$	Charge Transfer	0.2-1.6 V(a.u.)	$\mathrm{Th}$	1197
Li + H	Association	1  mK	$\mathrm{Th}$	1199
$\mathrm{Li}^{3+} + \mathrm{H}$	Excitation	40-7000  keV/u	$\mathrm{Th}$	1215
$Li^{3+} + H$	Ionization	40-7000  keV/u	$\mathrm{Th}$	1215
Li + Hg	Elastic Scattering	0.05-0.5  eV	$\mathrm{Th}$	1225
Li + Hg	Total Scattering	0.05-0.5  eV	$\mathrm{Th}$	1225
$Li^{3+} + He$	Charge Transfer	50-500  keV/amu	E/T	1227
$Li^{3+} + He$	Charge Transfer	$100-6000 {\rm ~keV}$	$\mathrm{Th}$	1232
$Li^{3+} + He$	Ionization	100-6000  keV	$\mathrm{Th}$	1232
$\mathrm{Li}^{3+} + \mathrm{He}$	Ionization	50-2000  keV/u	$\mathrm{Th}$	1237
Li + Na	Energy Transfer	$3x10^{-4} - 4x10^{-4}$ K	Exp	1259
Li + H	Association	1 mK	$\mathrm{Th}$	1264
Li + Cs	Association	$10^{-4} \text{ K}$	Exp	1265
Li + He	Fluorescence	10  keV	Th	1331
$\mathrm{Li}^* + \mathrm{He}$	Fluorescence	10  keV	Th	1331
$Be + H_2$	Interaction Potentials		Th	1073
$Be^+ + Cr$	Excitation	0.3-3.5 MeV	Exp	1171
$Be^+ + Cu$	Excitation	0.3-3.5 MeV	Exp	1171
$Be^+ + Ge$	Excitation	0.3-3.5 MeV	Exp	1171
$Be^+ + Ag$	Excitation	0.3-3.5 MeV	Exp	1171
Be' + W	Excitation	0.3-3.5 MeV	Exp	1171
Be' + Au	Excitation	0.3-3.5 MeV	Exp	1171
Be' + Cr	Ionization	0.3-3.5 MeV	Exp	1171
Be' + Cu		0.3-3.5 MeV	Exp	11/1
Be' + Ge		0.3-3.5 MeV	Exp	11/1
De' + Ag $De^+ + W'$	Ionization	U.5-5.5 MEV	Exp	1171
$De^+ + W$ $Be^+ + A \cdots$	Ionization	0.3-3.5 MeV	Exp E	11/1 1171
$\mathbf{B}\mathbf{e}^{4+} \perp \mathbf{H}$	Charge Transfer	0.3-3.3 INEV	ть ть	11/1
$\mathbf{D}\mathbf{e}^+ + \mathbf{\Pi}_2$ $\mathbf{B}\mathbf{e}^{4+} \perp \mathbf{\Pi}_2^+$	Charge Transfer	0.2.1.6 V(2.00)	111 TL	1192
$\mathbf{Be}^+ \perp \mathbf{H}_2$		0.2-1.0 v (a.u.) 30 mK	111 Fwn	1909
$\mathbf{B}_{\mathbf{a}}^+ \perp \mathbf{H}\mathbf{D}$	Association	30  mK	Exp Even	1202
	ASSOCIATION	JU IIII.	Ľхр	1202

$Be^+ + D_2$	Association	30 mK	Exp	1202
$Be^{4+} + H$	Excitation	40-7000 keV/u	Th	1215
$Be^{4+} + H$	Ionization	40-7000 keV/u	$\mathrm{Th}$	1215
$Be^{4+} + H$	Charge Transfer	10-1000 keV/u	$\mathrm{Th}$	1244
B + H	Interaction Potentials		$\mathrm{Th}$	1073
$\mathbf{B}^{2+} + \mathbf{H}_2$	Charge Transfer		$\mathrm{Th}$	1192
$\mathbf{B}^{5+} + \mathbf{H}$	Excitation	40-7000  keV/u	$\mathrm{Th}$	1215
$\mathbf{B}^{5+} + \mathbf{H}$	Ionization	40-7000 keV/u	$\mathrm{Th}$	1215
$\mathbf{B}^{5+} + \mathbf{He}$	Charge Transfer	50-500  keV/amu	E/T	1227
$C^{3+} + Ne$	Charge Transfer	$1-5 { m MeV}$	E/T	1059
$C^{3+} + Ne$	Ionization	$1-5 { m MeV}$	E/T	1059
$C^{6+} + H$	Charge Transfer	1-1000  eV	Th	1062
$\mathbf{C}^{4+} + \mathbf{C}\mathbf{H}_4$	Charge Transfer	200-1500  eV/u	Exp	1067
$C + H_2$	Interaction Potentials		$\mathrm{Th}$	1073
$\mathbf{C}^- + \mathbf{H}_2$	Dissociation	v=1.07-2.14 a.u.	Exp	1077
$C^- + H_2$	Ionization	v=1.07-2.14 a.u.	Exp	1077
$C^{4+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$\mathbf{C}^{5+} + \mathbf{C}$	Charge Transfer	100-40,000  keV/u	E/T	1103
$\mathbf{C}^{6+} + \mathbf{C}$	Charge Transfer	100-40,000  keV/u	E/T	1103
$C^{4+} + C$	Ionization	100-40,000  keV/u	E/T	1103
$\mathbf{C}^{5+} + \mathbf{C}$	Ionization	100-40,000  keV/u	E/T	1103
$\mathbf{C}^{6+} + \mathbf{C}$	Ionization	100-40,000  keV/u	E/T	1103
$C^{4+} + H$	Charge Transfer	3-11 a.u.	$\mathrm{Th}$	1109
$C^{4+} + H$	Interaction Potentials	3-11 a.u.	$\mathrm{Th}$	1109
$C_{+}^{5+} + He$	Total Scattering	$3.5-75 { m MeV}$	$\mathrm{Th}$	1112
$\mathbf{C}^{5+} + \mathbf{He}$	Ionization	$3.5-75 { m MeV}$	$\mathrm{Th}$	1112
$C^+ + H$	Association	0-1000 K	$\mathrm{Th}$	1123
$\mathbf{C} + \mathbf{H}_2$	Interchange reaction	$80 { m MeV}$	Th	1141
$C^{4+} + La$	Ionization	35-60 MeV	Exp	1150
$C^{4+} + Ce$	Ionization	35-60 MeV	Exp	1150
$C^{4+} + Nd$	Ionization	35-60 MeV	Exp	1150
$C^{4+} + Sm$	Ionization	35-60 MeV	Exp	1150
$C^{6+}$ + He	Iotal Scattering	6  keV; 100  MeV/amu	Th	1151
$C^{6+}$ + He	Ionization	6 keV; 100 MeV/amu	Th	1151
$C^{6+} + H_2$	Charge Transfer	1-5 MeV	Exp	1150
$\mathbf{C}^{\circ+} + \mathbf{D}_2$	Tatal Casttering	1-5  MeV	Exp Th	1100
$C^{6+} + H$	Iotal Scattering	2.5 MeV/amu	111 Th	1102
$C^{3+} + H$	Change Transfor	2.5 Mev/anu	111 Th	1102
$C^{6+} + H_2$	Charge Transfer		111 Th	1192
$C^{4+} + \mathbf{h}_2$	Dissociation	20,102 MoV	111 Fyrn	1192
$C^{4+} \perp Bi$	Dissociation	20-102 MeV 20 102 MeV	Exp Exp	1103
C + D $C^{5+} + Pb$	Dissociation	20-102  MeV 20-102  MeV	Exp	1195
$C^{5+} + Bi$	Dissociation	20-102 MeV	Exp	1103
$C^{6+} + Pb$	Dissociation	20-102 MeV	Exp	1193
$C^{6+} + Bi$	Dissociation	20-102 MeV	Exp	1193
$C^{4+} + Pb$	Ionization	20-102 MeV	Exp	1193
$C^{4+} + Bi$	Ionization	20-102 MeV	Exp	1193
$C^{5+} + Pb$	Ionization	20-102 MeV	Exp	1193
$C^{5+} + Bi$	Ionization	20-102 MeV	Exp	1193
$\mathbf{C}^{6+} + \mathbf{Pb}$	Ionization	$20-102 {\rm ~MeV}$	Exp	1193
$C^{6+} + Bi$	Ionization	$20-102 {\rm ~MeV}$	Exp	1193
$\mathbf{C}^{6+} + \mathbf{H}$	Excitation	40-7000 keV/u	Th	1215
$C^{6+} + H$	Ionization	40-7000 keV/u	$\mathrm{Th}$	1215
$C^{6+} + He$	Total Scattering	3.6-100 MeV/u	Exp	1221
$C^{6+} + He$	Ionization	3.6-100  MeV/u	Exp	1221
C + O	Interaction Potentials	1.5-3.5 a.u.	$\mathrm{Th}$	1234

$C + O^+$	Interaction Potentials	1.5-3.5 a.u.	$\mathrm{Th}$	1234
$C^+ + O$	Interaction Potentials	1.5-3.5 a.u.	$\mathrm{Th}$	1234
$C^{6+} + He$	Total Scattering	2  MeV/u	E/T	1235
$C^{6+} + He$	Ionization	2  MeV/u	E/T	1235
$C^{6+} + He$	Total Scattering	2  MeV/u	$\mathrm{Th}$	1242
$C^{6+} + He$	Ionization	2  MeV/u	$\mathrm{Th}$	1242
C + C	Interaction Potentials	0-10 eV	$\mathrm{Th}$	1243
$C^{6+} + He$	Total Scattering	3.6-8.3 MeV/amu	E/T	1246
$C^{6+} + He$	Ionization	3.6-8.3  MeV/amu	$\dot{E/T}$	1246
$C^{6+} + He$	Ionization	100  MeV/u	$\dot{\mathrm{E}/\mathrm{T}}$	1250
$\mathbf{C}^{6+} + \mathbf{H}$	Total Scattering	1  MeV/u	$\mathrm{Th}$	1255
$\mathbf{C}^{6+} + \mathbf{H}$	Ionization	1  MeV/u	$\mathrm{Th}$	1255
$\mathbf{C}^{6+} + \mathbf{H}$	Charge Transfer	$1-2 \text{ a.u.}; 1 \ \mu \text{ m}$	$\mathrm{Th}$	1276
$\mathbf{C}^{6+} + \mathbf{H}$	Ionization	1-2 a.u.; 1 $\mu$ m	$\mathrm{Th}$	1276
$\mathbf{C}^{6+} + \mathbf{H}$	Total Scattering	10 a.u.	$\mathrm{Th}$	1277
$\mathbf{C}^{6+} + \mathbf{H}$	Ionization	10 a.u.	$\mathrm{Th}$	1277
$\mathbf{C} + \mathbf{H}\mathbf{e}$	Elastic Scattering	$0.2-2.5 \ {\rm eV}$	E/T	1288
C + He	Total Scattering	$0.2-2.5 \ {\rm eV}$	$\mathbf{E'T}$	1288
$C^{4+} + Sb$	Ionization	2-6.25 MeV/u	$\mathbf{E'T}$	1290
$C^{4+} + Au$	Ionization	2-6.25 MeV/u	$\mathbf{E}'$ T	1290
$C^{4+} + Bi$	Ionization	2-6.25 MeV/u	E/T	1290
$C^+ + H$	Charge Transfer	50-200 keV/amu	Th	1295
$C^{2+} + H$	Charge Transfer	50-200  keV/amu	Th	1295
$C^{3+} + H$	Charge Transfer	50-200  keV/amu	Th	1295
$C^{4+} + H$	Charge Transfer	50-200  keV/amu	Th	1295
$C^{5+} + H$	Charge Transfer	50-200  keV/amu	Th	1295
$C^+ + H$	Excitation	50-200  keV/amu	Th	1295
$C^{2+} + H$	Excitation	50-200  keV/amu	Th	1295
$C^{3+} + H$	Excitation	50-200  keV/amu	Th	1295
$\mathbf{C}^{4+} + \mathbf{H}$	Excitation	50-200  keV/amu	Th	1295
$C^{5+} + H$	Excitation	50-200  keV/amu	Th	1295
C + He	Total Scattering	0.1-1.48  MeV/amu	Th	1296
$C^{2+} + He$	Total Scattering	0.1-1.48  MeV/amu	Th	1296
$C^{4+} + He$	Total Scattering	0.1-1.48  MeV/amu	Th	1296
$C^{6+} + He$	Total Scattering	0.1-1.48  MeV/amu	Th	1296
C + He	Ionization	0.1-1.48  MeV/amu	Th	1296
$C^{2+} + He$	Ionization	0.1-1.48  MeV/amu	Th	1296
$C^{4+} + He$	Ionization	0.1-1.48  MeV/amu	Th	1296
$C^{6+} + He$	Ionization	0.1-1.48  MeV/amu	Th	1296
C + OH	Interchange reaction	0-1 eV	Th	1316
$\mathbf{C} + \mathbf{C}_{2}\mathbf{H}_{2}$	Interchange reaction	0-70 kJ/mol	Th	1317
$C^{5+} + C^{3+}$	Charge Transfer	0.05-16  keV/amu	$\mathrm{Th}$	1322
$C^{6+} + C^{3+}$	Charge Transfer	0.05-16  keV/amu	Th	1322
$C^{5+} + C^{3+}$	Excitation	0.05-16  keV/amu	$\mathrm{Th}$	1322
$C^{6+} + C^{3+}$	Excitation	0.05-16  keV/amu	$\mathrm{Th}$	1322
$\mathbf{C}^{2+} + \mathbf{C}$	Charge Transfer	4.3  MeV/amu	Exp	1325
$C^{3+} + C$	Charge Transfer	4.3  MeV/amu	Exp	1325
$\mathbf{C}^{4+} + \mathbf{C}$	Charge Transfer	4.3  MeV/amu	Exp	1325
$\mathbf{C}^{5+} + \mathbf{C}$	Charge Transfer	4.3  MeV/amu	Exp	1325
$\mathbf{C}^{2+} + \mathbf{C}$	Ionization	4.3  MeV/amu	Exp	1325
$C^{3+} + C$	Ionization	$4.3 \; \mathrm{MeV/amu}$	Exp	1325
$\mathbf{C}^{4+} + \mathbf{C}$	Ionization	4.3  MeV/amu	Exp	1325
$\mathbf{C}^{5+} + \mathbf{C}$	Ionization	4.3  MeV/amu	Exp	1325
$C^{6+} + H_2$	Interaction Potentials	80  MeV	Exp	1328
$C^{6+} + H_{2}^{-2}$	Ionization	$80 { m MeV}$	Exp	1328
C + He	Ionization	0.067-11 MeV/11	Th	1333
$C^+ + He$	Ionization	0.067-11  MeV/m	Th	1333
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$C^{2+} + He$	Ionization	$0.067-11 { m MeV/u}$	$\mathrm{Th}$	1333
$C^{3+} + He$	Ionization	0.067-11 MeV/u	$\mathrm{Th}$	1333
$C^{4+} + He$	Ionization	0.067-11 MeV/u	$\mathrm{Th}$	1333
$\mathbf{C}^{5+}$ + He	Ionization	0.067-11 MeV/u	$\mathrm{Th}$	1333
$C^+ + He$	Ionization	25-500 keV/amu	E/T	1334
$C^{2+} + He$	Ionization	25-500 keV/amu	E/T	1334
$C^{3+} + He$	Ionization	25-500 keV/amu	$\dot{E/T}$	1334
$C^{6+} + He$	Ionization	3.6-8  MeV/u; 1-100 eV; 2 keV	$\dot{E/T}$	1337
$C^{6+} + He$	Ionization	0.075-100  MeV/u	Exp	1338
$C^{6+} + He$	Ionization	3.6-100  MeV/u	Th	1356
$C^+ + H$	Charge Transfer	$10^{-1} - 10^7 \text{ eV}$	E/T	1361
$C^+ + C$	Charge Transfer	$10^{-1} - 10^7 \text{ eV}$	$\dot{\mathrm{E/T}}$	1361
$\mathbf{C}^{2+} + \mathbf{H}$	Charge Transfer	$10^{-1} - 10^7 \text{ eV}$	$\dot{\mathrm{E/T}}$	1361
$C^{3+} + H$	Charge Transfer	$10^{-1} - 10^7 \text{ eV}$	$\dot{\mathrm{E/T}}$	1361
$C^{4+} + H$	Charge Transfer	$10^{-1} - 10^7 \text{ eV}$	$\dot{\mathrm{E/T}}$	1361
$C^{5+} + H$	Charge Transfer	$10^{-1} - 10^7 \text{ eV}$	$\dot{\mathrm{E/T}}$	1361
$C^{6+} + H$	Charge Transfer	$10^{-1} - 10^7 \text{ eV}$	$\dot{E/T}$	1361
N + N	Interaction Potentials		Th	1073
$N + H_3$	Interaction Potentials		$\mathrm{Th}$	1073
$\mathbf{N}^{2+} + \mathbf{H}$	Charge Transfer	0.001-10,000  eV	$\mathrm{Th}$	1122
$N + H_2$	Interchange reaction	0.0-0.5  eV	$\mathrm{Th}$	1130
$\mathbf{N} + \mathbf{H}_2$	Interchange reaction	$9,909,5 \ {\rm eV}$	$\mathrm{Th}$	1133
$\mathbf{N} + \mathbf{H}_2$	Interchange reaction	1.0  eV	$\mathrm{Th}$	1144
$N^{7+} + O$	Charge Transfer	1-100 eV/u	$\mathrm{Th}$	1160
$N^{7+} + O$	Excitation	1-100 eV/u	$\mathrm{Th}$	1160
$N^{4+} + H_2O$	Charge Transfer	1-100,000  eV	E/T	1188
$N^{4+} + CH_4$	Charge Transfer	1-100,000  eV	E/T	1188
$\mathbf{N}^{4+} + \mathbf{CO}_2$	Charge Transfer	1-100,000  eV	E/T	1188
$\mathbf{N}^{5+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	1-100,000  eV	E/T	1188
$\mathbf{N}^{5+}$ + $\mathbf{CH}_4$	Charge Transfer	1-100,000  eV	E/T	1188
$\mathbf{N}^{5+}_{2} + \mathbf{CO}_{2}$	Charge Transfer	1-100,000  eV	E/T	1188
$\mathbf{N}^{6+} + \mathbf{H}_2\mathbf{O}$	Charge Transfer	1-100,000  eV	E/T	1188
$\mathbf{N}^{6+} + \mathbf{CH}_4$	Charge Transfer	1-100,000  eV	E/T	1188
$\mathbf{N}^{6+} + \mathbf{CO}_2$	Charge Transfer	1-100,000  eV	E/T	1188
$\mathbf{N}^{\prime+} + \mathbf{H}_2\mathbf{O}$	Charge Transfer	1-100,000 eV	E/T	1188
$N^{7+} + CH_4$	Charge Transfer	1-100,000  eV	E/T	1188
$N^{3+} + H_2$	Charge Transfer		Th	1192
$\mathbf{N}^{\prime +} + \mathbf{H}_2$	Charge Transfer		Th	1192
$\mathbf{N} + \mathbf{H}_2$	Association	0.08-1.4 eV	Th	1218
$\mathbf{N} + \mathbf{H}_2$	Interchange reaction	0.08-1.4 eV	Th	1218
$\mathbf{N} + \mathbf{H}_2$	Total Scattering	0.08-1.4  eV	Th	1218
$N^2$ + H	Charge Transfer	$10^{-2} - 10^{2} \text{ eV}/\text{amu}$	Th	1220
$\mathbf{N} + \mathbf{H}$	Charge Transfer	50-200  keV/amu	Th	1295
$1N^{2}$ + H	Charge Transfer	50-200  keV/amu		1295
$1N^{\circ} + H$	Charge Transfer	50-200  keV/amu		1295
$IN^{\pm} + H$	Charge Transfer	50-200  keV/amu	Th	1295
$\mathbf{N}^{\circ}$ + H	Charge Transfer	50-200  keV/amu	Th	1295
IN' + H $NI^{2+} + H$	Excitation	50-200  keV/amu	1 n Th	1295
$\mathbf{N}^3 + \mathbf{\Pi}$	Excitation	50-200  keV/amu	111 Th	1290 1905
$\mathbf{N}^{4+} + \mathbf{H}$	Excitation	50-200  keV/amu	111 Тh	1290 1905
$\mathbf{N}^{5+} + \mathbf{H}$	Excitation	50-200  keV/amu	111 Тh	1290 1905
$\mathbf{N}^{6+} \perp \mathbf{N}^{4+}$	Charge Transfer	0.05-16  keV/amu	тп Th	1290 1200
$\mathbf{N}^{7+} + \mathbf{N}^{4+}$	Charge Transfer	0.05-16  keV/amu	Th	1322
$N^{6+} + N^{4+}$	Excitation	0.05-16  keV/amu	Th	1322
$N^{7+} + N^{4+}$	Excitation	0.05-16  keV/amu	Th	1322
O + H + H	Interaction Potentials	0.00 10 nov/annu	Th	1065
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$\mathbf{O} + \mathbf{H}_2$	Interaction Potentials		$\mathrm{Th}$	1065
$\mathbf{O}^{6+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	200-1500  eV/u	$\operatorname{Exp}$	1067
$\mathbf{O}^{6+} + \mathbf{CH}_4$	Charge Transfer	200-1500  eV/u	Exp	1067
$\mathbf{O}^{6+} + \mathbf{CO}_2$	Charge Transfer	200-1500  eV/u	Exp	1067
$\mathbf{O}^- + \mathbf{H}_2$	Dissociation	v=1.07-2.14 a.u.	Exp	1077
$\mathbf{O}^- + \mathbf{N}_2$	Dissociation	v=1.07-2.14 a.u.	Exp	1077
$O^- + H_2$	Ionization	v=1.07-2.14 a.u.	Exp	1077
$0^{-} + N_{2}$	Ionization	v=1.07-2.14 a.u.	Exp	1077
$O^{7+} + He$	Excitation	0.1-100  GeV/u	$\mathrm{Th}$	1092
$0^{7+} + He$	Ionization	$0.1-100 { m ~GeV/u}$	$\mathrm{Th}$	1092
$O^{6+} + Na$	Charge Transfer	1-9  keV/u	E/T	1107
$O^{6+} + Na$	Ionization	1-9  keV/u	$\dot{E/T}$	1107
$0^{7+} + He$	Total Scattering	3.5-75 MeV	$\mathrm{Th}$	1112
$0^{7+} + He$	Ionization	$3.5-75 { m MeV}$	$\mathrm{Th}$	1112
$\mathbf{O}^{2+} + \mathbf{H}$	Charge Transfer	0.001-10.000  eV	$\mathrm{Th}$	1122
$0^{+} + H_{2}$	Charge Transfer	10-10.000  eV	$\mathrm{Th}$	1126
$0^{+} + H_{2}^{-}$	Interchange reaction	0.01-6.0  eV	$\mathrm{Th}$	1127
$O^+ + HD$	Interchange reaction	$0.01-6.0 \; \mathrm{eV}$	$\mathrm{Th}$	1127
$0^{+} + D_{2}$	Interchange reaction	0.01- $6.0  eV$	$\mathrm{Th}$	1127
$\mathbf{O} + \mathbf{H}_2$	Interchange reaction	0-0.6 eV	$\mathrm{Th}$	1136
$\mathbf{O}^+ + \mathbf{H}_2$	Interchange reaction	$0.00-0.75 \ \mathrm{eV}$	$\mathrm{Th}$	1139
O + H	Excitation	1000-10.000 K	Th	1145
$O^{5+} + H_2$	Charge Transfer	0.5-145  keV	Th	1147
$O^{5+} + La$	Ionization	35-60 MeV	Exp	1150
$O^{5+} + Ce$	Ionization	35-60 MeV	Exp	1150
$O^{5+} + Nd$	Ionization	35-60 MeV	Exp	1150
$O^{5+} + Sm$	Ionization	35-60 MeV	Exp	1150
$0^{5+} + C0$	Excitation	2.2 keV/amu	Exp	1158
$O^{8+} + H$	Charge Transfer	1-100  eV/u	 Th	1160
$O^{8+} + H$	Excitation	1-100  eV/u	Th	1160
$O^{3+} + He$	Excitation	32  MeV	Exp	1163
$O^{3+} + He$	Ionization	32  MeV	Exp	1163
$0^{7+} + C0$	Dissociation	6.7-13.6  MeV/u	Exp	1165
$O^{4+} + H_2O$	Charge Transfer	1-100.000  eV	— <sub>г</sub> Е/Т	1188
$O^{4+} + CH_4$	Charge Transfer	1-100.000 eV	_, _ Е/Т	1188
$O^{4+} + CO_2$	Charge Transfer	1-100.000 eV	E/T	1188
$O^{5+} + H_2O$	Charge Transfer	1-100.000 eV	E/T	1188
$0^{5+} + CH_4$	Charge Transfer	1-100.000  eV	E/T	1188
$O^{5+} + CO_2$	Charge Transfer	1-100.000 eV	_, _ Е/Т	1188
$O^{6+} + H_2O$	Charge Transfer	1-100.000 eV	_, _ Е/Т	1188
$O^{6+} + CH_4$	Charge Transfer	1-100.000 eV	_, _ Е/Т	1188
$O^{6+} + CO_2$	Charge Transfer	1-100.000 eV	_, _ Е/Т	1188
$0^{7+} + H_2 0$	Charge Transfer	1-100.000 eV	E/T	1188
$O^{7+} + CH_4$	Charge Transfer	1-100.000 eV	_, _ Е/Т	1188
$0^{7+} + CO_2$	Charge Transfer	1-100.000 eV	_, _ Е/Т	1188
$O^{8+} + H$	Charge Transfer	1-100.000 eV	_, _ Е/Т	1188
$0^{8+} + H_2 0$	Charge Transfer	1-100.000 eV	E/T	1188
$O^{8+} + CH_4$	Charge Transfer	1-100.000 eV	E/T	1188
$0^{8+} + CO_2$	Charge Transfer	1-100.000 eV	E/T	1188
$O^{3+} + H_2$	Charge Transfer	00,000 0.	_, _ Th	1192
$O^{5+} + H_{2}$	Charge Transfer		Th	1192
$O^{7+} + H_2$	Charge Transfer		Th	1192
$O^{8+} + H_2$	Charge Transfer		Th	1192
$O^{2+} + H$	Charge Transfer	$10^{-2} - 10^2 \text{ eV/amu}$	Th	1220
$O^{5+} + He$	Charge Transfer	0.25-2  MeV/m	Th	1230
$O^{5+} + H_{2}$	Charge Transfer	0.25-2 MeV/u	Th	1230
$O^{5+} + H_{P}$	Ionization	0.25-2 MeV/u	Th	1230
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$\mathbf{O}^{5+} + \mathbf{H}_2$	Ionization	0.25-2 MeV/u	Th	1230
$O^{6+} + Na$	Ionization	2-10  keV/u	$\operatorname{Exp}$	1240
$\mathbf{O}^+ + \mathbf{N}_2$	Charge Transfer	1-5  keV	$\operatorname{Exp}$	1249
$\mathbf{O}^+ + \mathbf{N}_2$	Total Scattering	1-5  keV	$\operatorname{Exp}$	1249
$\mathbf{O} + \mathbf{H}_2$	Interchange reaction	$10^{-9} - 0.1 \text{ eV}; 10^{-4} - 100 \text{ K}$	$\mathrm{Th}$	1270
$O^{4+} + Sb$	Ionization	$2-6.25 \ \mathrm{MeV/u}$	E/T	1290
$O^{4+} + Au$	Ionization	$2-6.25 \ \mathrm{MeV/u}$	E/T	1290
$O^{4+} + Bi$	Ionization	$2-6.25 \ \mathrm{MeV/u}$	E/T	1290
$O^{5+} + Sb$	Ionization	2-6.25  MeV/u	E/T	1290
$O^{5+} + Au$	Ionization	2-6.25  MeV/u	E/T	1290
$O^{5+} + Bi$	Ionization	$2-6.25 \ \mathrm{MeV/u}$	E/T	1290
$O^{7+} + Sb$	Ionization	2-6.25  MeV/u	E/T	1290
$O^{7+}$ + Au	Ionization	2-6.25  MeV/u	E/T	1290
$O^{7+} + Bi$	Ionization	2-6.25  MeV/u	E/T	1290
$O^+ + H$	Charge Transfer	50-200  keV/amu	$\mathrm{Th}$	1295
$O^{2+} + H$	Charge Transfer	50-200  keV/amu	$\mathrm{Th}$	1295
$O^{3+} + H$	Charge Transfer	50-200  keV/amu	$\mathrm{Th}$	1295
$O^{4+} + H$	Charge Transfer	50-200  keV/amu	$\mathrm{Th}$	1295
$O^{5+} + H$	Charge Transfer	50-200  keV/amu	$\mathrm{Th}$	1295
$O^+ + H$	Excitation	50-200  keV/amu	$\mathrm{Th}$	1295
$O^{2+} + H$	Excitation	50-200  keV/amu	$\mathrm{Th}$	1295
$O^{3+} + H$	Excitation	50-200  keV/amu	$\mathrm{Th}$	1295
$O_{-}^{4+} + H$	Excitation	50-200  keV/amu	$\mathrm{Th}$	1295
$O^{5+} + H$	Excitation	50-200  keV/amu	$\mathrm{Th}$	1295
$O^+ + H_2$	Interchange reaction	0.0-1.1 eV	Th	1309
$O_{1+}^{+} + O_{2+}^{+}$	Charge Transfer	0.05-16 keV/amu	Th	1322
$O^{\circ+} + O^{\circ+}$	Charge Transfer	0.05-16 keV/amu	Th	1322
$O'^+ + O^{3+}$	Excitation	0.05-16 keV/amu	Th	1322
$O^{\circ+} + O^{\circ+}$	Excitation	0.05-16 keV/amu	Th	1322
$O^{5+} + C$	Charge Transfer	4.3 MeV/amu	Exp	1325
$O^{0+} + C$	Charge Transfer	4.3 MeV/amu	Exp	1325
O'' + C	Charge Transfer	4.3 MeV/amu	Exp	1325
$O^{6+} + C$		4.3  MeV/amu	Exp	1325
$0^{+} + C$ $0^{+} + C$		4.3  MeV/amu	Exp E	1325
$O^+ + C$		4.3  MeV/amu	Exp E/T	1323
$O^{+} + He$		25-500  keV/amu	Е/ 1 Е/Т	1004
$O^{3+} + H_{2}$	Ionization	25-500  keV/amu	Ľ/ I ⋤/Т	1004
$O^{3+} + H$	Charge Transfer	$10^{-1}$ $10^4 \text{ eV}$	E/I Th	1004
$0^{7+} + H_2$	Charge Transfer	10 - 10 eV 0.35.20.0 keV	111 Fyrn	1342
$O^{7+} + H_{0}O^{7+}$	Charge Transfer	0.35-20.0  keV	Exp Evp	1944
$O^{8+} + H_{0}$	Charge Transfer	0.35 20.0  keV	Exp	1344
$O^{8+}$ + H <sub>2</sub> O	Charge Transfer	0.35-20.0  keV	Exp	1344 1344
$F^{2+} + H$	Charge Transfer	0.02-10  keV/u	$\frac{Dxp}{Th}$	1044
$\mathbf{F}^{2+} + \mathbf{H}$	Excitation	$0.02 \cdot 10 \text{ keV/u}$	Th	1086
$\mathbf{F} + \mathbf{H}_{0}$	Interchange reaction	1 18-4.00  kcal/mol	Exp	1143
F + HD	Interchange reaction	1.18 - 4.00  kcal/mol	Exp	1143
$\mathbf{F}^{4+} + \mathbf{Pb}$	Dissociation	20-102 MeV	Exp	1193
$\mathbf{F}^{4+} + \mathbf{Bi}$	Dissociation	20-102 MeV	Exp	1193
$\mathbf{F}^{5+} + \mathbf{Pb}$	Dissociation	20-102  MeV	Exp	1193
$\mathbf{F}^{5+} + \mathbf{Bi}$	Dissociation	20-102 MeV	Exp	1193
$\mathbf{F}^{6+} + \mathbf{Pb}$	Dissociation	20-102  MeV	Exp	1193
$\mathbf{F}^{6+} + \mathbf{Bi}$	Dissociation	20-102 MeV	Exp	1193
$\mathbf{F}^{7+} + \mathbf{Pb}$	Dissociation	20-102 MeV	Exp	1193
$\mathbf{F}^{7+} + \mathbf{Bi}$	Dissociation	20-102 MeV	Exp	1193
$\mathbf{F}^{8+} + \mathbf{Pb}$	Dissociation	20-102  MeV	Exp	1193
$\mathbf{F}^{8+} + \mathbf{Bi}$	Dissociation	20-102  MeV	Exp	1193

$\mathbf{F}^{9+}$ + Pb	Dissociation	20-102 MeV	Exp	1193
$F^{9+} + Bi$	Dissociation	20-102 MeV	Exp	1193
$\mathbf{F}^{4+} + \mathbf{P}\mathbf{b}$	Ionization	20-102 MeV	Exp	1193
$\mathbf{F}^{4+} + \mathbf{Bi}$	Ionization	20-102 MeV	Exp	1193
$\mathbf{F}^{5+} + \mathbf{Pb}$	Ionization	20-102 MeV	Exp	1193
$\mathbf{F}^{5+} + \mathbf{Bi}$	Ionization	20-102 MeV	Exp	1193
$\mathbf{F}^{6+} + \mathbf{P}\mathbf{b}$	Ionization	20-102 MeV	Exp	1193
$F^{6+} + Bi$	Ionization	20-102 MeV	Exp	1193
$\mathbf{F}^{7+} + \mathbf{P}\mathbf{b}$	Ionization	20-102 MeV	Exp	1193
$\mathbf{F}^{7+} + \mathbf{Bi}$	Ionization	20-102 MeV	Exp	1103
$\mathbf{F}^{8+} + \mathbf{P}\mathbf{b}$	Ionization	20-102 MeV	Exp	1103
$\mathbf{F}^{8+} \perp \mathbf{B}_{i}$	Ionization	20-102 MeV	Exp	1103
$\mathbf{F}^{9+} + \mathbf{P}\mathbf{b}$	Ionization	20-102 MeV	Exp	1103
$F^{9+} + Bi$	Ionization	20-102 MeV	Exp	1103
$F^- + \Delta r$	Ionization	0.46-1.45 a u	Exp	1917
$\mathbf{F}^{6+} + \mathbf{H}_{\mathbf{P}}$	Charge Transfer	0.25-2 MeV/u	$\frac{Dxp}{Th}$	1211
$\mathbf{F}^{6+} + \mathbf{H}_{0}$	Charge Transfer	$0.25 - 2 \text{ MeV}/\mu$	Th	1230
$\mathbf{F}^{6+} + \mathbf{H}_{\mathbf{P}}$	Ionization	0.25-2 MeV/u	Th	1230
$\mathbf{F}^{6+} + \mathbf{H}_{0}$	Ionization	0.25-2 MeV/u	Th	1230
$F^{7+} + H_{2}O$	Dissociation	1-14  MeV/u	E/T	1236
$\mathbf{F}^{7+} + \mathbf{HDO}$	Dissociation	1-14  MeV/u	E/T	1236
$\mathbf{F}^{7+} \perp \mathbf{H}_{2}\mathbf{O}$	Ionization	$1_{-14} \text{ MeV/u}$	E/T	1236
$\mathbf{F}^{7+} \pm \mathbf{HDO}$	Ionization	1-14  MeV/u	E/T	1236
$\mathbf{F} \perp \mathbf{H}_{2}$	Interchange reaction	1.30.4.53 kcsl/mol	E/ 1 Evn	1200
$\mathbf{F} + \mathbf{H}\mathbf{D}$	Interchange reaction	1.30.4.53 kcal/mol	Exp	1304
$\mathbf{F} + \mathbf{H}_{0}$	Interchange reaction	5-220 MeV	Ддр Th	1304
$\mathbf{F} + \mathbf{H}\mathbf{D}$	Interchange reaction	5-220 MeV	Th	1306
$\mathbf{F} + \mathbf{H}_{0}$	Interchange reaction	25-50 MeV	Th	1313
$\mathbf{F}^+ + \mathbf{A}\mathbf{r}$	Ionization	0.067-11 MeV/u	Th	1333
$\mathbf{F}^{2+} + \mathbf{Ar}$	Ionization	$0.067 - 11 \text{ MeV}/\mu$	Th	1333
$\mathbf{F}^{3+} + \mathbf{Ar}$	Ionization	$0.067 - 11 \text{ MeV}/\mu$	Th	1333
$\mathbf{F}^{4+} + \mathbf{Ar}$	Ionization	0.067 - 11  MeV/u	Th	1333
$\mathbf{F}^{5+} + \mathbf{Ar}$	Ionization	$0.067 \cdot 11 \text{ MeV}/\text{u}$	Th	1333
$\mathbf{F}^{6+} + \mathbf{Ar}$	Ionization	$0.067 - 11 \text{ MeV}/\mu$	Th	1333
$\mathbf{F}^{7+} + \mathbf{Ar}$	Ionization	$0.067 \cdot 11 \text{ MeV}/\text{u}$	Th	1333
$\mathbf{F}^{8+} + \mathbf{Ar}$	Ionization	$0.067 \cdot 11 \text{ MeV}/\mu$	Th	1333
$F^{9+} + Ar$	Ionization	$0.067 \cdot 11 \text{ MeV}/\text{u}$	Th	1333
$Ne^{8+} + C$	Charge Transfer	$100-40\ 000\ \text{keV}/\text{u}$	E/T	1103
$Ne^{9+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Ne^{10+} + C$	Charge Transfer	100-40.000  keV/u	E/T	1103
$Ne^{8+} + C$	Ionization	100-40.000  keV/u	E/T	1103
$Ne^{9+} + C$	Ionization	100-40.000  keV/u	E/T	1103
$Ne^{10+} + C$	Ionization	100-40.000  keV/u	E/T	1103
$Ne^+ + CF_4$	Fluorescence	1-5000  eV	Exp	1110
$Ne^{2+} + Ar$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ne^{2+} + Xe$	Ionization	1.4-4.8  MeV/amu	Exp	1153
$Ne^{2+} + N_2$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ne^{3+} + Ar$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ne^{3+} + Xe$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ne^{3+} + N_2$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ne^{4+} + Ar$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ne^{4+} + Xe$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ne^{4+} + N_2$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ne^{9+} + Ar$	Charge Transfer	4  keV/u	Exp	1179
$Ne^{10+} + Ar$	Charge Transfer	4  keV'u	Exp	1179
Ne + Ne	Elastic Scattering	0.2-0.8 mK	Th	1182
$Ne + Ne^*$	Elastic Scattering	$0.2$ - $0.8 \mathrm{mK}$	$\mathrm{Th}$	1182
	0			

$Ne^{4+} + H_2O$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{4+} + CH_4$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{4+} + CO_2$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{5+} + H_2O$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{5+} + CH_4$	Charge Transfer	1-100,000  eV	$\dot{E}/T$	1188
$Ne^{5+} + CO_2$	Charge Transfer	1-100,000  eV	$\dot{E/T}$	1188
$Ne^{6+} + H_2O$	Charge Transfer	1-100,000  eV	$\dot{E/T}$	1188
$Ne^{6+} + CH_4$	Charge Transfer	1-100,000  eV	$\dot{E/T}$	1188
$Ne^{6+} + CO_2$	Charge Transfer	1-100,000  eV	$\dot{E/T}$	1188
$\mathrm{Ne}^{7+} + \mathrm{H}_2\mathrm{O}$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{7+} + CH_4$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{7+} + CO_2$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{8+} + H_2O$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{8+} + CH_4$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{8+} + CO_2$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{9+} + Ne$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{9+} + H_2O$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{9+} + CH_4$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{9+} + CO_2$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{10+} + He$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{10+} + Ne$	Charge Transfer	1-100,000  eV	E/T	1188
$Ne^{10+} + H_2O$	Charge Transfer	1-100,000  eV	$\mathrm{E}/\mathrm{T}$	1188
$Ne^{10+} + He$	Charge Transfer	0.01-1000  eV	$\mathrm{Th}$	1214
$Ne^{3+} + H_2O$	Dissociation	1-5  keV	$\operatorname{Exp}$	1231
$Ne^{7+} + H_2O$	Dissociation	1-5  keV	$\operatorname{Exp}$	1231
$\mathrm{Ne}^{3+} + \mathrm{H}_2\mathrm{O}$	Total Scattering	1-5  keV	Exp	1231
$Ne^{+} + H_2O$	Total Scattering	1-5  keV	Exp	1231
$Ne^{10+} + H$	Charge Transfer	1-2 a.u.; 1 $\mu$ m	Th	1276
$Ne^{10+} + H$	Ionization	$1-2 \text{ a.u.; } 1 \mu \text{ m}$	Th	1276
$Ne^{2+} + He$	Charge Transfer	$10^{-4} - 10^{-4} \text{ eV}$	Th	1278
$Ne^{2++} + He$	Charge Transfer	$10^{-1} - 10^{-1} \text{ eV}$	Th	1278
$Ne^{-1} + He$ $Ne^{-2+*} + He$	Fluorescence	$10^{-4} - 10^{4} \text{ eV}$	1 n m	1278
$Ne^{6+}$ + $Re^{6+}$	Change Transfer	$10^{-1} - 10^{-1} eV$	1 II Fun	1210
$Ne^{7+} + C$	Charge Transfer	4.3  MeV/amu	Exp	1225
$Ne^{8+} + C$	Charge Transfer	4.3  MeV/amu	Exp	1325
$Ne^{9+} + C$	Charge Transfer	4.3  MeV/amu	Exp	1325
$Ne^{6+} + C$	Ionization	4.3  MeV/amu	Exp	1325
$Ne^{7+} + C$	Ionization	4.3  MeV/amu	Exp	1325
$Ne^{8+} + C$	Ionization	4.3  MeV/amu	Exp	1325
$Ne^{9+} + C$	Ionization	4.3  MeV/amu	Exp	1325
$Ne^{9+} + He$	Charge Transfer	0.35-20.0  keV	Exp	1344
$Ne^{9+} + H_2O$	Charge Transfer	0.35-20.0  keV	Exp	1344
$Ne^{10+} + He$	Charge Transfer	0.35-20.0  keV	Exp	1344
$Ne^{10+} + H_2O$	Charge Transfer	$0.35-20.0 { m keV}$	Exp	1344
Na + Na	Association	600-1200 K	$\mathrm{Th}$	1068
Na + Na	Ionization	600-1200 K	$\mathrm{Th}$	1068
Na + Rb	Interaction Potentials	2-14 Å	Exp	1088
Na + Na	Association	420-630 K	$\tilde{E/T}$	1117
$Na^* + Na$	Association	420-630 K	$\dot{\mathrm{E}/\mathrm{T}}$	1117
Na + He	Line Broadening	$158-3000 { m K}$	Th	1177
Na + Li	Interaction Potentials	Ultracold	$\mathrm{Th}$	1190
Na + K	Interaction Potentials	Ultracold	$\mathrm{Th}$	1190
$Na^{11+} + H_2$	Charge Transfer		$\mathrm{Th}$	1192
Na + H	Association	1  mK	$\mathrm{Th}$	1199
Na + Hg	Elastic Scattering	$0.05\text{-}0.5~\mathrm{eV}$	$\mathrm{Th}$	1225
Na + Hg	Total Scattering	0.05-0.5  eV	$\mathrm{Th}$	1225

Na + Cs	Elastic Scattering	$10^{-5} { m K}$	E/T	1261
Na + Cs	Interaction Potentials	$10^{-5} { m K}$	E/T	1261
Na + Cs	Association	$3x10^{-5}$ K	Exp	1263
$Na + Cs^*$	Association	$3x10^{-5}$ K	Exp	1263
$Mg^{10+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Mg^{11+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Mg^{12+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Mg^{10+} + C$	Ionization	100-40,000  keV/u	E/T	1103
$Mg^{11+} + C$	Ionization	100-40,000  keV/u	E/T	1103
$Mg^{12+} + C$	Ionization	100-40,000  keV/u	E/T	1103
$Mg^{7+} + C$	Charge Transfer	4.3  MeV/amu	Exp	1325
$Mg^{8+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV}/\mathrm{amu}$	$\operatorname{Exp}$	1325
$Mg^{9+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$Mg^{10+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV}/\mathrm{amu}$	$\operatorname{Exp}$	1325
$Mg^{11+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$Mg^{7+} + C$	Ionization	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$Mg^{8+} + C$	Ionization	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$Mg^{9+} + C$	Ionization	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$Mg^{10+} + C$	Ionization	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$Mg^{11+} + C$	Ionization	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$Al^- + Ar$	Total Scattering	$0.054\text{-}8.8~\mathrm{MeV}$	$\operatorname{Exp}$	1222
$Al^- + Ar$	Detachment	$0.054\text{-}8.8~\mathrm{MeV}$	$\operatorname{Exp}$	1222
$Si^{12+} + C$	Charge Transfer	$100-40,000 \; \rm keV/u$	E/T	1103
$Si^{13+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Si^{14+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Si^{12+} + C$	Ionization	$100-40,000 {\rm ~keV/u}$	E/T	1103
$Si^{13+} + C$	Ionization	$100-40,000 {\rm ~keV/u}$	E/T	1103
$\mathbf{Si}^{14+} + \mathbf{C}$	Ionization	$100-40,000 {\rm ~keV/u}$	E/T	1103
$\mathbf{Si}^{15+} + \mathbf{H}_2$	Dissociation	$6.7\text{-}13.6 \; \mathrm{MeV/u}$	$\operatorname{Exp}$	1165
$\mathbf{Si}^{15+} + \mathbf{D}_2$	Dissociation	$6.7\text{-}13.6 \; \mathrm{MeV/u}$	$\operatorname{Exp}$	1165
$Si^{3+} + H$	Charge Transfer	$10^{-2} - 10^6 \text{ eV/u}$	E/T	1289
$Si^{3+} + H$	Ionization	$10^{-2} - 10^6 \text{ eV/u}$	E/T	1289
$Si^{9+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$\mathbf{Si}^{10+} + \mathbf{C}$	Charge Transfer	$4.3 \ \mathrm{MeV}/\mathrm{amu}$	$\operatorname{Exp}$	1325
$Si^{11+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$Si^{12+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV}/\mathrm{amu}$	$\operatorname{Exp}$	1325
$\mathbf{Si}^{13+} + \mathbf{C}$	Charge Transfer	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$Si^{9+} + C$	Ionization	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$\mathbf{Si}^{10+} + \mathbf{C}$	Ionization	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$\mathbf{Si}^{11+} + \mathbf{C}$	Ionization	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1325
$Si^{12+} + C$	Ionization	4.3  MeV/amu	$\operatorname{Exp}$	1325
$Si^{13+} + C$	Ionization	$4.3 \ \mathrm{MeV}/\mathrm{amu}$	$\operatorname{Exp}$	1325
$Si^{2+} + C_{60}$	Charge Transfer	2  MeV	Exp	1357
$Si^{2+} + C_{60}$	Ionization	2  MeV	Exp	1357
$S^{2+} + He$	Charge Transfer	1-10,000  eV	Th	1078
$S^{2+} + He$	Interaction Potentials	1-10,000  eV	Th	1078
$S^- + N$	Interaction Potentials	2-6 bohr	Th	1111
$S + N^{-}$	Interaction Potentials	2-6 bohr	Th	1111
$\mathbf{S}^{10+} + \mathbf{H}_2$	Dissociation	13.6 MeV/u	Exp	1176
$\mathbf{S}^{10+} + \mathbf{D}_2$	Dissociation	13.6 MeV/u	Exp	1176
$\mathbf{S}^{10+} + \mathbf{H}_2$	Excitation	13.6 MeV/u	Exp	1176
$S^{10+} + D_2$	Excitation	13.6 MeV/u	Exp	1176
$S^{} + H_2$	Ionization	13.6 MeV/u	Exp	1176
$\mathbf{S}^{2} + \mathbf{D}_2$	Ionization	13.6 $MeV/u$	Exp	1176
5'' + 5b	Ionization	2-0.25 MeV/u	E/T	1290
$\mathbf{S}^{+} + \mathbf{A}\mathbf{u}$	Ionization	2-0.25 MeV/u	E/T	1290
$\mathbf{S}_{,+} + \mathbf{R}_{\mathbf{I}}$	Ionization	2-6.25 MeV/u	E/T	1290
$S^{8+} + Sb$	Ionization	2-6.25  MeV/u	E/T	1290
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$S^{8+} + Au$	Ionization	2-6.25 MeV/u	E/T	1290
$S^{8+} + Bi$	Ionization	2-6.25 MeV/u	E/T	1290
$S^{9+} + Sb$	Ionization	2-6.25 MeV/u	E/T	1290
$S^{9+} + Au$	Ionization	2-6.25 MeV/u	E/T	1290
$S^{9+} + Bi$	Ionization	2-6.25 MeV/u	E/T	1290
$S^{10+} + Sb$	Ionization	2-6.25  MeV/u	E/T	1290
$S^{10+} + Au$	Ionization	2-6.25  MeV/u	E/T	1290
$\mathbf{S}^{10+} + \mathbf{Bi}$	Ionization	2-6.25  MeV/u	E/T	1290
$Cl^{4+} + H_2$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Ar^{17+} + H$	Charge Transfer	80  keV	E/T	1079
$Ar^{17+} + D$	Charge Transfer	80  keV	E/T	1079
$Ar^{13+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Ar^{14+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Ar^{15+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Ar^{16+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Ar^{17+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Ar^{18+} + C$	Charge Transfer	100-40,000  keV/u	E/T	1103
$Ar^{13+} + C$	Ionization	100-40,000  keV/u	E/T	1103
$Ar^{14+} + C$	Ionization	100-40,000  keV/u	E/T	1103
$Ar^{15+} + C$	Ionization	100-40,000  keV/u	E/T	1103
$Ar^{16+} + C$	Ionization	100-40,000  keV/u	E/T	1103
$Ar^{17+} + C$	Ionization	100-40,000  keV/u	E/T	1103
$Ar^{18+} + C$	Ionization	100-40,000  keV/u	E/T	1103
$Ar^{2+} + H_2$	Charge Transfer	0.5-145  keV	$\mathrm{Th}$	1147
$Ar^+ + Ar$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ar^+ + Xe$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ar^+_{} + N_2$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ar^{2+} + Ar$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ar^{2+} + Xe$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ar^{2+} + N_2$	Ionization	1.4-4.8 MeV/amu	Exp	1153
$Ar^{11+} + H_2$	Charge Transfer	$1-5 { m MeV}$	Exp	1156
$Ar^{11+} + D_2$	Charge Transfer	$1-5 { m MeV}$	Exp	1156
$Ar^{4+} + N_2$	Charge Transfer	200-250  eV	$\operatorname{Exp}$	1157
$Ar^{4+} + O_2$	Charge Transfer	200-250  eV	$\operatorname{Exp}$	1157
$Ar^{4+} + CF_4$	Charge Transfer	200-250  eV	$\operatorname{Exp}$	1157
$Ar^{5+} + N_2$	Charge Transfer	200-250 eV	Exp	1157
$Ar^{3+} + O_2$	Charge Transfer	200-250 eV	Exp	1157
$Ar^{5+} + CF_4$	Charge Transfer	200-250 eV	Exp	1157
$Ar^{4+} + N_2$	Interaction Potentials	200-250 eV	Exp	1157
$Ar^{4+} + O_2$	Interaction Potentials	200-250 eV	Exp	1157
$Ar^{4+} + CF_4$	Interaction Potentials	200-250 eV	Exp	1157
$Ar^{3+} + N_2$	Interaction Potentials	200-250 eV	Exp	1157
$Ar^{3+} + O_2$	Interaction Potentials	200-250 eV	Exp	1157
$Ar^{3+} + CF_4$	Interaction Potentials	200-250 eV	Exp	1157
$Ar^{1'+} + Ar$	Charge Transfer	4 keV/u	Exp	1179
$Ar^{10+} + Ar$	Charge Transfer	4 keV/u	Exp	1179
$Ar^{16+} + H_2$	Charge Transfer		Th	1192
$\mathbf{Ar}^{10+} + \mathbf{H}$	Charge Transfer	30-300 keV/amu	Th	1245
$\mathbf{Ar}^{+++} + \mathbf{H}$	Charge Transfer	30-300 keV/amu	Th	1245
$\mathbf{Ar}^{10+} + \mathbf{H}$	Charge Transfer	30-300 keV/amu	Th	1245
$\mathbf{Ar}^{10+} + \mathbf{H}$	Ionization	30-300  keV/amu	Th	1245
$\mathbf{Ar}^{++} + \mathbf{H}$	Ionization	30-300  keV/amu	Th	1245
$\mathbf{Ar}^{10+} + \mathbf{H}$	Ionization	30-300  keV/amu	Th	1245
$\mathbf{Ar}^{+} + \mathbf{Ar}$	Charge Transfer	2-94 keV	Exp	1251
$Ar^{+} + Ar$	Charge Transfer	2-94 keV	Exp	1251
$\mathbf{Ar}^{\pm \pm} + \mathbf{Ar}$	Charge Transfer	2-94 keV	Exp	1251

$Ar^{18+} + He$	Charge Transfer	5-23  MeV/u	$\mathrm{Th}$	1252
$Ar^{18+} + Li$	Charge Transfer	$5-23 { m MeV/u}$	$\mathrm{Th}$	1252
$Ar^{18+} + Be$	Charge Transfer	5-23  MeV/u	$\mathrm{Th}$	1252
$Ar^{18+} + B$	Charge Transfer	5-23  MeV/u	$\mathrm{Th}$	1252
$Ar^{18+} + C$	Charge Transfer	5-23  MeV/u	$\mathrm{Th}$	1252
$Ar + H_2$	Interaction Potentials	195 K	$\mathrm{Th}$	1292
$Ar^{12+} + Al$	Fluorescence	$180-380 \mathrm{~keV}$	$\operatorname{Exp}$	1299
$Ar^{13+} + Al$	Fluorescence	$180-380 \mathrm{~keV}$	$\operatorname{Exp}$	1299
$Ar^{14+} + Al$	Fluorescence	180-380  keV	$\operatorname{Exp}$	1299
$Ar^{15+} + Al$	Fluorescence	$180-380 \mathrm{~keV}$	$\operatorname{Exp}$	1299
$Ar^{16+} + Al$	Fluorescence	$180-380 \mathrm{~keV}$	$\operatorname{Exp}$	1299
$Ar^{13+} + C$	Charge Transfer	$4.3 \ { m MeV}/{ m amu}$	$\operatorname{Exp}$	1325
$Ar^{14+} + C$	Charge Transfer	$4.3 \ { m MeV}/{ m amu}$	$\operatorname{Exp}$	1325
$Ar^{15+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV}/\mathrm{amu}$	$\operatorname{Exp}$	1325
$Ar^{16+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV}/\mathrm{amu}$	$\operatorname{Exp}$	1325
$Ar^{17+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV}/\mathrm{amu}$	$\operatorname{Exp}$	1325
$Ar^{13+} + C$	Ionization	$4.3 \ { m MeV}/{ m amu}$	$\operatorname{Exp}$	1325
$Ar^{14+} + C$	Ionization	$4.3 \ \mathrm{MeV/amu}$	Exp	1325
$Ar^{15+} + C$	Ionization	$4.3 \ \mathrm{MeV/amu}$	Exp	1325
$Ar^{16+} + C$	Ionization	$4.3 \ \mathrm{MeV/amu}$	Exp	1325
$Ar^{17+} + C$	Ionization	$4.3 \ \mathrm{MeV}/\mathrm{amu}$	$\operatorname{Exp}$	1325
$Ar^{13+} + C$	Ionization	$4.3-20 \ \mathrm{MeV/amu}$	E/T	1326
$Ar^{14+} + C$	Ionization	$4.3-20 \ \mathrm{MeV/amu}$	E/T	1326
$Ar^{15+} + C$	Ionization	$4.3-20 \ \mathrm{MeV/amu}$	E/T	1326
$Ar^{16+} + C$	Ionization	$4.3-20 \ \mathrm{MeV/amu}$	E/T	1326
$Ar^{17+} + C$	Ionization	$4.3-20 \ \mathrm{MeV/amu}$	E/T	1326
$Ar^{18+} + C$	Ionization	4.3-20  MeV/amu	E/T	1326
$Ar^{4+} + Al$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{4+} + Ti$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{4+} + Cu$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{4+} + Zr$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{4+} + Ag$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{4+} + Sm$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{++} + Ta$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{5+} + Al$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{5+} + Ti$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{\circ +} + Cu$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{\circ +} + Zr$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{*+} + Ag$	Fluorescence	2.5-25 MeV/u	Exp E	1330
$Ar^{5+} + Sm$	Fluorescence	2.5-25  MeV/u	Exp	1000
$Ar^{6+} + Ia$	Fluorescence	2.5 - 25  MeV/u	Exp	1990
$Ar^{6+} \perp Ti$	Fluorescence	2.5 - 25  MeV/u	Exp Exp	1330
$Ar^{6+} + Cr$	Fluorescence	$2.5 \cdot 25 \text{ MeV}/\text{u}$	Exp Exp	1330
$\mathbf{Ar}^{6+} \perp \mathbf{Zr}$	Fluorescence	2.5-25 MeV/u 2.5-25 MeV/u	Exp	1330
$\Delta r^{6+} + \Delta \sigma$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{A}\mathbf{r}^{6+} + \mathbf{S}\mathbf{m}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{6+} + Ta$	Fluorescence	2.5 25  MeV/u	Exp	1330
$Ar^{7+} + Al$	Fluorescence	2.5 25  MeV/u	Exp	1330
$Ar^{7+} + Ti$	Fluorescence	2.5 25  MeV/u	Exp	1330
$Ar^{7+} + Cu$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{7+} + Zr$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{7+} + Ag$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{7+} + Sm$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{7+} + Ta$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{8+} + Al$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{8+} + Ti$	Fluorescence	$2.5-25 \mathrm{~MeV/u}$	Exp	1330
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$Ar^{8+} + Cu$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{8+} + Zr$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{8+} + Ag$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{8+} + Sm$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{8+} + Ta$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{9+} + Al$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{9+} + Ti$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{9+} + Cu$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{9+} + Zr$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{9+} + Ag$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{9+} + Sm$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{9+} + Ta$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{10+} + Al$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{10+} + Ti$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{10+} + Cu$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{10+} + Zr$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{10+} + Ag$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ar^{10+} + Sm$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{10+} + Ta$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{11+} + Al$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{11+} + Ti$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{11+} + Cu$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{11+}_{11+} + Zr$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{11+}_{11+} + Ag$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{11+} + Sm$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{11+} + Ta$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ar^{4+} + Al$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{4+} + Ti$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{+} + Cu$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{+} + Zr$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{4+} + Ag$		2.5-25 MeV/u	Exp E	1330
$Ar^{4+} + Sm$	Ionization	2.5-25 MeV/u 2.5-25 MeV/u	Exp E-m	1330
$Ar^{-1} + 1a$ $Ar^{5+} + Al$	Ionization	2.5-25 MeV/u 2.5-25 MeV/u	Exp Evr	1000
$An^{5+} + An$	Ionization	2.5 - 25  MeV/u	Exp Evr	1000
$An^{5+} + Cn$	Ionization	2.5 - 25  MeV/u	Exp Evp	1220
$\mathbf{Ar}^{5+} + \mathbf{Zr}$	Ionization	2.5 - 25  MeV/u	Exp Exp	1330
$Ar^{5+} \perp Ar$	Ionization	2.5-25  MeV/u 2.5-25 MeV/u	Exp	1330
$\mathbf{Ar}^{5+} + \mathbf{Sm}$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{5+} + Ta$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{6+} + Al$	Ionization	$2.5 - 25 \text{ MeV}/\mu$	Exp	1330
$Ar^{6+} + Ti$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{6+} + Cu$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{6+} + Zr$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{6+} + Ag$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{6+} + Sm$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{6+} + Ta$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{7+} + Al$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{7+} + Ti$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{7+} + Cu$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Ar^{7+} + Zr$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Ar^{7+}_{-} + Ag$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Ar^{7+} + Sm$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Ar^{7+} + Ta$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$	1330
$Ar^{8+} + Al$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Ar^{8+} + Ti$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{8+} + Cu$	Ionization	2.5-25 MeV/u	Exp	1330

$Ar^{8+} + Zr$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{8+} + Ag$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{8+} + Sm$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{8+} + Ta$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{9+} + Al$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{9+} + Ti$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{9+} + Cu$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{9+} + Zr$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{9+} + Ag$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{9+} + Sm$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{9+} + Ta$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{10+} + Al$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{10+} + Ti$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{10+}_{10+} + Cu$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{10+} + Zr$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{10+} + Ag$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{10+} + Sm$	Ionization	2.5-25  MeV/u	Exp	1330
$Ar^{10+} + Ta$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{11+} + Al$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{11+} + Ti$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{11+} + Cu$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{11+} + Zr$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{11+} + Ag$	Ionization	2.5-25 MeV/u	Exp	1330
$Ar^{11} + Sm$		2.5-25 MeV/u	Exp	1330
$Ar^{++} + Ta$	Ionization	2.5-25 MeV/u	Exp	1330
$\mathbf{Ar}^{9+} + \mathbf{N}_2$	Dissociation	v=1 a.u.	Exp	1353
$\mathbf{Ar}^{9+} + \mathbf{N}_2$	Charge Transfer	v=1 a.u.	Exp	1353
$Ar^{s+} + N_2$		v=1 a.u.	Exp E	1353
$\mathbf{K} + \mathbf{R}\mathbf{D}$	Association		Exp E	1072
$\mathbf{K} + \mathbf{K}\mathbf{D}$	Line Dreadening	158 2000 V	схр ть	1072
$\mathbf{K} + \mathbf{H}\mathbf{e}$ $\mathbf{K} + \mathbf{P}\mathbf{b}$	Electic Sectoring	138-3000 K $1 \times 10^{-6}$ K	1 II Fyn	1108
$K + H_{\alpha}$	Elastic Scattering	0.05.0.5  eV	њ Тр	1995
K + Hg $K \perp Hg$	Total Scattering	0.05-0.5 eV	Th	1220
$K^+ + N_{P}$	Charge Transfer	350-2000 eV	Evn	1323
$K^+ + Ne$	Total Scattering	350-2000 eV	Exp	1323
$K^+ + Ne$	Ionization	350-2000 eV	Exp	1323
$Ca^+ + MgH^+$	Energy Transfer	300 K	Th	1272
$Ca^+ + H_2$	Energy Transfer	298 K	Exp	1275
$Ca^+ + D_2$	Energy Transfer	298 K	Exp	1275
Sc + He	Interaction Potentials		Th	1075
Ti + He	Interaction Potentials		$\mathrm{Th}$	1075
$Ti^+ N_2$	Detachment	7-30  keV	Exp	1362
$Cr^- + He$	Detachment	7-30  keV	Exp	1362
$Cr^- + N_2$	Detachment	7-30  keV	Exp	1362
$\mathbf{F}\mathbf{e}^{19+} + \mathbf{C}$	Charge Transfer	100-40,000  keV/u	E/T	1103
$\mathbf{F}\mathbf{e}^{20+} + \mathbf{C}$	Charge Transfer	100-40,000  keV/u	É/T	1103
$\mathbf{F}\mathbf{e}^{21+} + \mathbf{C}$	Charge Transfer	100-40,000  keV/u	É/T	1103
$\mathbf{F}\mathbf{e}^{22+} + \mathbf{C}$	Charge Transfer	100-40,000  keV/u	E/T	1103
$\mathbf{F}\mathbf{e}^{23+} + \mathbf{C}$	Charge Transfer	100-40,000  keV/u	E/T	1103
$\mathbf{F}\mathbf{e}^{24+} + \mathbf{C}$	Charge Transfer	100-40,000  keV/u	E/T	1103
$\mathbf{F}\mathbf{e}^{25+} + \mathbf{C}$	Charge Transfer	100-40,000  keV/u	E/T	1103
$\mathrm{Fe}^{26+} + \mathrm{C}$	Charge Transfer	100-40,000  keV/u	E/T	1103
$\mathbf{Fe}^{19+} + \mathbf{C}$	Ionization	$100-40,000 {\rm ~keV/u}$	E/T	1103
$\mathbf{Fe}^{20+} + \mathbf{C}$	Ionization	$100-40,000 {\rm ~keV/u}$	E/T	1103
$\mathrm{Fe}^{21+} + \mathrm{C}$	Ionization	$100-40,000 \; \rm keV/u$	E/T	1103
$\mathbf{F}\mathbf{e}^{22+} + \mathbf{C}$	Ionization	100-40,000  keV/u	E/T	1103

$\mathbf{F}\mathbf{e}^{23+} + \mathbf{C}$	Ionization	100-40,000  keV/u	E/T	1103
$\mathbf{F}\mathbf{e}^{24+} + \mathbf{C}$	Ionization	100-40,000  keV/u	E/T	1103
$\mathbf{F}\mathbf{e}^{25+} + \mathbf{C}$	Ionization	100-40,000  keV/u	E/T	1103
$\mathbf{F}\mathbf{e}^{26+} + \mathbf{C}$	Ionization	100-40,000  keV/u	E/T	1103
$\mathbf{F}\mathbf{e}^{24+} + \mathbf{N}_2$	Charge Transfer	10 eV/amu	Exp	1121
$\mathbf{F}\mathbf{e}^{25+} + \mathbf{N}_2$	Charge Transfer	10 eV/amu	Exp	1121
$\mathbf{F}\mathbf{e}^{12+} + \mathbf{H}_2$	Charge Transfer		$\mathrm{Th}$	1192
$\mathbf{F}\mathbf{e}^{20+} + \mathbf{H}_2$	Charge Transfer		$\mathrm{Th}$	1192
$Fe^- + He$	Detachment	7-30  keV	Exp	1362
${f Fe}^-+{f N}_2$	Detachment	7-30  keV	Exp	1362
$Ni^{25+} + H_2O$	Dissociation	$11.7 { m MeV}$	E/T	1099
$Ni^{25+} + HDO$	Dissociation	$11.7 { m MeV}$	E/T	1099
$Ni^{25+} + H_2O$	Charge Transfer	$11.7 { m MeV}$	E/T	1099
$Ni^{25+} + HDO$	Charge Transfer	$11.7 { m MeV}$	E/T	1099
$\mathbf{Ni}^{25+} + \mathbf{H}_2\mathbf{O}$	Ionization	$11.7 { m MeV}$	E/T	1099
$Ni^{25+} + HDO$	Ionization	$11.7 { m MeV}$	E/T	1099
$Ni^{24+} + CO_2$	Dissociation	$6.7-13.6 { m MeV/u}$	Exp	1165
$Ni^{25+} + H_2O$	Dissociation	$6.7-13.6 { m MeV/u}$	Exp	1165
$Ni^{25+} + HDO$	Dissociation	$6.7-13.6 { m MeV/u}$	Exp	1165
$Cu^{20+} + Ne$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$Cu^{20+} + Ar$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$Cu^{20+} + Kr$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$Cu^{20+} + Xe$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$\mathbf{C}\mathbf{u}^{20+} + \mathbf{H}_2$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$Cu^{21+} + Ne$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$Cu^{21+} + Ar$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$Cu^{21+} + Kr$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$Cu^{21+} + Xe$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$\mathbf{C}\mathbf{u}^{21+} + \mathbf{H}_2$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$Cu^{22+} + Ne$	Charge Transfer	$2.5 { m MeV}$	Exp	1229
$\mathbf{C}\mathbf{u}^{22+} + \mathbf{A}\mathbf{r}$	Charge Transfer	$2.5 { m MeV}$	$\operatorname{Exp}$	1229
$Cu^{22+} + Kr$	Charge Transfer	2.5  MeV	$\operatorname{Exp}$	1229
$Cu^{22+} + Xe$	Charge Transfer	2.5  MeV	Exp	1229
$Cu^{22+} + H_2$	Charge Transfer	2.5  MeV	$\operatorname{Exp}$	1229
$Cu^{23+} + Ne$	Charge Transfer	$2.5 { m MeV}$	$\operatorname{Exp}$	1229
$Cu^{23+} + Ar$	Charge Transfer	$2.5 { m MeV}$	$\operatorname{Exp}$	1229
$Cu^{23+} + Kr$	Charge Transfer	$2.5 { m MeV}$	$\operatorname{Exp}$	1229
$Cu^{23+} + Xe$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{23+} + H_2$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{24+} + Ne$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{24+} + Ar$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{24+} + Kr$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{24+} + Xe$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{24+} + H_2$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{23+} + Ne$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{23+} + Ar$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{25+} + Kr$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{25+} + Xe$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{26+} + H_2$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{26+} + Ne$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{26+} + Ar$	Charge Transfer	2.5 MeV	Exp	1229
$Cu^{26+} + Kr$	Charge Transfer	2.5 MeV	Exp E	1229
$\mathbf{U}\mathbf{u}^{-\circ} + \mathbf{A}\mathbf{e}$	Change Transfer	Z.Ə MEV	Ŀхр Б-	1229
$\mathbf{U}\mathbf{u}^{-*+} + \mathbf{H}_2$	Unarge Transfer	Z.Ə MEV	Ŀхр Б-	1229
$Cu^{} + Ne$	Excitation	Z.Ə MEV	Ŀхр Б-	1229
$\mathbf{O}\mathbf{u}^{-\circ} + \mathbf{A}\mathbf{r}$	Excitation	Z.Ə MEV	Ŀхр Б-	1229
$\mathbf{U}\mathbf{u}^{-*+} + \mathbf{K}\mathbf{r}$	Excitation	2.0 MeV	Ŀхр	1229

$Cu^{20+} + Xe$	Excitation	$2.5 { m MeV}$	Exp	1229
$\mathbf{C}\mathbf{u}^{20+} + \mathbf{H}_2$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{21+} + Ne$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{21+} + Ar$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{21+} + Kr$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{21+} + Xe$	Excitation	$2.5 { m MeV}$	Exp	1229
$\mathbf{C}\mathbf{u}^{21+} + \mathbf{H}_2$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{22+} + Ne$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{22+} + Ar$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{22+} + Kr$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{22+} + Xe$	Excitation	$2.5 { m MeV}$	Exp	1229
$\mathbf{C}\mathbf{u}^{22+} + \mathbf{H}_2$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{23+} + Ne$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{23+} + Ar$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{23+} + Kr$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{23+} + Xe$	Excitation	$2.5 { m MeV}$	Exp	1229
$\mathbf{C}\mathbf{u}^{23+} + \mathbf{H}_2$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{24+} + Ne$	Excitation	$2.5 { m MeV}$	$\operatorname{Exp}$	1229
$Cu^{24+} + Ar$	Excitation	$2.5 { m MeV}$	$\operatorname{Exp}$	1229
$Cu^{24+} + Kr$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{24+} + Xe$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{24+} + H_2$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{25+} + Ne$	Excitation	$2.5 { m MeV}$	Exp	1229
$Cu^{25+} + Ar$	Excitation	$2.5 { m MeV}$	$\operatorname{Exp}$	1229
$Cu^{25+} + Kr$	Excitation	2.5 MeV	Exp	1229
$Cu^{25+} + Xe$	Excitation	2.5 MeV	Exp	1229
$Cu^{23+} + H_2$	Excitation	2.5 MeV	Exp	1229
$Cu^{20+} + Ne$	Excitation	2.5 MeV	Exp	1229
$Cu^{26+} + Ar$	Excitation	2.5 MeV	Exp	1229
$Cu^{26+} + Kr$	Excitation	2.5 MeV	Exp	1229
$Cu^{26+} + Xe$	Excitation	2.5 MeV	Exp	1229
$Cu^{-+} + H_2$	Excitation Data abra ant	2.5 MeV 7.20 heV	Exp E-m	1229
Cu + He	Detachment	7-30 KeV	ьхр Бир	1002
Cu + Ne $Cu^- + Ar$	Detachment	7-30 keV	Exp Evp	1302
$Cu^- + N_c$	Detachment	7 30 keV	Exp Exp	1362
$\mathbf{Kr}^{35+} \perp \mathbf{H}$	Excitation	$0.1-100 \text{ GeV}/\mu$	њ Тh	1002
$Kr^{35+} + H$	Ionization	0.1-100  GeV/u	Th	1092
$\mathbf{Kr}^{35+} + \mathbf{Ar}$	Charge Transfer	4  keV/u	Exp	1179
$Kr^{36+} + Ar$	Charge Transfer	4  keV/u	Exp	1179
$Kr^{36+} + H_2$	Charge Transfer	1 110 V / 4	Th	1192
$Kr^{34+} + H_2$	Dissociation	$60 { m MeV}$	Exp	1219
$Kr^{34+} + H_2^2$	Charge Transfer	$60 { m MeV}$	Exp	1219
$\mathbf{Kr}^{34+} + \mathbf{H}_2$	Ionization	$60 { m MeV}$	Exp	1219
$Kr^+ + Kr$	Line Broadening		E/T	1238
$Kr^{2+} + Kr$	Line Broadening		É/T	1238
$Kr^{2+} + Kr$	Charge Transfer	2-94 keV	Exp	1251
$Kr^{3+} + Kr$	Charge Transfer	2-94 keV	Exp	1251
$Kr^{4+} + Kr$	Charge Transfer	2-94 keV	Exp	1251
$Kr^{8+} + Al$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Kr^{8+} + Ti$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{8+} + Cu$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Kr^{8+} + Zr$	Fluorescence	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{8+}_{\circ} + \mathbf{Ag}$	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{8+} + Sm$	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{8+} + Ta$	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{9+} + Al$	Fluorescence	2.5-25  MeV/u	Exp	1330

$Kr^{9+} + Ti$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{9+} + Cu$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{9+} + Zr$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{9+} + Ag$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{9+} + Sm$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{9+} + Ta$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{10+} + Al$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{10+} + Ti$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{10+} + \mathbf{Cu}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{10+} + \mathbf{Zr}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{10+} + \mathbf{Ag}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{10+} + Sm$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{10+} + Ta$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{11+} + Al$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{11+} + Ti$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{11+} + \mathbf{Cu}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{11+} + \mathbf{Zr}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{11+} + Ag$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{11+} + Sm$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{11+} + Ta$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{12+} + Al$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{12+} + Ti$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{12+} + Cu$	Fluorescence	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{12+} + \mathbf{Zr}$	Fluorescence	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{12+} + \mathbf{Ag}$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{12+} + Sm$	Fluorescence	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{12+} + \mathbf{Ta}$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Kr^{13+} + Al$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$	1330
$Kr^{13+} + Ti$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$	1330
$Kr^{13+} + Cu$	Fluorescence	$2.5-25 \mathrm{~MeV/u}$	Exp	1330
$\mathbf{Kr}^{13+}_{13+} + \mathbf{Zr}$	Fluorescence	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{13+} + \mathbf{Ag}$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{13+} + Sm$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{13+} + Ta$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{14+} + \mathbf{Al}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{14+} + Ti$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{14+} + \mathbf{Cu}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{\pm\pm} + \mathbf{Zr}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{14+} + \mathbf{Ag}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{11} + \mathbf{Sm}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{1} + 1a$	Fluorescence	2.5-25 MeV/u	Exp E	1330
$\mathbf{K}\mathbf{r}^{15+} + \mathbf{A}\mathbf{I}$	Fluorescence	2.5 - 25  MeV/u	Exp	1330
$Kr^{15+} + 11$ $Kr^{15+} + Cr$	Fluorescence	2.5 - 25  MeV/u	Exp Evr	1000
$\mathbf{K}\mathbf{r}^{15+} + \mathbf{C}\mathbf{u}$	Fluorescence	2.5 - 25  MeV/u	Exp Evp	1330
$\mathbf{K}\mathbf{r}^{15+} \pm \mathbf{A}\mathbf{g}$	Fluorosconco	2.5 - 25 MeV/u 2.5 - 25 MeV/u	Exp Evp	1330
$\mathbf{Kr}^{15+} \pm \mathbf{Sm}$	Fluorosconco	2.5 - 25 MeV/u 2.5 - 25 MeV/u	Exp Evp	1330
$\mathbf{Kr}^{15+} \perp \mathbf{Tr}$	Fluorosconco	$2.5 \cdot 25 \text{ MeV/u}$	Exp	1330
$Kr^{16+} + \Delta l$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{16+} + Ti$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{16+} + Cu$	Fluorescence	2.5-25 MeV/1	Exp	1330
$Kr^{16+} + Zr$	Fluorescence	2.5 - 25  MeV/u	Exp	1330
$\mathbf{Kr}^{16+} + \mathbf{Ag}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{16+} + Sm$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{16+} + Ta$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{17+} + Al$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{17+} + Ti$	Fluorescence	$2.5-25 { m MeV}'$ u	Exp	1330
		,	-	

$Kr^{17+} +$	Cu	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{17+} +$	Zr	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{17+} +$	$\mathbf{A}\mathbf{g}$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{17+} +$	$\mathbf{Sm}$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Kr^{17+} +$	Та	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{18+} +$	Al	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{18+} +$	Ti	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{18+} +$	Cu	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{18+} +$	Zr	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{18+} +$	$\mathbf{A}\mathbf{g}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{18+} +$	Sm	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{18+} +$	Та	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{19+} +$	Al	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{19+} +$	Ti	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{19+} +$	Cu	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{19+} +$	$\mathbf{Zr}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{19+} +$	$\mathbf{A}\mathbf{g}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{19+} +$	$\mathbf{Sm}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{19+} +$	Та	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{20+} +$	Al	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{20+} +$	$\mathbf{Ti}$	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{20+} +$	Cu	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{20+} +$	Zr	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{20+} +$	$\mathbf{A}\mathbf{g}$	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{20+} +$	$\mathbf{Sm}$	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{20+} +$	Та	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Kr^{21+} +$	Al	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{21+} +$	$\mathbf{Ti}$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{21+} +$	Cu	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{21+} +$	$\mathbf{Zr}$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{21+} +$	$\mathbf{A}\mathbf{g}$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{21+} +$	$\mathbf{Sm}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{21+} +$	Ta	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{22+} +$	Al	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{22+} +$	Ti	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{22+} +$	Cu	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{22+} +$	Zr	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{22+} +$	Ag	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{22+} +$	Sm	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{22+} +$	Та	Fluorescence	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Kr^{23+} +$	Al	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{23+} +$	Ti	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{23+} +$	Cu	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{23+} +$	Zr	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{23+} +$	Ag	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{23+} +$	Sm	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{20+} +$	Ta	Fluorescence	2.5-25 MeV/u	Exp	1330
$Kr^{\circ} + .$		Ionization	2.5-25 MeV/u	Exp	1330
$\mathbf{K}\mathbf{r}^{\circ}$ + '	11 C.:	Ionization	2.0-20 MeV/u	ьхр Балт	1330
$nr^{+} + Kr^{8+} +$	0u 7n	Ionization	2.0-20 MeV/u 2.5.25 MeV/	ьхр Бит	1000
$Kr^{8+}$ +	∠r A œ	Ionization	2.0-20 MeV/u 2.5.25 MeV/	ьхр Бит	1000
$\mathbf{N}\mathbf{r}^{*+} + \mathbf{K}\mathbf{r}^{8+} + \mathbf{K}\mathbf{r}^{8+}$	Ag Sm	Ionization	2.0-20 MeV/u 2.5.25 MeV/m	ьхр Бур	1000
$Kr^{8+}$	SIII Ta	Ionization	2.5 - 25  MoV/m	цхр Fvn	1330
$\mathbf{Kr}^{9+}$	1a Al	Ionization	2.5-25  MoV/u	Exp	1330
$Kr^{9+}$ +	лı Ti	Ionization	2.5-25  MoV/u	Exp	1330
$Kr^{9+}$ +		Ionization	2.5-25  MoV/u	Exp	1330
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$\mathbf{Kr}^{9+} + \mathbf{Zr}$	Ionization	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{9+} + \mathbf{Ag}$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{9+} + Sm$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{9+} + Ta$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{10+} + Al$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{10+} + Ti$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{10+} + Cu$	Ionization	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{10+} + \mathbf{Zr}$	Ionization	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{10+} + \mathbf{Ag}$	Ionization	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{10+} + \mathbf{Sm}$	Ionization	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{10+} + \mathbf{Ta}$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{11+} + Al$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{11+} + Ti$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{11+} + Cu$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$\mathbf{Kr}^{11+} + \mathbf{Zr}$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$\mathbf{Kr}^{11+} + \mathbf{Ag}$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{11+} + Sm$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{11+} + Ta$	Ionization	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{12+} + \mathbf{Al}$	Ionization	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{12+} + \mathbf{Ti}$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{12+} + Cu$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{12+} + Zr$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$\mathrm{Kr}^{12+} + \mathrm{Ag}$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{12+} + Sm$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{12+} + Ta$	Ionization	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{13+} + \mathbf{Al}$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{13+} + Ti$	Ionization	2.5-25 MeV/u	Exp	1330
$\mathrm{Kr}^{13+} + \mathrm{Cu}$	Ionization	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{13+} + \mathbf{Zr}$	Ionization	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{13+} + \mathbf{Ag}$		2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{13+} + \mathbf{Sm}$	Ionization	2.5-25 MeV/u 2.5-25 MeV/u	Exp E-m	1330
$Kr^{-3} + 1a$ $Kr^{14+} + A1$		2.5-25  MeV/u	схр Бир	1330
$\mathbf{K}\mathbf{r}^{14+} + \mathbf{K}\mathbf{r}^{14+}$	Ionization	2.5 - 25  MeV/u	Exp Evr	1990
$\mathbf{K}\mathbf{n}^{14+} + \mathbf{C}\mathbf{n}$	Ionization	2.5 - 25  MeV/u	Exp Evp	1330
$\mathbf{K}\mathbf{r}^{14+} \pm \mathbf{Z}\mathbf{r}$	Ionization	2.5 - 25  MeV/u	Exp Evn	1330
$\mathbf{Kr}^{14+} + \mathbf{Ar}$	Ionization	2.5-25 MeV/u 2.5-25 MeV/u	Evn	1330
$\mathbf{Kr}^{14+} + \mathbf{Sm}$	Ionization	2.5-25 MeV/u 2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{14+} + \mathbf{Ta}$	Ionization	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{15+} + \mathbf{Al}$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{15+} + Ti$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{15+} + Cu$	Ionization	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{15+} + \mathbf{Zr}$	Ionization	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{15+} + \mathbf{Ag}$	Ionization	$2.5-25 { m MeV/u}$	Exp	1330
$Kr^{15+} + Sm$	Ionization	2.5-25  MeV'/u	Exp	1330
$Kr^{15+} + Ta$	Ionization	2.5-25  MeV'/u	Exp	1330
$\mathbf{Kr}^{16+} + \mathbf{Al}$	Ionization	2.5-25  MeV'/u	Exp	1330
$Kr^{16+} + Ti$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{16+} + Cu$	Ionization	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{16+} + \mathbf{Zr}$	Ionization	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{16+} + \mathbf{Ag}$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{16+} + Sm$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Kr^{16+} + Ta$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{17+} + Al$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{17+} + Ti$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{17+} + Cu$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$\mathbf{Kr}^{17+} + \mathbf{Zr}$	Ionization	2.5-25  MeV/u	Exp	1330

$Kr^{17+} + Ag$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{17+} + Sm$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{17+} + Ta$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{18+} + Al$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{18+} + Ti$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{18+} + Cu$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{18+} + Zr$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{18+} + Ag$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{18+} + Sm$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{18+} + Ta$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{19+} + Al$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{19+} + Ti$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{19+} + Cu$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{19+} + Zr$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{19+} + Ag$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{19+} + Sm$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{19+} + Ta$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{20+} + Al$	Ionization	2.5-25  MeV/u	Exp	1330
$Kr^{20+} + Ti$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{20+} + Cu$	Ionization	2.5-25  MeV/u	Exp	1330
$\mathbf{Kr}^{20+} + \mathbf{Zr}$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$\mathbf{Kr}^{20+} + \mathbf{Ag}$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$\mathbf{Kr}^{20+} + \mathbf{Sm}$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{20+} + Ta$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$\mathbf{Kr}^{21+}_{21+} + \mathbf{Al}$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{21+} + Ti$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Kr^{21+} + Cu$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$\mathbf{Kr}^{21+} + \mathbf{Zr}$	Ionization	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$\mathrm{Kr}^{21+} + \mathrm{Ag}$	Ionization	2.5-25 MeV/u	Exp	1330
$\mathrm{Kr}^{21+} + \mathrm{Sm}$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{21+} + Ta$	Ionization	2.5-25 MeV/u	Exp	1330
$\mathbf{Kr}^{22+} + \mathbf{Al}$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{22+} + Ti$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{22+} + Cu$		2.5-25 MeV/u	Exp	1330
$\mathbf{K}\mathbf{r}^{22+} + \mathbf{Z}\mathbf{r}$		2.5-25 MeV/u	Exp	1330
$\mathbf{K}\mathbf{r}^{2+} + \mathbf{A}\mathbf{g}$		2.5-25 MeV/u	Exp E	1330
Kr + Sm $Kr^{22+} + Tr$	Ionization	2.5-25  MeV/u	ьхр Б-тр	1000
Kr + 1a $Kr^{23+} + A1$	Ionization	2.5 - 25 MeV/u 2.5 - 25 MeV/u	Exp Evr	1000
$Kr^{23+} + Kr^{23+}$	Ionization	2.5 - 25 MeV/u 2.5 - 25 MeV/u	Exp Evp	1330
$Kr^{23+} + Cu$	Ionization	2.5 - 25 MeV/u 2.5 - 25 MeV/u	Exp Evn	1330
$\mathbf{Kr}^{23+} \perp \mathbf{Zr}$	Ionization	2.5-25  MeV/u 2.5-25 MeV/u	Exp	1330
$\mathbf{K}\mathbf{r}^{23+} + \mathbf{A}\mathbf{\sigma}$	Ionization	2.5-25 MeV/u 2.5-25 MeV/u	Exp	1330
$Kr^{23+} + Sm$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{23+} + Ta$	Ionization	2.5-25 MeV/u	Exp	1330
$Kr^{33+} + He$	Ionization	60-70  keV/amu	Exp	1343
$Kr^{33+} + H_2$	Ionization	60-70  keV/amu	Exp	1343
Rb + Li	Interaction Potentials	Ultracold	Th	1190
Rb + K	Interaction Potentials	Ultracold	Th	1190
Rb + Rb	Association	$2x10^{-4}$ K	E/T	1257
$Rb + Rb^*$	Association	$2x10^{-4}$ K	$\dot{\mathrm{E}/\mathrm{T}}$	1257
Rb + Rb	Interaction Potentials	$2x10^{-4}$ K	́е/Т	1257
$Rb + Rb^*$	Interaction Potentials	$2x10^{-4}$ K	$\dot{E/T}$	1257
Rb + Fr	Interaction Potentials		Th	1260
$Rb^+ + Rb$	Interaction Potentials		$\mathrm{Th}$	1260
$\mathrm{Rb}^+ + \mathrm{Cs}$	Interaction Potentials		$\mathrm{Th}$	1260
$\mathrm{Rb}^+ + \mathrm{Fr}$	Interaction Potentials		$\mathrm{Th}$	1260

Rb + Rb	Association	$10^{-4} {\rm K}$	$\mathrm{Th}$	1266
$Rb + Rb^*$	Association	$10^{-4} {\rm K}$	$\mathrm{Th}$	1266
Rb + Rb	Association		Th	1268
$Rb + Rb^*$	Association		Th	1268
Rb + Rb	Interaction Potentials	100-10,000 $\mu~{\rm K}$	Th	1273
Rb + He	De-excitation		Exp	1339
$Rb^* + He$	De-excitation		Exp	1339
Sr + He	Line Broadening	660-1390 K	Exp	1060
Sr + Ne	Line Broadening	660-1390 K	Exp	1060
Sr + Ar	Line Broadening	660-1390 K	Exp	1060
Sr + Kr	Line Broadening	660-1390 K	Exp	1060
Sr + Xe	Line Broadening	660-1390 K	Exp	1060
Sr + He	Interaction Potentials	660-1390 K	Exp	1060
Sr + Ne	Interaction Potentials	660-1390 K	$\operatorname{Exp}$	1060
$\mathbf{Sr} + \mathbf{Ar}$	Interaction Potentials	660-1390 K	$\operatorname{Exp}$	1060
Sr + Kr	Interaction Potentials	660-1390 K	Exp	1060
$\mathbf{Sr} + \mathbf{Xe}$	Interaction Potentials	660-1390 K	Exp	1060
$Sr^+ + H_2$	Energy Transfer	298 K	Exp	1275
$\mathbf{Sr^+} + \mathbf{D}_2$	Energy Transfer	298 K	$\operatorname{Exp}$	1275
$Ag^- + He$	Detachment	7-30 keV	Exp	1362
$Ag^- + N_2$	Detachment	7-30 keV	$\operatorname{Exp}$	1362
$Xe^{3+} + Ar$	Ionization	1.4-4.8 MeV/amu	$\operatorname{Exp}$	1153
$Xe^{3+} + Xe$	Ionization	1.4-4.8 MeV/amu	$\operatorname{Exp}$	1153
$\mathbf{Xe}^{3+} + \mathbf{N}_2$	Ionization	1.4-4.8 MeV/amu	$\operatorname{Exp}$	1153
$Xe^{44+} + H_2O$	Dissociation	6.7-13.6 MeV/u	Exp	1165
$Xe^{2+} + Xe$	Charge Transfer	2-94 keV	Exp	1251
$Xe^{3+} + Xe$	Charge Transfer	2-94 keV	Exp	1251
$Xe^{\pm +} + Xe$	Charge Transfer	2-94 keV	Exp	1251
$\mathbf{Xe} + \mathbf{AI}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{X}\mathbf{e}^{13+} + \mathbf{A}\mathbf{I}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{13+} + Ti$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Ae^{13+} + Cu$	Fluorescence	2.5-25 MeV/u 2.5-25 MeV/u	Exp E-m	1330
$\mathbf{X}\mathbf{e}^{13+} + \mathbf{Z}\mathbf{r}$	Fluerescence	2.5-25 MeV/u	схр Бир	1330
$Ae^{13+} + Ag$ $Ve^{13+} + Sm$	Fluorescence	2.5-25 MeV/u 2.5-25 MeV/u	Exp Evr	1000
$Xe^{13+} + Te$	Fluorescence	2.5 - 25  MeV/u	Exp Evp	1330
$Xe^{14+} + Al$	Fluorescence	2.5 - 25  MeV/u	Exp Evp	1330
$\mathbf{X} \mathbf{e}^{14+} \perp \mathbf{T} \mathbf{i}$	Fluorescence	2.5-25  MeV/u	Evp	1330
$Xe^{14+} + Cu$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{X}\mathbf{e}^{14+} + \mathbf{Z}\mathbf{r}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{X}\mathbf{e}^{14+} + \mathbf{A}\mathbf{g}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{14+} + Sm$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{14+} + Ta$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{15+} + Al$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{15+} + Ti$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Xe^{15+} + Cu$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Xe^{15+} + Zr$	Fluorescence	2.5-25  MeV'/u	Exp	1330
$Xe^{15+} + Ag$	Fluorescence	2.5-25  MeV'/u	Exp	1330
$Xe^{15+} + Sm$	Fluorescence	2.5-25  MeV'/u	Exp	1330
$Xe^{15+} + Ta$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{16+} + Al$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{16+} + Ti$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{16+} + Cu$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{X}\mathbf{e}^{16+} + \mathbf{Z}\mathbf{r}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{X}\mathbf{e}^{16+} + \mathbf{A}\mathbf{g}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{16+} + Sm$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Xe^{16+} + Ta$	Fluorescence	2.5-25  MeV/u	Exp	1330

$Xe^{17+} + Al$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{17+} + Ti$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{17+} + Cu$	I Fluorescence	$2.5-25 { m MeV/u}$	ı Exp	1330
$Xe^{17+} + Zr$	Fluorescence	$2.5-25 { m MeV/u}$	ı Exp	1330
$Xe^{17+} + Ag$	g Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{17+} + Sn$	n Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{17+} + Ta$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{18+} + Al$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{18+} + Ti$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{18+} + Cu$	I Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{18+} + Zr$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{18+} + Ag$	g Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{18+} + Sn$	n Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{18+} + Ta$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{19+} + Al$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{19+} + Ti$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{19+} + Cu$	I Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{19+} + Zr$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{19+} + Ag$	g Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{19+} + Sn$	n Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{19+} + Ta$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{20+} + Al$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{20+} + Ti$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{20+} + Cu$	I Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{20+} + Zr$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{20+} + Ag$	g Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{20+} + Sn$	n Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{20+} + Ta$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{21+} + Al$	Fluorescence	2.5-25 MeV/u	ı Exp	1330
$Xe^{21+} + Ti$	Fluorescence	2.5-25 MeV/u	ı Exp	1330
$Xe^{21+} + Cu$	I Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{21+} + Zr$	Fluorescence	2.5-25 MeV/u	ı Exp	1330
$Ae^{21+} + Ag$	g Fluorescence	2.5-25 MeV/u	ı Exp	1330
$Ae^{21+} + Sn$	n Fluorescence	2.5-25 MeV/U	ı Exp	1330
$Ae^{21} + 1a$ $X^{22+} + A1$	Fluorescence	2.5-25 MeV/U	ı Exp	1330
$Ae^{-2+} + Al$ V - 22+ + T	Fluorescence	2.5-25 MeV/t	I Exp	1330
$Ae^{+} + II$ $Ve^{22+} + Ce^{-}$	F luorescence	2.5-25 MeV/t	t Exp	1000
$Xe^{22+} + Ct$	Fluorescence	2.5-25 MeV/t 2.5-25 MeV/t	n Exp	1000
$\mathbf{X}\mathbf{e}^{22+} + \mathbf{X}\mathbf{e}^{22+}$	r Fluorosconco	2.5-25 MeV/t 2.5-25 MeV/t	t Exp	1220
$\mathbf{X}\mathbf{e}^{22+} \perp \mathbf{S}\mathbf{n}$	Fluorescence	2.5 - 25 MeV/t 2.5 - 25 MeV/t	i Exp	1330
$\mathbf{X}\mathbf{e}^{22+} \perp \mathbf{T}\mathbf{a}$	Fluorescence	2.5-25  MeV/1 2.5-25  MeV/1	i Exp	1330
$Xe^{23+} + Al$	Fluorescence	2.5-25  MeV/1	ı Exp	1330
$Xe^{23+} + Ti$	Fluorescence	2.5 25  MeV/1	ı Exp	1330
$Xe^{23+} + Ci$	I Fluorescence	$2.5-25 \text{ MeV/}_{1}$	ı Exp	1330
$Xe^{23+} + Zr$	Fluorescence	$2.5-25 \text{ MeV/}_{1}$	ı Exp	1330
$Xe^{23+} + Ae$	r Fluorescence	$2.5-25 \text{ MeV/}_{1}$	ı Exp	1330
$Xe^{23+} + Sn$	n Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{23+} + Ta$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{24+} + Al$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$\mathbf{X}\mathbf{e}^{24+} + \mathbf{T}\mathbf{i}$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{24+} + Cu$	I Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{24+} + Zr$	Fluorescence	$2.5-25 \mathrm{~MeV}'/\mathrm{u}$	ı Exp	1330
$Xe^{24+} + Ag$	g Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{24+} + Sn$	n Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{24+} + Ta$	Fluorescence	2.5-25  MeV/u	ı Exp	1330
$Xe^{25+} + Al$	Fluorescence	2.5-25  MeV/u	ı Exp	1330

$Xe^{25+} + Ti$	Fluorescence	$2.5\text{-}25 \mathrm{~MeV/u}$	$\operatorname{Exp}$	1330
$Xe^{25+} + Cu$	Fluorescence	$2.5-25 \mathrm{MeV/u}$	$\operatorname{Exp}$	1330
$Xe^{25+} + Zr$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Xe^{25+} + Ag$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Xe^{25+} + Sm$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Xe^{25+} + Ta$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{26+} + Al$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{26+} + Ti$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{26+} + Cu$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$\mathbf{X}\mathbf{e}^{26+} + \mathbf{Z}\mathbf{r}$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$\mathbf{X}\mathbf{e}^{26+} + \mathbf{A}\mathbf{g}$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$\mathbf{X}\mathbf{e}^{26+} + \mathbf{S}\mathbf{m}$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$\mathbf{X}\mathbf{e}^{26+} + \mathbf{T}\mathbf{a}$	Fluorescence	$2.5\text{-}25 \mathrm{~MeV/u}$	$\operatorname{Exp}$	1330
$\mathrm{Xe}^{27+} + \mathrm{Ti}$	Fluorescence	$2.5\text{-}25 \mathrm{~MeV/u}$	$\operatorname{Exp}$	1330
$\mathrm{Xe}^{27+} + \mathrm{Cu}$	Fluorescence	$2.5\text{-}25 \mathrm{~MeV/u}$	$\operatorname{Exp}$	1330
$\mathrm{Xe}^{27+} + \mathrm{Zr}$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$\mathrm{Xe}^{27+} + \mathrm{Ag}$	Fluorescence	$2.5\text{-}25 \mathrm{~MeV/u}$	$\operatorname{Exp}$	1330
$Xe^{27+} + Sm$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{27+} + Ta$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{28+} + Al$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{28+} + Ti$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{28+} + Cu$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{28+} + Zr$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{28+} + Ag$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{28+} + Sm$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{28+} + Ta$	Fluorescence	$2.5-25 { m ~MeV/u}$	$\operatorname{Exp}$	1330
$Xe^{29+} + Al$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{29+} + Ti$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{29+} + Cu$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{29+} + Zr$	Fluorescence	2.5-25  MeV/u	Exp	1330
$\mathbf{X}\mathbf{e}^{29+} + \mathbf{A}\mathbf{g}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{29+} + Sm$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{29+} + Ta$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{X}\mathbf{e}^{30+} + \mathbf{A}\mathbf{I}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{30+} + Ti$	Fluorescence	2.5-25 MeV/u	Exp	1330
$\mathbf{X}\mathbf{e}^{30+} + \mathbf{C}\mathbf{u}$	Fluorescence	2.5-25  MeV/u	Exp	1330
$Ae^{30+} + Zr$ V = 30+	Fluorescence	2.5-25 MeV/u	Exp E	1330
$Ae^{30+} + Ag$ X = 30+ $C = 30$	Fluorescence	2.5-25 MeV/u	Exp E	1330
$\mathbf{X}\mathbf{e}^{30+} + \mathbf{S}\mathbf{m}$	Fluorescence	2.5-25 MeV/u 2.5.25 MeV/u	Exp E-m	1330
$\mathbf{X}\mathbf{e}^{31+} + \mathbf{A}\mathbf{I}$	Fluorescence	2.5 - 25 MeV/u 2.5 - 25 MeV/u	Exp	1000
$\mathbf{X}\mathbf{e}^{31+} + \mathbf{X}\mathbf{i}$	Fluorescence	2.5 - 25 MeV/u 2.5 - 25 MeV/u	Exp Evp	1330
$Xe^{31+} \perp Cu$	Fluorescence	2.5-25 MeV/u 2.5-25 MeV/u	Exp	1330
$\mathbf{X}\mathbf{e}^{31+} + \mathbf{Z}\mathbf{r}$	Fluorescence	2.5-25 MeV/u 2.5-25 MeV/u	Evn	1330
$\mathbf{X}\mathbf{e}^{31+} + \mathbf{A}\mathbf{g}$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{31+} + Sm$	Fluorescence	2.5-25 MeV/u	Exp	1330
$Xe^{31+} + Ta$	Fluorescence	2.5 - 25  MeV/u	Exp	1330
Xe + Al	Ionization	2.5 - 25  MeV/u	Exp	1330
$Xe^{13+} + Al$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{13+} + Ti$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{13+} + Cu$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{13+} + Zr$	Ionization	$2.5-25 \mathrm{MeV/u}$	Exp	1330
$Xe^{13+} + Ag$	Ionization	$2.5-25 \mathrm{MeV/u}$	Exp	1330
$Xe^{13+} + Sm$	Ionization	$2.5-25~{ m MeV}/{ m u}$	Exp	1330
$Xe^{13+} + Ta$	Ionization	$2.5\text{-}25~\mathrm{MeV}^{'}\!\mathrm{/u}$	Exp	1330
$Xe^{14+} + Al$	Ionization	$2.5\text{-}25~\mathrm{MeV^{'}}\mathrm{u}$	Exp	1330
$Xe^{14+} + Ti$	Ionization	$2.5-25~{ m MeV}'/{ m u}$	Exp	1330

$Xe^{14+} +$	Cu	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{14+} +$	$\mathbf{Zr}$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Xe^{14+} +$	$\mathbf{A}\mathbf{g}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{14+} +$	$\mathbf{Sm}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{14+} +$	Ta	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{15+} +$	Al	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{15+} +$	$\mathbf{Ti}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{15+} +$	Cu	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{15+} +$	$\mathbf{Zr}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{15+} +$	$\mathbf{A}\mathbf{g}$	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{15+} +$	$\mathbf{Sm}$	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{15+} +$	Ta	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{16+} +$	Al	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{16+} +$	$\mathbf{Ti}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{16+} +$	Cu	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{16+} +$	$\mathbf{Zr}$	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{16+} +$	$\mathbf{A}\mathbf{g}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{16+} +$	$\mathbf{Sm}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{16+} +$	Ta	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{17+} +$	Al	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{17+} +$	$\mathbf{Ti}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{17+} +$	Cu	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{17+} +$	$\mathbf{Zr}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{17+} +$	$\mathbf{A}\mathbf{g}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{17+} +$	$\mathbf{Sm}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{17+} +$	Ta	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{18+} +$	Al	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{18+} +$	Ti	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{18+} +$	Cu	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{18+} +$	$\mathbf{Zr}$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{18+} +$	$\mathbf{A}\mathbf{g}$	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{18+} +$	$\mathbf{Sm}$	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{18+} +$	Ta	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{19+} +$	Al	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{19+} +$	${f Ti}$	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{19+} +$	Cu	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{19+} +$	Zr	Ionization	2.5-25 MeV/u	$\operatorname{Exp}$	1330
$Xe^{19+} +$	Ag	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{19+} +$	Sm	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{19+} +$	Ta	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{20+} +$	Al	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{20+} +$	Ti	lonization	2.5-25 MeV/u	Exp	1330
$Xe^{20+} +$	Cu		2.5-25 MeV/u	Exp	1330
$Xe^{20+} +$	Zr		2.5-25 MeV/u	Exp	1330
$Xe^{20+} +$	Ag		2.5-25 MeV/u	Exp	1330
$Xe^{20+} +$	Sm		2.5-25 MeV/u	Exp	1330
$Xe^{20+} +$	Ta		2.5-25 MeV/u	Exp	1330
$Ae^{-1} + V^{21+}$			2.5-25 MeV/u	Exp	1330
$Ae^{} + Ve^{21+}$			2.0-20 MeV/U 2.5.25 MeV/	ьхр Бит	1330
$Ae^{} + Ve^{21+}$	Uu Zn		2.0-20 MeV/U 2.5.25 MeV/	ьхр Бит	1330
$Ae^{} + Ve^{21+}$	∠ır A g		2.0-20 MeV/U 2.5.25 MeV/	ьхр Бит	1000
$Ae^{} + Ve^{21+}$	Ag Sm	Ionization	2.0-20 MeV/U 2.5.25 MeV/m	њхр Fwn	1000
$Ae + Xe^{21+}$	ын Тъ	Ionization	2.5 - 25  MeV / u	Exp Exp	1390
$Ae + + Xe^{22+} +$	1a Al	Ionization	2.5-25  MeV/u	Exp	1330
$Ae + + Xe^{22+} +$	лı Ti	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{22+}$		Ionization	$2.5^{-}25$ MeV/u	Exp	1330
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$Xe^{22+} +$	Zr	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{22+} +$	Ag	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{22+} +$	Sm	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{22+} +$	Ta	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{23+} +$	Al	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{23+} +$	Ti	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{23+} +$	Cu	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{23+} +$	Zr	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{23+} +$	Ag	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{23+} +$	Sm	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{23+} +$	Ta	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{24+} +$	Al	Ionization	2.5-25  MeV/u	$\operatorname{Exp}$	1330
$Xe^{24+} +$	Ti	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{24+} +$	Cu	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{24+} +$	Zr	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{24+} +$	Ag	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{24+} +$	Sm	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{24+} +$	Ta	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{25+} +$	Al	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{25+} +$	Ti	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{25+} +$	Cu		2.5-25 MeV/u	Exp	1330
$Xe^{25+} +$	Zr		2.5-25 MeV/u	Exp	1330
$Xe^{25+} + Xe^{25+}$	Ag		2.5-25 MeV/u	Exp	1330
$Xe^{25+} +$	Sm .		2.5-25 MeV/u	Exp	1330
$Xe^{26+} + Ve^{26+} + Ve^{26+}$			2.5-25 MeV/u	Exp	1330
$Ae^{-0+} + V = 26+$			2.5-25 MeV/u	Exp E	1330
$Ae^{+} + Ve^{-26+} + Ve^{-26+}$			2.5-25  MeV/u	Exp	1330
$Ae^{+} + Ve^{26+} + $			2.5 - 25  MeV/u	Exp	1000
Ae + + $Va^{26+} +$			2.5 - 25  MeV/u	Exp	1000
$xe + xo^{26+} +$	Ag Sm	Ionization	2.5 - 25  MeV/u	Exp Evn	1330
$Xe^{26+} +$	Ta Ta	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{27+} +$	Ti	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{27+} +$	Cu	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{27+} +$	Zr	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{27+} +$	Ag	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{27+} +$	Sm	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{27+} +$	Ta	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{28+} +$	Al	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{28+} +$	Ti	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{28+} +$	Cu	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{28+} +$	Zr	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Xe^{28+} +$	Ag	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp	1330
$Xe^{28+} +$	Sm	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{28+} +$	Ta	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{29+} +$	Al	Ionization	2.5-25  MeV/u	Exp	1330
$Xe^{29+} +$	Ti	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{29+} +$	Cu	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{29+} +$	Zr	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{29+} +$	Ag	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{29+} +$	Sm	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{29+} + V^{30+}$	'I'a	Ionization	2.5-25 MeV/u	Exp E	1330
$Ae^{30+} + V = 30+$	Al .		2.5-25 MeV/u	Exp	1330
$Ae^{30+} +$	<b>1</b> 1 <b>C</b>		2.5-25 MeV/u	Exp	1330
$Ae^{30+} +$		Ionization	2.5-25 MeV/u 2.5.25 MeV/u	ьхр Б-тр	1330
$Ae^{-3} + Ve^{-30+} + Ve^{-30+}$		Ionization	2.0-20 MeV/u 2.5.25 MeV/	схр Бир	1220
<b>ne</b> +	Ag	IOIIIZation	2.0-20 IVIEV/U	ъхр	1920

$Xe^{30+} + Sm$	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{30+} + Ta$	Ionization	$2.5-25 { m MeV}'/{ m u}$	Exp	1330
$Xe^{31+} + Al$	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{31+} + Ti$	Ionization	$2.5-25 { m MeV}'/{ m u}$	Exp	1330
$Xe^{31+} + Cu$	Ionization	$2.5-25 { m MeV}'/{ m u}$	Exp	1330
$Xe^{31+} + Zr$	Ionization	2.5-25 MeV/u	Exp	1330
$Xe^{31+} + Ag$	Ionization	2.5-25  MeV'/u	Exp	1330
$Xe^{31+} + Sm$	Ionization	2.5-25  MeV'/u	Exp	1330
$Xe^{31+} + Ta$	Ionization	2.5-25  MeV'/u	Exp	1330
Cs + Li	Interaction Potentials	Ultracold	Th	1190
Cs + K	Interaction Potentials	Ultracold	$\mathrm{Th}$	1190
Cs + Ar	De-excitation	60-120 deg C	Exp	1203
$Cs^* + Ar$	De-excitation	60-120 deg C	Exp	1203
Cs + H	Interaction Potentials	3-80 a.u.	Th	1256
Cs + Fr	Interaction Potentials		Th	1260
$Cs^+ + Cs$	Interaction Potentials		$\mathrm{Th}$	1260
$Cs^+ + Fr$	Interaction Potentials		$\mathrm{Th}$	1260
Cs + Cs	Association	$1.5x10^{-4}$ K	$\mathrm{Th}$	1262
$Cs + Cs^*$	Association	$1.5x10^{-4}$ K	$\mathrm{Th}$	1262
Cs + Rb	Association	$0.5x10^{-4} - 1.5x10^{-4}$ K	$\mathrm{Th}$	1267
$Cs + Rb^*$	Association	$0.5x10^{-4} - 1.5x10^{-4}$ K	$\mathrm{Th}$	1267
Cs + He	De-excitation		Exp	1339
$Cs^* + He$	De-excitation		Exp	1339
$Ba^+ + H_2$	Energy Transfer	298 K	Exp	1275
$Ba^+ + D_2$	Energy Transfer	298 K	Exp	1275
$Ta^{41+} + He$	Charge Transfer	10  keV/q	Exp	1196
$Ta^{42+} + Xe$	Charge Transfer	10  keV/q	$\operatorname{Exp}$	1196
$Ta^{43+} + He$	Charge Transfer	10  keV/q	$\operatorname{Exp}$	1196
$Ta^{43+} + Xe$	Charge Transfer	10  keV/q	Exp	1196
$Ta^{44+} + He$	Charge Transfer	10  keV/q	$\operatorname{Exp}$	1196
$Ta^{44+} + Xe$	Charge Transfer	10  keV/q	$\operatorname{Exp}$	1196
$Ta^{40+} + He$	Charge Transfer	10  keV/q	Exp	1196
$Ta^{40+} + Xe$	Charge Transfer	10  keV/q	Exp	1196
$Ta^{49+} + He$	Charge Transfer	10 keV/q	Exp	1196
$^{1}\mathrm{Ia}^{49+} + \mathrm{Xe}$	Charge Transfer	10 keV/q	Exp	1196
$Au^{24+} + He$	Total Scattering	3.6 MeV/u	Th	1096
$Au^{33} + He$	Total Scattering	3.6 MeV/u	Th	1096
$Au^{21} + He$		3.6 MeV/u	Th	1096
$Au^{33} + He$	Ionization	3.0 MeV/u	In E	1090
$Au^{+} + He$	Total Scattering	3.0-100 MeV/u	Exp E	1221
$Au^{24+} + He$	Iotal Scattering	3.0-100  MeV/u	ьхр Бчт	1221
Au + He Au <sup>53+</sup> + He	Ionization	3.0-100  MeV/u	Exp Evp	1221
Au $+$ He	Total Scattoring	$3.6 \times 3 \text{ MeV}/\text{amu}$	ыхр Б/Т	1221
Au $+$ He	Total Scattering	3.6.8.3  MeV/amu	E/T	1240
Au $+$ He	Ionization	3.6.8.3  MeV/amu	E/T	1240
$Au^{53+} \perp He$	Ionization	3.6-8.3  MeV/amu	E/T	1240
$Au^{53+} \perp He$	Ionization	$3.6-8$ MeV/ $\mu$ : 1-100 eV: 2 keV	E/T	1337
$Au^{53+} \perp He$	Ionization	$0.075_{-}100 \text{ MeV}/\mu$	Eyn	1338
$Au^{53+} + He$	Ionization	3.6-100  MeV/m	тр Th	1356
$Ph^{2+} + Ph$	Charge Transfer	2-94 keV	Exp	1951
$Ph^{3+} + Ph$	Charge Transfer	2-94 keV	Exp	1251
$Ph^{4+} + Ph$	Charge Transfer	2-94 keV	Exp	1251
$Bi^{2+} + Bi$	Charge Transfer	2-94 keV	Exp	1251
$Bi^{3+} + Bi$	Charge Transfer	2-94 keV	Exp	1251
$Bi^{4+} + Bi$	Charge Transfer	2-94 keV	Exp	1251
Fr + Fr	Interaction Potentials		Th	1260

$Fr^+ + Rb$	Interaction Potentials		$\mathrm{Th}$	1260
$Fr^+ + Fr$	Interaction Potentials		$\mathrm{Th}$	1260
$U^{91+} + H^+$	Ionization	1  GeV/u	$\mathrm{Th}$	1104
$U^{92+} + H_2^+$	Ionization	1  GeV/u	$\mathrm{Th}$	1105
$U^{4+} + Ar$	Ionization	1.4-4.8  MeV/amu	$\operatorname{Exp}$	1153
$U^{4+} + Xe$	Ionization	$1.4-4.8 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1153
$\mathbf{U}^{4+} + \mathbf{N}_2$	Ionization	1.4-4.8  MeV/amu	$\operatorname{Exp}$	1153
$U^{6+} + Ar$	Ionization	1.4-4.8  MeV/amu	$\operatorname{Exp}$	1153
$U^{6+} + Xe$	Ionization	1.4-4.8  MeV/amu	$\operatorname{Exp}$	1153
$\mathbf{U}^{6+} + \mathbf{N}_2$	Ionization	1.4-4.8  MeV/amu	$\operatorname{Exp}$	1153
$\mathbf{U}^{10+} + \mathbf{Ar}$	Ionization	1.4-4.8  MeV/amu	$\operatorname{Exp}$	1153
$\mathbf{U}^{10+} + \mathbf{Xe}$	Ionization	1.4-4.8 MeV/amu	$\operatorname{Exp}$	1153
$\mathbf{U}^{10+} + \mathbf{N}_2$	Ionization	1.4-4.8  MeV/amu	$\operatorname{Exp}$	1153
$\mathbf{U}^{73+} + \mathbf{Au}$	Excitation	$69 { m MeV/u}$	$\operatorname{Exp}$	1164
$\mathbf{U}^{86+} + \mathbf{Au}$	Excitation	$69 { m MeV/u}$	$\operatorname{Exp}$	1164
$\mathbf{U}^{88+} + \mathbf{Au}$	Excitation	$69 { m MeV/u}$	$\operatorname{Exp}$	1164
$\mathbf{U}^{91+} + \mathbf{Au}$	Excitation	$69 { m MeV/u}$	$\operatorname{Exp}$	1164
$U^{89+} + N_2$	Ionization	98-398  MeV/u	$\operatorname{Exp}$	1211
$\mathbf{U}^{10+} + \mathbf{Ar}$	Ionization	1.4-6.5  MeV/u	$\mathrm{Th}$	1233
$\mathbf{U}^{28+} + \mathbf{Ar}$	Ionization	1.4-6.5  MeV/u	$\mathrm{Th}$	1233
$U^{28+} + N_2$	Ionization	$1.4-6.5 \ \mathrm{MeV/u}$	$\mathrm{Th}$	1233
$\mathbf{U}^{88+} + \mathbf{N}_2$	Ionization	$990 { m MeV/amu}$	$\operatorname{Exp}$	1297
$\mathbf{U}^{92+} + \mathbf{N}_2$	Charge Transfer	$20-400 { m MeV/amu}$	$\operatorname{Exp}$	1349
$\mathbf{U}^{92+} + \mathbf{N}_2$	Excitation	$20-400 { m MeV/amu}$	$\operatorname{Exp}$	1349
$H_2 + O$	Interaction Potentials		$\mathrm{Th}$	1073
$H_2 + H_2$	Interchange reaction	$0.0-6.0 \mathrm{~eV}$	$\mathrm{Th}$	1132
$H_2 + CO$	Excitation	$10^{-6} - 15,000 \ cm^{-1}$	$\mathrm{Th}$	1137
$\mathbf{H}_2 + \mathbf{C}_2 \mathbf{H}$	Interchange reaction	0-1.0  eV	$\mathrm{Th}$	1142
$\mathbf{H}_{2}^{+} + \mathbf{H}$	Charge Transfer	$0.5-100 \ eV$	$\mathrm{Th}$	1149
$\mathbf{H}_2{}^- + \mathbf{H}_2$	Detachment	4.2  keV	$\operatorname{Exp}$	1205
$\mathbf{H}_{2}^{+} + \mathbf{H}^{-}$	Recombination	0.05-5  keV/u	E/T	1247
$\mathbf{H}_2 + \mathbf{H}_2 \mathbf{O}$	Excitation	5-20 K	$\mathrm{Th}$	1282
$\mathbf{H}_2 + \mathbf{H}\mathbf{C}_3\mathbf{N}$	Excitation	5-100 K	$\mathrm{Th}$	1285
$\mathbf{H}_2 + \mathbf{H}_2$	Interchange reaction	0.0-2.0  eV	$\mathrm{Th}$	1302
$\mathbf{H}_{2}^{+} + \mathbf{He}$	Ionization	0.075-100  MeV/u	Exp	1338
$\mathbf{H}_{2}^{+} + \mathbf{Ne}$	Dissociation	0.1-4 MeV/amu	E/T	1347
$\mathbf{H}_{2}^{+} + \mathbf{Ne}$	Ionization	0.1-4  MeV/amu	E/T	1347
$\mathbf{H}_2 + \mathbf{H}_2$	Dissociation	$10^{-2} - 10^{3} \text{ eV}$	E/T	1358
$\mathbf{H}_{2^{\top}} + \mathbf{H}_{2}$	Dissociation	$10^{-2} - 10^{3} \text{ eV}$	E/T	1358
$\mathbf{H}_2 + \mathbf{H}_2$	Elastic Scattering	$10^{-2} - 10^{5} \text{ eV}$	E/T	1358
$\mathbf{H}_2 + \mathbf{H}_2$	Charge Transfer	$10^{-2} - 10^{5} \text{ eV}$	E/T	1358
$\mathbf{H}_{2}^{+} + \mathbf{H}_{2}$	Charge Transfer	$10^{-2} - 10^{5} \text{ eV}$	E/T	1358
$\mathbf{H}_{2}$ + $\mathbf{H}_{2}$	Interchange reaction	$10^{-2} - 10^{5} \text{ eV}$	E/T D/T	1358
$\mathbf{H}_2 + \mathbf{H}_2$	Excitation	$10^{-2} - 10^{5} \text{ eV}$	E/T E/T	1358
$\mathbf{H}_{2}$ + $\mathbf{H}_{2}$		$10^{-2} - 10^{5} \text{ eV}$	E/T E/T	1358
$\mathbf{H}_2 + \mathbf{H}_2$		$10^{-2} - 10^{5} \text{ eV}$	E/ 1 E/T	1358
$\mathbf{H}_2$ + $\mathbf{H}_2$	Ionization	$10^{-2} - 10^{-5} \text{ eV}$	E/ 1 E	1358
$\mathbf{H}_{3}$ + $\mathbf{H}\mathbf{e}$	Dissociation	1-5 KeV	Exp	1170
$n_3 + n_6$ $n_3 + n_6$	Diggo ciction	1-0  KeV	Exp E	1100
$H_3^+ + H_0^+$	Association	00  keV/u	Exp E	1109
$\mathbf{H}_{3}^{+} + \mathbf{U}_{2}^{-}$	Dissociation	$10^{-2}$ $10^{5}$ v	Exp E/T	1202 1950
$\mathbf{n}_{3}^{+} + \mathbf{n}_{2}^{-}$ $\mathbf{H}_{2}^{+} \pm \mathbf{H}_{2}^{-}$	Dissociation Flastic Scattoring	$10 - 10^{2} \text{ eV}$ $10^{-2} - 10^{5} \text{ eV}$	Ľ/ 1 Б/Т	1358 1350
$\mathbf{H}_3^+ \mathbf{+} \mathbf{H}_2$	Charge Transfer	10 - 10  eV $10^{-2} - 10^5 \text{ eV}$	Ľ/ 1 F /T	1250
$\mathbf{H}_{3}$ $\mathbf{T}$ $\mathbf{H}_{2}$ $\mathbf{H}_{3}$ $\mathbf{H}_{4}$ $\mathbf{H}_{5}$	Excitation	$10^{-2} - 10^{5} \text{ eV}$	ці/ т г / т	1250
$\mathbf{H}_{3}$ $\mathbf{T}$ $\mathbf{H}_{2}$ $\mathbf{H}_{3}$ $\mathbf{H}_{4}$ $\mathbf{H}_{5}$	Ionization	$10^{-2} - 10^{5} \text{ eV}$	ці/ т г / т	1250
$\mathbf{H}\mathbf{D}^{-} \perp \mathbf{H}_{-}$	Detechment	10 - 10 ev 4.9 keV	E/ I Fyn	1905 1905
		1.2 AU V	Ľхр	1400

$HD_2^+ + He$	Dissociation	1-5  keV	Exp	1170
$HD_2^+ + He$	Total Scattering	1-5  keV	Exp	1170
$H_2O + He$	Line Broadening	300 K	Exp	1178
$H_2O + H_2O$	Line Broadening	300 K	Exp	1178
$H_2O + N_2$	Line Broadening	300 K	Exp	1178
$H_2O + SF_6$	Line Broadening	300 K	Exp	1178
$\mathbf{D}^+ + \mathbf{H}_2$	Interchange reaction	0.0-2.0  eV	Th	1128
D + OH	Interchange reaction	0-500 K	$\mathrm{Th}$	1129
$D^+ + H$	Interaction Potentials		$\mathrm{Th}$	1241
$D^+ + D$	Interaction Potentials		Th	1241
$D^+ + Mg$	Charge Transfer	1-100 keV	Th	1298
$D^+ + Ca$	Charge Transfer	1-100 keV	Th	1298
$\mathrm{D^{+}+Mg}$	Total Scattering	1-100 keV	$\mathrm{Th}$	1298
$D^+ + Ca$	Total Scattering	1-100 keV	$\mathrm{Th}$	1298
D + HD	Interchange reaction	0-1000 K	E/T	1310
D + NH	Interchange reaction	0-1000 K	$\dot{E}/T$	1310
$\mathbf{D} + \mathbf{CH}_4$	Interchange reaction	250-400 K	Th	1311
$\mathbf{D}^- + \mathbf{H}_2$	Interchange reaction	0.2-2.4  eV	Th	1332
$\mathbf{D}_2^- + \mathbf{H}_2$	Detachment	4.2  keV	Exp	1205
$D_3^+ + He$	Dissociation	1-5  keV	Exp	1170
$D_3^+ + He$	Total Scattering	1-5  keV	Exp	1170
$\mathbf{He}_{2}^{+} + \mathbf{He}$	Interchange reaction	$10^{-6} - 10^{-1} \text{ eV}$	Th	1191
$CH + H_3$	Interaction Potentials		$\mathrm{Th}$	1073
$CH^+ + O^-$	Interchange reaction	0.01-10.00  eV	Exp	1140
$\mathbf{CH}_4 + \mathbf{CH}_4$	Interchange reaction	163-297 K	Th	1082
$\mathbf{CH}_4 + \mathbf{CH}_4$	Energy Transfer	163-297 K	$\mathrm{Th}$	1082
$\mathbf{CH}_4 + \mathbf{CH}_4$	Interaction Potentials		$\mathrm{Th}$	1184
$CO + H_2$	Excitation	$1-520 \ cm^{-1}$	$\mathrm{Th}$	1118
CO + H	De-excitation	$10^{-5} - 10 \ cm^{-1}$	$\mathrm{Th}$	1271
CO + He	De-excitation	$10^{-5} - 10 \ cm^{-1}$	$\mathrm{Th}$	1271
$CO + H_2$	De-excitation	$10^{-5} - 10 \ cm^{-1}$	$\mathrm{Th}$	1271
$CO^+ + He$	Dissociation	5  keV	$\operatorname{Exp}$	1300
$N_2^+ + He$	De-excitation	$10^{-6} - 2000 \ cm^{-1}$	$\mathrm{Th}$	1081
$N_2^+ + He$	Dissociation	1-5  keV	$\operatorname{Exp}$	1161
$N_2^+ + Ar$	Dissociation	1-5  keV	$\operatorname{Exp}$	1161
$N_2^+ + He$	Total Scattering	1-5  keV	$\operatorname{Exp}$	1161
$N_2^+ + Ar$	Total Scattering	1-5  keV	$\operatorname{Exp}$	1161
$\mathbf{N}_2 + \mathbf{N}_2$	Line Broadening	300 K	$\operatorname{Exp}$	1178
$\mathbf{N}_2^+ + \mathbf{N}_2$	Charge Transfer	0-3 eV	$\mathrm{Th}$	1350
$\mathbf{NH} + \mathbf{NH}$	Elastic Scattering	$10^{-6}$ K	$\mathrm{Th}$	1355
$\mathbf{NH} + \mathbf{NH}$	Energy Transfer	$10^{-6} \text{ K}$	$\mathrm{Th}$	1355
NO + Ar	Excitation	$516 \ cm^{-1}$	Exp	1341
$O_2^+ + O_2$	Charge Transfer	0-3 eV	Th	1350
$Ne_2 + H_2$	Line Broadening	300 K	Exp	1106
$\mathbf{Ne}_{2}^{*} + \mathbf{H}_{2}$	Line Broadening	300 K	Exp	1106
$Ne_2 + H_2$	Dissociation	300 K	Exp	1106
$\mathbf{Ne}_{2}^{*} + \mathbf{H}_{2}$	Dissociation	300 K	Exp	1106
$Ne_2 + H_2$	Energy Transfer	300 K	Exp	1106
$\mathbf{Ne}_{2}^{*} + \mathbf{H}_{2}$	Energy Transfer	300 K	Exp	1106
$\mathbf{N}\mathbf{e}_2 + \mathbf{H}_2$	Excitation	300 K	Exp	1106
$\mathbf{N}\mathbf{e}_2^+ + \mathbf{H}_2$	Excitation	300 K	Exp	1106
$\mathbf{U}\mathbf{N} + \mathbf{U}_2\mathbf{H}_2$	Excitation	300 K	Exp Th	1314
$SIR_4 + R$	Interchange reaction	200-1000 K 100-1000 K	111 Th	1312
OH + H	Interchange reaction	100-1000 K	1 n Th	1135
$OH^- + OH^-$	Interchange reaction	100-1000 K	111 E /T	1135
$OH + O_2H_2$	Interchange reaction	0.3(-1.40  eV) 10-5 $10-3$ $-1$	Ľ/ 1 ТЪ	1138
Ou + ue	De-excitation	$10^{-1} - 10^{-1} cm^{-1}$	1 II	1199

OH + He	Excitation	$10^{-5} - 10^{-3} \ cm^{-1}$	$\mathrm{Th}$	1185
$OH^- + He$	De-excitation	$10^{-9} - 0.1 \ cm^{-1}$	$\mathrm{Th}$	1269
$\mathbf{OH}^+ + \mathbf{C}_3\mathbf{H}_6$	Interchange reaction	0.21-0.92  eV	E/T	1321
$\mathbf{OD}^+ + \mathbf{C}_3 \mathbf{H}_6$	Interchange reaction	0.21-0.92  eV	É/T	1321
$\mathbf{H}_{4}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp	1189
$C_3^+ + He$	Ionization	v=2.6 a.u.	Exp	1076
$C_5^+ + He$	Ionization	v=2.6 a.u.	Exp	1076
$C_8^+ + He$	Ionization	v=2.6 a.u.	Exp	1076
$\mathbf{C}_{10}^{+} + \mathbf{He}$	Ionization	v=2.6 a.u.	Exp	1076
$C_4^+ + He$	Ionization	v=2.6 a.u.	Exp	1076
$\mathbf{Al}_2^- + \mathbf{Ar}$	Total Scattering	$0.054-8.8 { m MeV}$	Exp	1222
$\mathbf{Al}_2^- + \mathbf{Ar}$	Detachment	$0.054-8.8 { m MeV}$	Exp	1222
$\mathbf{H}_{27}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp	1189
$Al_3^- + Ar$	Total Scattering	$0.054-8.8 { m MeV}$	Exp	1222
$Al_3^- + Ar$	Detachment	$0.054-8.8 { m MeV}$	Exp	1222
$\mathbf{Al}_4{}^- + \mathbf{Ar}$	Total Scattering	$0.054-8.8 { m MeV}$	Exp	1222
$\mathbf{Al}_4{}^- + \mathbf{Ar}$	Detachment	$0.054-8.8 { m MeV}$	Exp	1222
$C_7^+ + He$	Ionization	v=2.6 a.u.	Exp	1076
$\mathbf{H}_{5}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp	1189
$\mathbf{H}_{7}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp	1189
$\mathbf{H}_{9}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$	1189
$\mathbf{H}_{11}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp	1189
$\mathbf{C}_9^+ + \mathbf{He}$	Ionization	v=2.6 a.u.	Exp	1076
$\mathbf{H}_{13}{}^+ + \mathbf{He}$	Dissociation	60  keV/u	Exp	1189
$\mathbf{C}_{6}^{+} + \mathbf{He}$	Ionization	v=2.6 a.u.	$\operatorname{Exp}$	1076
$\mathbf{H}_{6}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$	1189
$H_8^+ + He$	Dissociation	60  keV/u	$\operatorname{Exp}$	1189
$\mathbf{H}_{10}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$	1189
$\mathbf{H}_{12}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp	1189
$\mathbf{H}_{14}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp	1189
$\mathbf{H}_{15}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp	1189
$H_{16}^{+} + He$	Dissociation	60  keV/u	Exp	1189
$H_{17}^{+} + He$	Dissociation	60  keV/u	Exp	1189
$H_{18}^{+} + He$	Dissociation	60  keV/u	Exp	1189
$H_{19}^{+} + He$	Dissociation	60 keV/u	Exp	1189
$H_{20}^{+} + He$	Dissociation	60 keV/u	Exp	1189
$\mathbf{H}_{21}^+ + \mathbf{He}$	Dissociation	60 keV/u	Exp	1189
$\mathbf{H}_{22}^+ + \mathbf{He}$	Dissociation	60 keV/u	Exp	1189
$H_{23}^+ + He$	Dissociation	60 keV/u	Exp	1189
$\mathbf{H}_{24}^+ + \mathbf{He}$	Dissociation	60 keV/u	Exp	1189
$\mathbf{H}_{25}^+ + \mathbf{He}$	Dissociation	60 keV/u	Exp	1189
$\mathbf{H}_{26}^+ + \mathbf{He}$	Dissociation	60 keV/u	Exp	1189
$\mathbf{H}_{28}$ + He	Dissociation	60 keV/u	Exp	1189
$\mathbf{H}_{29}$ + He	Dissociation	60 keV/u	Exp	1189
$\mathbf{H}_{30}$ + He	Dissociation	60 keV/u	Exp	1189
$H_{31}' + He$	Dissociation	bu keV/u	Exp	1189
$\mathbf{n}_{32}$ + <b>He</b>	Dissociation	00  keV/u	ьхр Б	1189
$\mathbf{n}_{33}$ + <b>He</b>	Dissociation	00  keV/u	ьхр Б	1189
$n_{34}$ + He	Dissociation	OU KEV/U	ьхр Б	1189
${\bf H}_{35}$ + He	Dissociation	ou kev/u	Exp	1189

## 2.3 Surface Interactions

$H^+ + Al$	Secondary Electron Emission	100  keV	$\mathrm{Th}$	1363
$H^+ + Al$	Reflection	98  keV	E/T	1364

$H^+ + W$	Trapping, Detrapping	20-40  keV	Exp	1370
$H^- + Pd$	Neutraliz., Ioniz., Dissoc.	1  keV	$\mathrm{Th}$	1387
$\mathrm{H}^- + \mathrm{Ag}$	Neutraliz., Ioniz., Dissoc.	1  keV	$\mathrm{Th}$	1387
$H^+ + Si$	Surface Interactions	210-420  keV	Exp	1392
$H^+ + Ti$	Trapping, Detrapping	$1.7-5.0 { m keV}$	Exp	1402
$H^+ + V$	Trapping, Detrapping	$1.7-5.0 { m keV}$	Exp	1402
$\rm H^+ + Cr$	Trapping, Detrapping	$1.7-5.0 { m keV}$	Exp	1402
$H^+ + Ti$	Trapping, Detrapping		$\mathrm{Th}$	1403
$H^+ + V$	Trapping, Detrapping		$\mathrm{Th}$	1403
$\mathrm{H^{+}+Cr}$	Trapping, Detrapping		$\mathrm{Th}$	1403
$H^+ + Si$	Reflection	100  keV	E/T	1404
$H^+ + Y$	Reflection	100  keV	E/T	1404
$\rm H^+ + Cu$	Reflection	6  eV; 5  keV	E/T	1427
$H^- + Cu$	Neutraliz., Ioniz., Dissoc.	6  eV; 5  keV	E/T	1427
H + Si	Reflection	1-4  keV	$\mathrm{Th}$	1431
$\mathrm{H^{+}} + \mathrm{Mg}$	Secondary Electron Emission	10-100  eV	$\mathrm{Th}$	1437
$H^- + Na$	Neutraliz., Ioniz., Dissoc.	1  keV	$\mathrm{Th}$	1442
$H^- + Al$	Neutraliz., Ioniz., Dissoc.	1  keV	$\mathrm{Th}$	1442
$H^- + Cu$	Neutraliz., Ioniz., Dissoc.	1  keV	$\mathrm{Th}$	1442
$H^+ + Cu$	Reflection	100  keV	Exp	1445
$H^+ + Cu$	Secondary Electron Emission	100  keV	Exp	1445
H + C	Sputtering	$5-10   \mathrm{eV}$	$\mathrm{Th}$	1446
H + C	Trapping, Detrapping	$5-10   \mathrm{eV}$	$\mathrm{Th}$	1446
$H^+ + C$	Sputtering	$5-100   \mathrm{eV}$	Exp	1447
$H^+ + W$	Trapping, Detrapping	500  eV	Exp	1448
$H^+ + W$	Trapping, Detrapping	500  eV	$\operatorname{Exp}$	1449
$H^+ + C$	Sputtering	10-1000  eV	$\mathrm{Th}$	1450
$\mathbf{H}^{+} + \mathbf{W}$	Trapping, Detrapping	200  eV	$\operatorname{Exp}$	1451
$H^+ + Re$	Trapping, Detrapping	200  eV	$\operatorname{Exp}$	1451
$\mathbf{H}^{+} + \mathbf{W}$	Trapping, Detrapping	500  eV	$\operatorname{Exp}$	1452
$H^+ + C$	Sputtering	$0.2-1.0 \; \mathrm{keV}$	$\mathrm{Th}$	1460
$H^+ + Fe$	Sputtering	$0.2-1.0 { m keV}$	$\mathrm{Th}$	1460
$H^+ + W$	Sputtering	$0.2-1.0 { m keV}$	Th	1460
H + Ti	Reflection	0.7-2  keV	E/T	1461
H + V	Reflection	0.7-2  keV	E/T	1461
H + Cr	Reflection	0.7-2  keV	E/T	1461
$H^+ + CsI$	Secondary Electron Emission	$2-48 { m MeV}$	$\operatorname{Exp}$	1464
$\mathrm{H^{+}}$ + GaN	Secondary Electron Emission	$2-48 { m MeV}$	$\operatorname{Exp}$	1464
$H^+ + ZnO$	Secondary Electron Emission	$2-48 { m MeV}$	Exp	1464
$H^+ + Ar$	Reflection	50-500  eV	E/T	1479
$H^+ + Kr$	Reflection	50-500  eV	E/T	1479
$H^+ + Xe$	Reflection	50-500  eV	E/T	1479
$H^+ + Si$	Sputtering	380 keV	Exp	1485
$H^+ + Al$	Secondary Electron Emission	25-3000 keV	Th	1490
$H^+ + C$	Secondary Electron Emission	1 MeV/amu	Exp	1498
$H^+ + H_2O$	Secondary Electron Emission	1 MeV	Th	1503
$H^+ + LiF$	Reflection	100 keV	Th	1509
$H^+ + LiF$	Secondary Electron Emission	100 keV	Th	1509
H' + Ar	Reflection	500 eV	Th	1510
H + Mg	Reflection		Th	1514
H' + AI	Keffection		Th	1514
H + Mg	Neutraliz., Ioniz., Dissoc.		Th	1514
$\mathbf{H}^{+} + \mathbf{A}\mathbf{I}$	Neutraliz., Ioniz., Dissoc.	5 200 M	Th	1514
$\mathbf{H}^{+} + \mathbf{C}$	Sputtering	5-300 eV	Exp	1528
H + C	Sputtering	(.5-6U eV	Exp	1530
$\mathbf{H}^{+} + \mathbf{W}$	Reflection	30-1000 eV	Exp	1532
$\mathbf{n} + \mathbf{K}$	Kenection	TOO KEV	$\mathbf{E}/1$	1533

$H^+ + Rb$	Reflection	100  keV	E/T	1533
$H^+ + Cs$	Reflection	100  keV	É/T	1533
$\mathbf{H}^+ + \mathbf{O}_2$	Sputtering	25-240  keV	Exp	1536
$\mathrm{H^{+}}+\mathrm{Be}$	Chemical Reactions	3-10 keV	Exp	1539
$H^+ + C$	Chemical Reactions	3-10 keV	Exp	1539
$\mathrm{H^{+}+BeO}$	Chemical Reactions	3-10 keV	Exp	1539
$H^+ + WO_3$	Chemical Reactions	3-10 keV	Exp	1539
$H^+ + WC$	Chemical Reactions	3-10 keV	Exp	1539
$\mathrm{H^{+}} + \mathrm{Be}$	Trapping, Detrapping	3-10  keV	Exp	1539
$\mathbf{H}^+ + \mathbf{C}$	Trapping, Detrapping	3-10  keV	Exp	1539
$ m H^+ + BeO$	Trapping, Detrapping	3-10  keV	Exp	1539
$H^+ + WO_3$	Trapping, Detrapping	3-10  keV	Exp	1539
$H^+ + WC$	Trapping, Detrapping	3-10  keV	Exp	1539
$H^+ + Al$	Secondary Electron Emission	100  keV	Exp	1545
H + C	Sputtering	100-300  eV	Exp	1547
$\mathbf{H}^+ + \mathbf{C}$	Sputtering	100-300  eV	Exp	1547
$H^+ + C$	Sputtering	30  eV	Exp	1548
$H^+ + SiC$	Sputtering	30  eV	Exp	1548
$\mathbf{H}^+ + \mathbf{TiC}_4$	Sputtering	30  eV	Exp	1548
$\mathbf{H}^+ + \mathbf{VC}_4$	Sputtering	30  eV	Exp	1548
$\mathbf{H}^+ + \mathbf{WC}_4$	Sputtering	30  eV	Exp	1548
$\mathbf{H}^+ + \mathbf{ZrC}_4$	Sputtering	30  eV	Exp	1548
$H^+ + C$	Sputtering	2-5  keV	E/T	1549
$H^+ + C$	Sputtering	10-1000 eV	E/T	1551
$H^+ + C$	Sputtering	$1 - 10^4 \text{ eV}$	Exp	1552
$\mathbf{H}^+ + \mathbf{C}$	Sputtering	3-13 eV	Exp	1553
$\mathbf{H}^+ + \mathbf{C}$	Sputtering	1-100 eV	$\mathrm{Th}$	1554
$\mathbf{H}^+ + \mathbf{C}$	Sputtering	10-150  eV	$\mathrm{Th}$	1555
$H^+ + C$	Surface Interactions	150-1500  eV	$\operatorname{Exp}$	1556
$\mathbf{H}^+ + \mathbf{W}$	Surface Interactions	150-1500  eV	$\operatorname{Exp}$	1556
$H^+ + C$	Trapping, Detrapping	150-1500  eV	Exp	1556
$H^+ + W$	Trapping, Detrapping	150-1500  eV	Exp	1556
$H^+ + C$	Sputtering	5-180 eV	E/T	1557
$H^+ + W$	Trapping, Detrapping	5-30 keV	Exp	1558
$H^+ + Be$	Trapping, Detrapping	1 keV	Exp	1560
H + W	Adsorption, Desorption	$3x10^{-3} - 10 \text{ eV}$	Th	1562
$H^+ + H_2O$	Adsorption, Desorption	0-4 eV	Th	1565
$\mathbf{H}^+ + \mathbf{H}_2\mathbf{O}$	Desorption	0-4 eV	Th	1565
$\mathbf{H}^+ + \mathbf{H}_2\mathbf{O}$	Sputtering	0-4 eV	Th	1565
H + Pt	Neutraliz., Ioniz., Dissoc.		Th	1567
H + D + Ni	Neutraliz., Ioniz., Dissoc.		Th	1567
H + D + Pt	Neutraliz., Ioniz., Dissoc.		Th	1567
H' + Ni	Neutraliz., Ioniz., Dissoc.			1507
H + Pt	Trapping, Detrapping			1507
H + D + Ni	Trapping, Detrapping			1507
H + D + Pt	Trapping, Detrapping			1507
H + NI	Trapping, Detrapping	F0 17		1507
H + Cu	Reflection			1568
$\mathbf{H} + \mathbf{U}\mathbf{u}$	Neutraliz., Ioniz., Dissoc.		1 N Th	1508
$\mathbf{H}^{+} + \mathbf{A}\mathbf{I}$	Neutraliz., Ioniz., Dissoc.	0.1 - 0.5  KeV	1 h Th	1574
$\Pi' + AI$	Sputtering	U.I-U.J KEV	1 h Th	1574
$ne^+ + Al$ $ue^+ + Cu$	Secondary Electron Emission	15-500 eV	1 N Th	1307
$ne^+ + Ou$	Secondary Electron Emission	15-500 eV	111 Th	1307
$ne^+ + Au$ $He^+ + Al$	Neutralia Lopia Disco	15-500 eV	111 Th	1307
$ne^+ + AI$ $He^+ + Cu$	Neutraliz, Ioniz, Dissoc.	15-500 eV	111 Th	1307
$ne^+ + Ou$	Neutraliz, Ioniz., Dissoc.	15-500 eV	111 Th	1307
ne' + Au	neutraliz., Ioniz., Dissoc.	19-900 ev	ΤU	1307

$\mathrm{He^{+}} + \mathrm{W}$	Trapping, Detrapping	$1.3 { m MeV}$	$\operatorname{Exp}$	1369
$\mathrm{He^{+}} + \mathrm{W}$	Trapping, Detrapping	20-40  keV	$\operatorname{Exp}$	1370
$He^+ + W$	Trapping, Detrapping	$1.3 { m MeV}$	$\operatorname{Exp}$	1371
$\mathrm{He^{+}} + \mathrm{H_{2}O}$	Sputtering	15  keV	Exp	1384
$\mathrm{He^{+}}$ + KCl	Secondary Electron Emission	$2 { m MeV}$	$\operatorname{Exp}$	1395
$\mathrm{He^{+}}$ + $\mathrm{SiO}_{2}$	Sputtering	$250-550 { m keV}$	$\operatorname{Exp}$	1400
$\mathrm{He^{+}}$ + Ti	Trapping, Detrapping	$1.7-5.0 { m keV}$	$\operatorname{Exp}$	1402
$\mathrm{He^{+}} + \mathrm{V}$	Trapping, Detrapping	$1.7-5.0 { m keV}$	$\operatorname{Exp}$	1402
$\mathrm{He^{+}}+\mathrm{Cr}$	Trapping, Detrapping	$1.7-5.0 { m keV}$	$\operatorname{Exp}$	1402
$\mathrm{He^{+}}$ + SiC	Trapping, Detrapping		$\mathrm{Th}$	1403
$\mathrm{He^{+}}+\mathrm{Ar}$	Sputtering	0-10  keV	E/T	1425
$\mathrm{He^{+}}+\mathrm{CH}_{4}$	Sputtering	0-10  keV	E/T	1425
$\mathrm{He^{+}}$ + $\mathrm{N}_{2}$	Sputtering	0-10  keV	E/T	1425
$\mathrm{He^{+}}$ + SiH	Reflection	$3 { m keV}$	$\operatorname{Exp}$	1426
$\mathrm{He^{+}}$ + SiH	Secondary Electron Emission	$3 { m keV}$	$\operatorname{Exp}$	1426
$\mathrm{He^{+}}$ + Xe	Reflection	$10-500 {\rm ~eV}$	Exp	1434
$\mathrm{He^{+}}$ + Xe	Secondary Electron Emission	$10-500 {\rm ~eV}$	Exp	1434
He + Al	Neutraliz., Ioniz., Dissoc.	1-10,000  keV/u	$\mathrm{Th}$	1439
He + Zn	Neutraliz., Ioniz., Dissoc.	1-10,000  keV/u	$\mathrm{Th}$	1439
$He^+ + Al$	Neutraliz., Ioniz., Dissoc.	1-10,000  keV/u	$\mathrm{Th}$	1439
$\mathrm{He^{+}}$ + Zn	Neutraliz., Ioniz., Dissoc.	1-10,000  keV/u	$\mathrm{Th}$	1439
He + C	Sputtering	5-10  eV	$\mathrm{Th}$	1446
He + C	Trapping, Detrapping	5-10  eV	$\mathrm{Th}$	1446
$He^+ + W$	Trapping, Detrapping	500  eV	$\operatorname{Exp}$	1449
$He^+ + W$	Trapping, Detrapping	500  eV	Exp	1452
$He^+ + SiC$	Trapping, Detrapping	1-1.3 keV	Exp	1455
$He^+ + W$	Trapping, Detrapping	12-20  keV	Exp	1457
He + Ti	Reflection	0.7-2 keV	E/T	1461
He + V	Reflection	0.7-2 keV	E/T	1461
He + Cr	Reflection	0.7-2 keV	E/T	1461
$He^+ + Ni$	Reflection	80-120 KeV	Exp E	14/1
$He^+ + Cu$	Deflection	80-120  KeV	Exp Th	1471
$He^+ + Ag$	Neutroliz Joniz Dissoa	1-2  KeV 1 -2  boV	1 II Th	1472
$He^+ + Ag$ $He^+ + Mg$	Reflection	1-2  KeV 15.60 eV	1 II Fyrd	1475
$He^+ + Mg$	Secondary Floctron Emission	15-60  eV	Exp Exp	1475
$He^+ \perp Mg$	Neutraliz Ioniz Dissoc	15-60  eV	Exp	1475
$H_{\Phi} \perp C$	Secondary Electron Emission	0.2-2.0 MeV	Цхр Th	1476
$He^+ + C$	Secondary Electron Emission	0.2 - 2.0 MeV	Th	1476
$He^{2+} + C$	Secondary Electron Emission	0.2-2.0 MeV	Th	1476
$He^+ + Al_2O_2$	Reflection	390-1210 eV	Exp	1480
$He^+ + Cr$	Reflection	0.7-2.0  keV	Exp	1481
$He^+ + Cr$	Neutraliz., Ioniz., Dissoc.	0.7-2.0 keV	Exp	1481
He + Al	Secondary Electron Emission	3-16  keV	Exp	1487
$He^{2+} + C$	Secondary Electron Emission	1  MeV/amu	Exp	1498
$He^+ + H_2O$	Reflection	15  keV	Exp	1499
$He^+ + CH_4$	Reflection	15  keV	Exp	1499
$\mathrm{He^{+}}$ + $\mathrm{NH}_{3}$	Reflection	15  keV	Exp	1499
$\mathrm{He^{+}} + \mathrm{H_{2}O}$	Sputtering	15  keV	Exp	1499
$\mathrm{He^{+}}$ + $\mathrm{CH}_{4}$	Sputtering	15  keV	Exp	1499
$He^+ + NH_3$	Sputtering	15  keV	$\operatorname{Exp}$	1499
$\mathrm{He^{+}}$ + Si	Reflection	270  keV	$\mathrm{Th}$	1500
$He^+ + Ta$	Reflection	270  keV	$\mathrm{Th}$	1500
$He^+ + ZrO_2$	Reflection	270  keV	$\mathrm{Th}$	1500
He + Al	Reflection	0-20  keV	Exp	1506
$He^+ + Al$	Reflection	0-20  keV	$\operatorname{Exp}$	1506
${ m He^+}$ + NaCl	Reflection	1000  eV	$\operatorname{Exp}$	1507

$\mathrm{He^{+}}$ + NaCl	Neutraliz., Ioniz., Dissoc.	1000  eV	$\operatorname{Exp}$	1507
$He^+ + Cu$	Reflection	$1.9-3.0 { m keV}$	Exp	1508
$He^+ + Cu$	Neutraliz., Ioniz., Dissoc.	$1.9-3.0 { m keV}$	Exp	1508
$He^+ + Cu$	Reflection	1-100  keV	$\mathrm{Th}$	1511
$He^+ + Cu$	Reflection	$1.8-88.0 { m keV}$	$\operatorname{Exp}$	1512
$He^+ + Si$	Reflection	4  keV	$\mathrm{Th}$	1513
He + Al	Reflection		$\mathrm{Th}$	1515
He + Al	Reflection	1.2-12  keV	$\mathrm{Th}$	1517
He + Al	Secondary Electron Emission	1.2-12  keV	$\mathrm{Th}$	1517
$He^+ + Ar$	Secondary Electron Emission	10-500  eV	$\operatorname{Exp}$	1521
$He^+ + Kr$	Secondary Electron Emission	10-500  eV	$\operatorname{Exp}$	1521
$He^+ + Xe$	Secondary Electron Emission	10-500  eV	$\operatorname{Exp}$	1521
$He^{2+} + Fe$	Secondary Electron Emission	100  eV	$\operatorname{Exp}$	1524
$He^{2+} + Ni$	Secondary Electron Emission	100  eV	$\operatorname{Exp}$	1524
$\mathrm{He^{+}}+\mathrm{Ag}$	Reflection		E/T	1534
$\mathrm{He^{+}}$ + Ag	Neutraliz., Ioniz., Dissoc.		E/T	1534
$\mathrm{He^{+}}$ + Ag	Reflection	4  keV	$\mathrm{Th}$	1537
$\mathrm{He^{+}}$ + Ag	Neutraliz., Ioniz., Dissoc.	4  keV	$\mathrm{Th}$	1537
$He^+ + C$	Sputtering	$100-300 {\rm eV}$	Exp	1547
$He^+ + C$	Sputtering	10-1000  eV	E/T	1551
He + Fe	Secondary Electron Emission		$\operatorname{Exp}$	1570
$Li^+ + Li$	Sputtering	200-1000  eV	$\mathrm{Th}$	1382
$Li^{3+} + C$	Secondary Electron Emission	$1 { m MeV/amu}$	Exp	1498
$C^+ + U$	Chemical Reactions	33  keV	Exp	1429
$C^+ + CsI$	Secondary Electron Emission	$2-48 {\rm ~MeV}$	Exp	1464
$\mathrm{C^{+}+GaN}$	Secondary Electron Emission	$2-48 {\rm ~MeV}$	$\operatorname{Exp}$	1464
$C^+ + ZnO$	Secondary Electron Emission	$2-48 {\rm ~MeV}$	$\operatorname{Exp}$	1464
$\mathbf{C}^+ + \mathbf{Al}_2\mathbf{O}_3$	Reflection	390-1210  eV	$\operatorname{Exp}$	1480
$C^+ + C$	Sputtering	100-300  eV	$\operatorname{Exp}$	1547
C + C	Reflection	0.01-10 eV	$\mathrm{Th}$	1550
$\mathbf{C} + \mathbf{C}$	Adsorption, Desorption	$1 - 10^4 {\rm eV}$	Exp	1552
$C^{5+} + Al$	Neutraliz., Ioniz., Dissoc.	$v=10^{-5} - 1$ a.u.	Th	1576
$N^+ + Pt$	Reflection	1 MeV	Th	1473
$N^+ + H_2O$	Sputtering	1.7 MeV	E/T	1491
$N^+ + H_2O$	Reflection	15  keV	Exp	1499
$N^+ + CH_4$	Reflection	15 keV	Exp	1499
$\mathbf{N}^+ + \mathbf{N}\mathbf{H}_3$	Reflection	15 keV	Exp	1499
$\mathbf{N}^+ + \mathbf{H}_2 \mathbf{O}$	Sputtering	15 keV	Exp	1499
$\mathbf{N}^{+} + \mathbf{CH}_{4}$	Sputtering	15 keV	Exp	1499
$\mathbf{N}' + \mathbf{N}\mathbf{H}_3$	Sputtering	15 keV	Exp	1499
$1N^{\circ}$ + $1N1$	Secondary Electron Emission	10-5 1	Th	1525
$\mathbf{N}^{\circ+} + \mathbf{A}\mathbf{I}$	Neutraliz., Ioniz., Dissoc.	$v=10^{\circ} - 1$ a.u.	1 n 5	1570
$0^{+} + 0^{+}$	Secondary Electron Emission	2  keV/amu	Exp E	1380
$0^{8+} + 51$	Secondary Electron Emission	2  keV/amu	Exp	1380
$O^{\circ+} + Au$ $O^{8+} + S^{\circ}O$	Secondary Electron Emission	2  keV/amu	Exp	1380
$0^{-1} + 50_{2}$	Secondary Electron Emission	2  keV/amu	Exp E/T	1380
0 + 11	Reflection	0.7-2  KeV		1401
$\mathbf{O} + \mathbf{v}$	Reflection	0.7-2  KeV		1401
O + Cr	Reflection	0.7-2 KeV 200.1210 eV	E/1 E-m	1401
$O^+ + AI_2O_3$	Surface Interactions	10.20 heV	Exp E-m	1480
$O^{2+} + IO_{2}$	Bufface Interactions	10-30 Kev 2 MaV	Exp E	1482 1407
$O^{2+} + KO^{1}$	Sputtering	o mev 2 MoV	Exp	1497
$O^+ + C$	Sputtering	100300  eV	Exp	1497 1577
$O^{7+} \perp \Lambda$	Noutraliz Ioniz Dissoc	$x = 10^{-5}$ 1 s y	ть ть	1547 1576
$\mathbf{F}^+ \perp \mathbf{N}_2 \mathbf{C}^1$	Reflection	v = 10 - 1 a.u.	1 11 Fwn	1507
$F^+ \perp NaCl$	Neutraliz Ioniz Dissoc	1000 eV	Exp	1507
- 1 1 1 U U	1,000000000000000000000000000000000000	1000 01	цть	1001

$\mathbf{F}^{7+} + \mathbf{Au}$	Reflection	4-5  keV	Exp	1546
$\mathbf{F}^{7+} + \mathbf{RbI}$	Reflection	4-5  keV	Exp	1546
$\mathbf{F}^{7+} + \mathbf{Au}$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp	1546
$\mathbf{F}^{7+} + \mathbf{RbI}$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp	1546
$Ne^+ + Mg$	Reflection	$100-400 {\rm ~eV}$	Exp	1366
$Ne^+ + Al$	Reflection	$100-400 {\rm ~eV}$	Exp	1366
$Ne^+ + Si$	Reflection	$100-400 {\rm ~eV}$	Exp	1366
$Ne^+ + P$	Reflection	$100-400 {\rm ~eV}$	Exp	1366
$Ne^+ + Mg$	Neutraliz., Ioniz., Dissoc.	$100-400 {\rm ~eV}$	Exp	1366
$Ne^+ + Al$	Neutraliz., Ioniz., Dissoc.	$100-400 {\rm ~eV}$	Exp	1366
$Ne^+ + Si$	Neutraliz., Ioniz., Dissoc.	$100-400 {\rm ~eV}$	Exp	1366
$Ne^+ + P$	Neutraliz., Ioniz., Dissoc.	$100-400 {\rm ~eV}$	Exp	1366
$Ne^+ + PERT$	Sputtering	1-5  keV	Exp	1380
$Ne^+ + Mg$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp	1394
$Ne^+ + Al$	Neutraliz., Ioniz., Dissoc.	320  eV	$\operatorname{Exp}$	1394
$Ne^+ + Si$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp	1394
$Ne^+ + Ti$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp	1394
$Ne^+ + Y$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp	1394
$Ne^+ + Zr$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp	1394
$Ne^+ + Nb$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp	1394
$Ne^+ + Te$	Neutraliz., Ioniz., Dissoc.	320  eV	$\operatorname{Exp}$	1394
$Ne^+ + Nd$	Neutraliz., Ioniz., Dissoc.	320  eV	$\operatorname{Exp}$	1394
$\mathrm{Ne^{+}+Gd}$	Neutraliz., Ioniz., Dissoc.	320  eV	$\operatorname{Exp}$	1394
$Ne^+ + Dy$	Neutraliz., Ioniz., Dissoc.	320  eV	$\operatorname{Exp}$	1394
$Ne^+ + Ta$	Neutraliz., Ioniz., Dissoc.	320  eV	$\operatorname{Exp}$	1394
$Ne^+ + Au$	Neutraliz., Ioniz., Dissoc.	320  eV	$\operatorname{Exp}$	1394
$\mathrm{Ne^{+}+Hf}$	Neutraliz., Ioniz., Dissoc.	320  eV	$\operatorname{Exp}$	1394
$Ne^+ + At$	Neutraliz., Ioniz., Dissoc.	320  eV	$\operatorname{Exp}$	1394
${ m Ne^+}+{ m MgO}$	Secondary Electron Emission	0-2000  eV	$\operatorname{Exp}$	1401
Ne + Al	Secondary Electron Emission	3-5  keV	$\operatorname{Exp}$	1406
$\mathrm{Ne}^{7+}+\mathrm{SiO}_2$	Reflection	7  keV	$\operatorname{Exp}$	1440
Ne + C	Sputtering	5-10  eV	$\mathrm{Th}$	1446
Ne + C	Trapping, Detrapping	5-10  eV	$\mathrm{Th}$	1446
$Ne^+ + Ni$	Reflection	2-12  keV	$\operatorname{Exp}$	1474
$Ne^+ + Ni$	Neutraliz., Ioniz., Dissoc.	2-12  keV	$\operatorname{Exp}$	1474
$Ne^+ + Al_2O_3$	Reflection	390-1210  eV	$\operatorname{Exp}$	1480
Ne + Al	Secondary Electron Emission	3-16  keV	$\operatorname{Exp}$	1487
$Ne^+ + Al$	Secondary Electron Emission	1.0-10  keV	$\operatorname{Exp}$	1504
$Ne^+ + NaCl$	Reflection	1000  eV	Exp	1507
$Ne^+ + NaCl$	Neutraliz., Ioniz., Dissoc.	1000 eV	Exp	1507
Ne + Al	Reflection	1.2-12  keV	Th	1517
Ne + Al	Secondary Electron Emission	1.2-12  keV	Th	1517
$Ne^{o+} + Au$	Reflection	4-5 keV	Exp	1546
$Ne^{o+} + RbI$	Reflection	4-5 keV	Exp	1546
$Ne^{o+} + Au$	Neutraliz., Ioniz., Dissoc.	4-5 keV	Exp	1546
$Ne^{o+} + RbI$	Neutraliz., Ioniz., Dissoc.	4-5 keV	Exp	1546
$Ne^+ + C$	Sputtering	10-1000 eV	E/T	1551
Na' + Ru	Secondary Electron Emission	50 eV	Exp	1411
Na' + Au	Sputtering	50 eV	Exp	1411
$\mathbf{Na}$ + $\mathbf{CeO}_2$	Keffection	1-4.5 KeV	Exp	1433
1Na' + Al	Secondary Electron Emission	4(4 keV	Th	1489
1Na' + Al	Secondary Electron Emission	1.0-10 keV	Exp	1504
1Na' + AI	Secondary Electron Emission	300 eV	Exp	1519
Na' + AI	Secondary Electron Emission	150-4000 eV	Exp	1535
1Na' + AI	Neutraliz., Ioniz., Dissoc.	150-4000 eV	Exp	1535
$\mathbf{S}\mathbf{I}' + \mathbf{A}\mathbf{I}$ $\mathbf{D}^{5+} + \mathbf{C}$	Sputtering	1-5 KeV	E/T	1413
$\mathbf{P}^{+} + \mathbf{U}$	Secondary Electron Emission	35-400 kev	Exp	1488

$\mathbf{P}^{6+} + \mathbf{C}$	Secondary Electron Emission	$35-400 {\rm ~keV}$	Exp	1488
$\mathbf{P}^{7+} + \mathbf{C}$	Secondary Electron Emission	$35-400 {\rm ~keV}$	Exp	1488
$\mathbf{P}^{8+} + \mathbf{C}$	Secondary Electron Emission	35-400  keV	Exp	1488
$\mathbf{P}^{9+} + \mathbf{C}$	Secondary Electron Emission	35-400  keV	Exp	1488
$P^{10+} + C$	Secondary Electron Emission	35-400  keV	Exp	1488
$P^{11+} + C$	Secondary Electron Emission	35-400  keV	Exp	1488
$P^{13+} + C$	Secondary Electron Emission	35-400  keV	$\operatorname{Exp}$	1488
$Cl^+ + Al_2O_3$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$\mathbf{Cl}^+ + \mathbf{Si}_3 \mathbf{N}_4$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$\mathrm{Cl}^+ + \mathrm{TiO}_2$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$\mathrm{Cl}^+ + \mathrm{SiO}_2$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$Cl^+ + SrTiO_3$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$Cl^+ + MgO$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$Cl^+ + ZrO_2$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$Cl^+ + AlN$	Sputtering	$55-200 { m MeV}$	Exp	1484
$\mathrm{Cl}^+ + \mathrm{CeO}_2$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$Cl^+ + ZnO$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$Cl^+ + Y_2O_3$	Sputtering	55-200 MeV	Exp	1484
$Cl^+ + MgAl_2O_4$	Sputtering	55-200 MeV	Exp	1484
$Ar^+ + PERT$	Sputtering	1-5 keV	Exp	1380
$Ar^+ + H_2O$	Sputtering	15 keV	Exp	1384
$Ar^+ + Ni$	Sputtering	2 keV	Th	1388
$Ar^+ + Cu$	Sputtering	2  keV	Th	1388
$Ar^{10+} + Be$	Reflection		Exp	1390
$Ar^{10+} + Be$	Reflection		Exp	1390
$Ar^{1+} + Be$	Reflection		Exp	1390
$Ar^{10+} + Be$	Reflection	1 5 1 37	Exp	1390
Ar + Ge	Sputtering	1-5 KeV	Exp	1391
$Ar' + GeH_4$	Sputtering	1-5 KeV	Exp	1391
$Ar + Sin_4$	Deflection	1-3  KeV	Exp Th	1391
Ar + SI $Ar^+ + C$	Sputtoring		1 fi Furp	1090
Ar + Al	Secondary Floatron Emission	25  keV	Exp	1406
AI + AI $Ar^+ \perp Si$	Sputtering	3-5 KeV	Бхр Б/Т	1400
$Ar^+ \perp Ce$	Sputtering	3 koV	E/T	1409
$\Delta r^+ + H_0 O$	Sputtering	100 keV	Eyn	1403
$\Delta r^+ + Ni$	Sputtering	4 keV	Exp	1410
$Ar^+ + NiAl$	Sputtering	4 keV	Exp	1412
$Ar^+ + Ni_2Al$	Sputtering	4 keV	Exp	1412
$Ar^+ + Pt$	Reflection	5 keV	Th	1428
$Ar^+ + Pt$	Sputtering	5 keV	Th	1428
$Ar^+ + NiAl$	Sputtering	4 keV	Exp	1435
$Ar^+ + Ni_3Al$	Sputtering	4  keV	Exp	1435
Ar + C	Sputtering	5-10 eV	Th	1446
Ar + C	Trapping, Detrapping	5-10 eV	$\mathrm{Th}$	1446
$Ar^+ + Si$	Sputtering	1-20  keV	$\mathrm{Th}$	1466
$Ar^+ + Ge$	Sputtering	1-20  keV	$\mathrm{Th}$	1466
Ar + Si	Sputtering	500  eV	$\mathrm{Th}$	1467
Ar + Cu	Sputtering	$0.1-5.0 { m keV}$	$\mathrm{Th}$	1470
$Ar^+ + Al_2O_3$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Ar^+ + Si_3N_4$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Ar^+ + TiO_2$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Ar^+ + SiO_2$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Ar^+ + SrTiO_3$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Ar^+ + MgO$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Ar^+ + ZrO_2$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Ar^+ + AlN$	Sputtering	$55-200 { m MeV}$	Exp	1484

$Ar^+ + CeO_2$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$Ar^+ + ZnO$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Ar^+ + Y_2O_3$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Ar^+ + MgAl_2O_4$	Sputtering	$55-200 { m MeV}$	Exp	1484
Ar + Al	Secondary Electron Emission	3-16  keV	$\operatorname{Exp}$	1487
$Ar^+ + Si$	Sputtering	$160-400 {\rm ~keV}$	$\operatorname{Exp}$	1492
$Ar^{11+} + Si$	Sputtering	160-400  keV	Exp	1492
$Ar^{13+} + Si$	Sputtering	160-400  keV	Exp	1492
$Ar^{15+} + Si$	Sputtering	160-400  keV	Exp	1492
$Ar^{16+} + Si$	Sputtering	$160-400 {\rm ~keV}$	Exp	1492
$Ar^+ + Al_2O_3$	Sputtering	20  keV	Exp	1493
$Ar^+ + MgO$	Sputtering	20  keV	Exp	1493
$Ar^+ + C$	Secondary Electron Emission	30  keV	Exp	1495
$Ar^{11+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	Exp	1496
$Ar^{17+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	Exp	1496
$Ar^+ + H_2O$	Reflection	15  keV	Exp	1499
$Ar^+ + CH_4$	Reflection	15  keV	Exp	1499
$Ar^+ + NH_3$	Reflection	15  keV	Exp	1499
$Ar^+ + H_2O$	Sputtering	15  keV	Exp	1499
$Ar^+ + CH_4$	Sputtering	15  keV	Exp	1499
$Ar^+ + NH_3$	Sputtering	15  keV	Exp	1499
$Ar^+ + Al$	Secondary Electron Emission	130-1000  eV	$\mathrm{Th}$	1502
Ar + Al	Reflection	1.2-12  keV	$\mathrm{Th}$	1517
Ar + Al	Secondary Electron Emission	1.2-12  keV	$\mathrm{Th}$	1517
$Ar^{16+} + Be$	Surface Interactions	204-450  keV	Exp	1523
$Ar^{17+} + Be$	Surface Interactions	204-450  keV	$\operatorname{Exp}$	1523
$Ar^{18+} + Be$	Surface Interactions	204-450  keV	$\operatorname{Exp}$	1523
$Ar^{16+} + Be$	Neutraliz., Ioniz., Dissoc.	$204-450 { m keV}$	$\operatorname{Exp}$	1523
$Ar^{17+} + Be$	Neutraliz., Ioniz., Dissoc.	$204-450 { m keV}$	$\operatorname{Exp}$	1523
$Ar^{18+} + Be$	Neutraliz., Ioniz., Dissoc.	204-450  keV	$\operatorname{Exp}$	1523
Ar + Si	Sputtering	11  keV	$\operatorname{Exp}$	1527
$Ar^{2+} + Au$	Reflection	4-5  keV	Exp	1546
$Ar^{2+} + RbI$	Reflection	4-5  keV	Exp	1546
$Ar^{11+} + Au$	Reflection	4-5  keV	Exp	1546
$Ar^{11+} + RbI$	Reflection	4-5 keV	Exp	1546
$Ar^{2+} + Au$	Neutraliz., Ioniz., Dissoc.	4-5 keV	Exp	1546
$Ar^{2+} + RbI$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp	1546
$Ar^{11+} + Au$	Neutraliz., Ioniz., Dissoc.	4-5 keV	Exp	1546
$Ar^{++} + RbI$	Neutraliz., Ioniz., Dissoc.	4-5 keV	Exp	1546
Ar' + C	Sputtering	100-300 eV	Exp	1547
Ar' + Al	Secondary Electron Emission	130-1000 eV	In F/T	1569
Ar' + Si $Ar^+ + T$	Sputtering	20-30 KeV	E/1 E/T	1575
Ar' + 11 $Ar^{17+} + A1$	Sputtering Neutralia Lonia Diagon	20-30  KeV	E/I Th	1575
$Ar^{++} + Ar$	Adaption Decemtion	$v=10^{\circ} - 1$ a.u.	1 fl Furr	10/0
$\mathbf{K} + \mathbf{N}\mathbf{a}$ $\mathbf{K} + \mathbf{S}\mathbf{O}$	Adsorption, Desorption	300 deg K; 200 eV	Exp	1417
$\mathbf{K} + \mathbf{SIO}_2$	Surface Interactions	$10 \log K$ ; 200 eV	Exp Th	1417
$re^{+} + re$	Surface interactions	10 KeV 55 200 MoV	I II Furp	1402
$\mathbf{N}^{+} + \mathbf{A}^{-}_{2}\mathbf{O}_{3}$ $\mathbf{N}^{+}_{3} + \mathbf{S}^{+}_{3}\mathbf{N}_{3}$	Sputtering	55-200 MeV	Exp	1404
$\mathbf{N}_{i}^{+} + \mathbf{S}_{i31N4}$ $\mathbf{N}_{i}^{+} + \mathbf{T}_{i}^{-} \mathbf{\Omega}_{a}$	Sputtering	55-200 MeV	Exp Free	1404
$\mathbf{N}_{i}^{+} \pm \mathbf{S}_{i}^{-}$	Sputtering	55-200 MeV	Exp Free	1404
$\mathbf{N}_{i}^{+} \perp \mathbf{S}_{r} \mathbf{T}_{i}^{0} \mathbf{O}_{r}$	Sputtering	55-200 MeV	Exp	1404
$\mathbf{N}_{i}^{+} \perp \mathbf{M}_{0} \mathbf{\Omega}$	Sputtering	55-200 MeV	Exp	1/18/
$\mathrm{Ni}^+ \pm \mathrm{Zr}\Omega_2$	Sputtering	55-200 MeV	Exp	1/18/
$Ni^+ + \Delta IN$	Sputtering	55-200 MeV	Evn	1484
$Ni^+ + CeO_2$	Sputtering	55-200 MeV	Evn	1/18/
$Ni^+ + ZnO$	Sputtering	55-200 MeV	Exp	1484
	Spanner	00 A00 MTO M	цть	<b>T</b> IOI

$Ni^+ + Y_2O_3$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$	1484
$Ni^+ + MgAl_2O_4$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Ni^{14+} + C$	Secondary Electron Emission	$20-100 { m MeV/u}$	Exp	1494
$Ni^{19+} + C$	Secondary Electron Emission	20-100 MeV/u	Exp	1494
$Kr^+ + Al$	Sputtering	20-160  keV	$\operatorname{Exp}$	1383
$ m Kr^+ + Be$	Surface Interactions	5  keV	$\operatorname{Exp}$	1399
$ m Kr^+ + BeO$	Surface Interactions	5  keV	$\operatorname{Exp}$	1399
$ m Kr^+ + Be$	Sputtering	5  keV	$\operatorname{Exp}$	1399
$ m Kr^+ + BeO$	Sputtering	5  keV	$\operatorname{Exp}$	1399
$Kr^+ + Al$	Secondary Electron Emission	1-8  keV	$\operatorname{Exp}$	1407
$Kr^+ + Al$	Secondary Electron Emission	474  keV	$\mathrm{Th}$	1489
$\mathrm{Kr}^{32+} + \mathrm{C}$	Secondary Electron Emission	20-100  MeV/u	$\operatorname{Exp}$	1494
$Kr^{34+} + C$	Secondary Electron Emission	20-100  MeV/u	$\operatorname{Exp}$	1494
$Ag^{25+} + LiF$	Sputtering	$120 { m MeV}$	$\operatorname{Exp}$	1483
$I^{34+} + Si$	Surface Interactions	$119-186 \ {\rm keV}$	$\operatorname{Exp}$	1443
$I_{35+}^{35+} + Si$	Surface Interactions	119-186  keV	$\operatorname{Exp}$	1443
$I^{30+} + Si$	Surface Interactions	119-186  keV	Exp	1443
$\mathbf{I}^{3i+}_{2i+} + \mathbf{Si}_{2i+}$	Surface Interactions	119-186 keV	Exp	1443
$\mathbf{I}^{30+} + \mathbf{Si}$	Surface Interactions	119-186 keV	Exp	1443
$I^{39+} + Si$	Surface Interactions	119-186 keV	Exp	1443
$I^{40+} + Si$	Surface Interactions	119-186 keV	Exp	1443
$\mathbf{I}^{\pm 1+} + \mathbf{S}\mathbf{i}$	Surface Interactions	119-186 keV	Exp	1443
$I^{42+} + S_1$	Surface Interactions	119-186 keV	Exp	1443
$1^{10+} + S_1$ $1^{44+} + S_1$	Surface Interactions	119-186 keV	Exp	1443
$1^{11+} + S_1$ $1^{45+} + S_2^{*}$	Surface Interactions	119-186 keV	Exp	1443
$1^{46+} + 51$ $1^{46+} + 5$	Surface Interactions	119-180 KeV	Exp	1443 1442
$1^{-+} + 51$ $1^{47+} + 5!$	Surface Interactions	119-180 KeV	Exp	1443 1442
$1^{++} + 51$ $1^{+8+} + 6^{+}$	Surface Interactions	119-180 KeV	Exp E-m	1443 1449
$1^{49+} + S1$	Surface Interactions	119-100 KeV 110-186 keV	Exp	1445
$1^{50+} + 51^{50+}$	Surface Interactions	119-100 KeV 110-186 keV	Exp	1445
$\mathbf{I}^{51+} \perp \mathbf{S}_{\mathbf{i}}$	Surface Interactions	119-180 keV 119-186 keV	Exp Exp	1440
$I^{52+} + Si$	Surface Interactions	119-186 keV	Exp	1443 1443
$I^{53+} + Si$	Surface Interactions	119-186 keV	Exp	1443
$I^{34+} + Si$	Neutraliz Ioniz Dissoc	119-186 keV	Exp	1443
$I^{35+} + Si$	Neutraliz., Ioniz., Dissoc.	119-186 keV	Exp	1443
$I^{36+} + Si$	Neutraliz., Ioniz., Dissoc.	119-186 keV	Exp	1443
$I^{37+} + Si$	Neutraliz., Ioniz., Dissoc.	119-186 keV	Exp	1443
$\mathbf{I}^{38+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	119-186 keV	Exp	1443
$I^{39+} + Si$	Neutraliz., Ioniz., Dissoc.	$119-186 { m ~keV}$	Exp	1443
$\mathbf{I}^{40+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	$119-186 { m ~keV}$	Exp	1443
$\mathbf{I}^{41+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	$119-186 { m keV}$	Exp	1443
$\mathbf{I}^{42+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	$119-186 { m ~keV}$	Exp	1443
$\mathbf{I}^{43+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	$119-186 { m ~keV}$	$\operatorname{Exp}$	1443
$\mathbf{I}^{44+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	119-186 $\rm keV$	$\operatorname{Exp}$	1443
$\mathbf{I}^{45+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	$119-186 { m keV}$	$\operatorname{Exp}$	1443
$\mathbf{I}^{46+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	$119-186 { m keV}$	$\operatorname{Exp}$	1443
$\mathbf{I}^{47+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	119-186 $\rm keV$	$\operatorname{Exp}$	1443
$\mathbf{I}^{48+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	$119-186 { m ~keV}$	$\operatorname{Exp}$	1443
$I_{50+}^{49+} + Si$	Neutraliz., Ioniz., Dissoc.	119-186 ${\rm keV}$	Exp	1443
$\mathbf{I}_{1}^{\mathrm{b0+}} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	119-186 $\rm keV$	$\operatorname{Exp}$	1443
$\mathbf{I}^{\text{D1+}} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	$119-186 { m keV}$	Exp	1443
$1^{32+} + Si$	Neutraliz., Ioniz., Dissoc.	119-186 keV	Exp	1443
$\mathbf{I}^{55+} + \mathbf{Si}$	Neutraliz., Ioniz., Dissoc.	119-186 keV	Exp	1443
$\mathbf{I}^{50\pm} + \mathbf{Si}$	Sputtering	150 keV	Exp	1526
$\mathbf{I}^{\mathrm{ou+}} + \mathbf{SiO}_2$	Sputtering	150  keV	Exp	1526
$Xe^+ + Mo$	Sputtering	30-125  eV	Exp	1378

$Xe^+ + Ta$	Sputtering	30-125  eV	Exp	1378
$Xe^+ + W$	Sputtering	30-125  eV	Exp	1378
$Xe^+ + PERT$	Sputtering	1-5  keV	Exp	1380
$Xe^+ + Au$	Sputtering	$0.1-200 {\rm ~keV}$	Th	1381
$Xe^{12+} + C$	Secondary Electron Emission	2 keV/amu	$\operatorname{Exp}$	1386
$Xe^{12+} + Si$	Secondary Electron Emission	2 keV/amu	$\operatorname{Exp}$	1386
$Xe^{12+} + Au$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{12+} + SiO_2$	Secondary Electron Emission	2 keV/amu	$\operatorname{Exp}$	1386
$Xe^{20+} + C$	Secondary Electron Emission	2 keV/amu	$\operatorname{Exp}$	1386
$Xe^{20+} + Si$	Secondary Electron Emission	2 keV/amu	$\operatorname{Exp}$	1386
$Xe^{20+} + Au$	Secondary Electron Emission	2 keV/amu	$\operatorname{Exp}$	1386
$\mathbf{X}\mathbf{e}^{20+} + \mathbf{SiO}_2$	Secondary Electron Emission	2 keV/amu	$\operatorname{Exp}$	1386
$Xe^{24+} + C$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{24+} + Si$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{24+} + Au$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{24+} + SiO_2$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{26+} + C$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{26+} + Si$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{26+} + Au$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{26+} + SiO_2$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{28+} + C$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{28+} + Si$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{28+} + Au$	Secondary Electron Emission	2 keV/amu	Exp	1386
$\mathrm{Xe}^{28+}+\mathrm{SiO}_2$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{30+} + C$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{30+} + Si$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{30+} + Au$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{30+} + SiO_2$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{34+} + C$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{34+} + Si$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{34+} + Au$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{34+} + SiO_2$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{38+} + C$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{38+} + Si$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{38+} + Au$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Xe^{38+} + SiO_2$	Secondary Electron Emission	2 keV/amu	$\operatorname{Exp}$	1386
$Xe^{40+} + C$	Secondary Electron Emission	2 keV/amu	$\operatorname{Exp}$	1386
$Xe^{40+} + Si$	Secondary Electron Emission	2 keV/amu	$\operatorname{Exp}$	1386
$Xe^{40+} + Au$	Secondary Electron Emission	2 keV/amu	Exp	1386
$\mathbf{X}\mathbf{e}^{40+} + \mathbf{S}\mathbf{i}\mathbf{O}_2$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{44+} + C$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{44+} + Si$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{44+} + Au$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{44+} + SiO_2$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{40+} + C$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{40+} + Si$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{40+} + Au$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{50} + SiO_2$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Xe^{52+} + C$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Ae^{2} + Si$ V 52+ + A	Secondary Electron Emission	2  keV/amu	Exp	1386
$Ae^{2} + Au$ V 52 + CO	Secondary Electron Emission	2  keV/amu	Exp	1386
$\mathbf{A}\mathbf{e}^{2}$ + $\mathbf{S}\mathbf{I}\mathbf{U}_2$	Secondary Electron Emission	2 keV/amu 20 h-W	Exp E-	1386
$Ae^{+} + Si$ $V_{-}6^{+} + U_{-} + C^{+}$	Desorption	JU KEV	Exp E-	1397
$\mathbf{A}\mathbf{e}^{*} + \mathbf{H} + \mathbf{S}\mathbf{I}$ $\mathbf{V}_{-}10^{+} + \mathbf{S}^{*}$	Desorption	JU KEV	Exp E-	1397
$Ae^{-+} + Si$ $V = 10^{+} + U + C^{+}$	Desorption	JU KEV	Exp E-	1397
$Ae^{-+} + H + Si$ $V_{-}11^{+} + S^{+}$	Desorption	JU KEV	Exp E-	1397
$Ae^{++} + Si$	Desorption	JU KEV	Exp	1397

$Xe^{11+} + H + Si$	Desorption	30  keV	Exp	1397
$Xe^{14+} + Si$	Desorption	30  keV	Exp	1397
$Xe^{14+} + H + Si$	Desorption	30  keV	Exp	1397
$Xe^{19+} + Si$	Desorption	30  keV	Exp	1397
$Xe^{19+} + H + Si$	Desorption	30  keV	Exp	1397
$Xe^{20+} + Si$	Desorption	30  keV	Exp	1397
$Xe^{20+} + H + Si$	Desorption	30  keV	Exp	1397
$Xe^{22+} + Si$	Desorption	30  keV	Exp	1397
$Xe^{22+} + H + Si$	Desorption	30  keV	Exp	1397
$Xe^{6+} + Si$	Sputtering	30  keV	Exp	1397
$Xe^{6+} + H + Si$	Sputtering	30  keV	Exp	1397
$Xe^{10+} + Si$	Sputtering	30  keV	Exp	1397
$Xe^{10+} + H + Si$	Sputtering	30  keV	Exp	1397
$Xe^{11+} + Si$	Sputtering	30  keV	Exp	1397
$Xe^{11+} + H + Si$	Sputtering	30  keV	Exp	1397
$Xe^{14+} + Si$	Sputtering	30  keV	Exp	1397
$Xe^{14+} + H + Si$	Sputtering	30  keV	Exp	1397
$Xe^{19+} + Si$	Sputtering	30  keV	Exp	1397
$Xe^{19+} + H + Si$	Sputtering	30  keV	Exp	1397
$Xe^{20+} + Si$	Sputtering	30  keV	Exp	1397
$Xe^{20+} + H + Si$	Sputtering	30  keV	Exp	1397
$Xe^{22+} + Si$	Sputtering	30  keV	Exp	1397
$Xe^{22+} + H + Si$	Sputtering	30  keV	Exp	1397
$Xe^{26+} + Si$	Desorption	520-1000  keV	Exp	1424
$\mathbf{X}\mathbf{e}^{26+} + \mathbf{H}_2 + \mathbf{S}\mathbf{i}$	Desorption	520-1000  keV	Exp	1424
$Xe^{34+} + Si$	Desorption	520-1000  keV	$\operatorname{Exp}$	1424
$\mathbf{X}\mathbf{e}^{34+} + \mathbf{H}_2 + \mathbf{S}\mathbf{i}$	Desorption	520-1000  keV	$\operatorname{Exp}$	1424
$Xe^{44+} + Si$	Desorption	520-1000  keV	$\operatorname{Exp}$	1424
$\mathbf{X}\mathbf{e}^{44+} + \mathbf{H}_2 + \mathbf{S}\mathbf{i}$	Desorption	520-1000  keV	$\operatorname{Exp}$	1424
$\mathbf{X}\mathbf{e}^{50+} + \mathbf{S}\mathbf{i}$	Desorption	520-1000  keV	$\operatorname{Exp}$	1424
$\mathbf{X}\mathbf{e}^{30+} + \mathbf{H}_2 + \mathbf{S}\mathbf{i}$	Desorption	520-1000 keV	Exp	1424
$Xe^{26+} + Si$	Sputtering	520-1000 keV	Exp	1424
$Xe^{20+} + H_2 + Si$	Sputtering	520-1000 keV	Exp	1424
$Ae^{31} + Si$	Sputtering	520-1000 KeV	Exp	1424
$Ae^{31} + H_2 + Si$	Sputtering	520-1000 KeV	Exp	1424
$Ae^{11} + Si$	Sputtering	520-1000 KeV	Exp	1424
$Ae^{11} + H_2 + SI$	Sputtering	520-1000 KeV	Exp	1424
$X_{-50+} + S_{-50+}$	Sputtering	520-1000 KeV	Exp E	1424
$\mathbf{X}\mathbf{e}^{+} + \mathbf{H}_2 + \mathbf{S}\mathbf{I}$	Neutroliz Ioniz Dissoe	0.005.0.01 e.v	ехр ть	1424
$\mathbf{X}\mathbf{e} + \mathbf{A}\mathbf{I}$	Neutraliz, Ioniz, Dissoc.	0.005 - 0.01 a.u.	111 Th	1441 1/1
$\mathbf{X}\mathbf{e} + \mathbf{A}\mathbf{i}$ $\mathbf{X}\mathbf{e} + \mathbf{S}\mathbf{i}$	Neutraliz, Ioniz, Dissoc.	300 dog K	1 II Evn	1441 1/77
Xe + Si	Sputtering	300 deg K	Exp	1477
$Xe^+ + Al_2O_2$	Sputtering	55-200 MeV	Exp	1484
$Xe^+ + Si_2N_4$	Sputtering	55-200 MeV	Exp	1484
$Xe^+ + TiO_2$	Sputtering	55-200 MeV	Exp	1484
$Xe^+ + SiO_2$	Sputtering	55-200 MeV	Exp	1484
$Xe^+ + SrTiO_3$	Sputtering	55-200 MeV	Exp	1484
$Xe^+ + MgO$	Sputtering	55-200 MeV	Exp	1484
$Xe^+ + ZrO_2$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Xe^+ + AlN$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Xe^+ + CeO_2$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Xe^+ + ZnO^-$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Xe^+ + Y_2O_3$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Xe^+ + MgAl_2O_4$	Sputtering	$55-200 { m MeV}$	Exp	1484
$Xe^{34+} + C$	Secondary Electron Emission	35-400  keV	Exp	1488
$Xe^{35+} + C$	Secondary Electron Emission	35-400  keV	Exp	1488

$Xe^{36+} + C$	Secondary Electron Emission	35-400  keV	$\operatorname{Exp}$	1488
$Xe^{37+} + C$	Secondary Electron Emission	35-400  keV	$\operatorname{Exp}$	1488
$Xe^{38+} + C$	Secondary Electron Emission	35-400  keV	$\operatorname{Exp}$	1488
$Xe^{39+} + C$	Secondary Electron Emission	35-400  keV	$\operatorname{Exp}$	1488
$Xe^{40+} + C$	Secondary Electron Emission	35-400  keV	$\operatorname{Exp}$	1488
$Xe^{41+} + C$	Secondary Electron Emission	35-400  keV	$\operatorname{Exp}$	1488
$Xe^{42+} + C$	Secondary Electron Emission	35-400  keV	$\operatorname{Exp}$	1488
$Xe^{43+} + C$	Secondary Electron Emission	35-400  keV	$\operatorname{Exp}$	1488
$Xe^{44+} + C$	Secondary Electron Emission	35-400  keV	$\operatorname{Exp}$	1488
$Xe^{26+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$	1496
$Xe^{32+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$	1496
$Xe^{36+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$	1496
$Xe^{40+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$	1496
$Xe^{44+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$	1496
$Xe^{48+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$	1496
$Xe^{50+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$	1496
Xe + Au	Neutraliz., Ioniz., Dissoc.	$300 \deg K$	$\operatorname{Exp}$	1516
$\mathbf{X}\mathbf{e}^{10+} + \mathbf{U}\mathbf{O}_2$	Secondary Electron Emission	$0.03-81 \mathrm{~keV}$	$\operatorname{Exp}$	1520
$\mathbf{X}\mathbf{e}^{15+} + \mathbf{U}\mathbf{O}_2$	Secondary Electron Emission	$0.03-81 \mathrm{~keV}$	$\operatorname{Exp}$	1520
$\mathbf{X}\mathbf{e}^{25+} + \mathbf{U}\mathbf{O}_2$	Secondary Electron Emission	$0.03-81 \mathrm{~keV}$	$\operatorname{Exp}$	1520
$Xe^{10+} + UO_2$	Sputtering	$0.03-81 \mathrm{~keV}$	$\operatorname{Exp}$	1520
$\mathrm{Xe}^{15+} + \mathrm{UO}_2$	Sputtering	$0.03-81 \mathrm{~keV}$	$\operatorname{Exp}$	1520
$\mathrm{Xe}^{25+} + \mathrm{UO}_2$	Sputtering	$0.03-81 \mathrm{~keV}$	$\operatorname{Exp}$	1520
$Xe^{28+} + Be$	Surface Interactions	204-450  keV	$\operatorname{Exp}$	1523
$Xe^{29+} + Be$	Surface Interactions	204-450  keV	$\operatorname{Exp}$	1523
$Xe^{30+} + Be$	Surface Interactions	$204-450 {\rm ~keV}$	$\operatorname{Exp}$	1523
$Xe^{28+} + Be$	Neutraliz., Ioniz., Dissoc.	204-450  keV	$\operatorname{Exp}$	1523
$Xe^{29+} + Be$	Neutraliz., Ioniz., Dissoc.	204-450  keV	$\operatorname{Exp}$	1523
$Xe^{30+} + Be$	Neutraliz., Ioniz., Dissoc.	204-450  keV	$\operatorname{Exp}$	1523
$Xe^{10+} + UO_2$	Sputtering	8-81  keV	$\operatorname{Exp}$	1543
$Xe^{15+} + UO_2$	Sputtering	8-81  keV	$\operatorname{Exp}$	1543
$Xe^{25+} + UO_2$	Sputtering	8-81 keV	$\operatorname{Exp}$	1543
$Xe^{15+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	$\operatorname{Exp}$	1573
$Xe^{10+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp	1573
$Xe^{10+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp	1573
$Xe^{10+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp	1573
$Xe^{27+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp	1573
$Xe^{27+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp	1573
$Xe^{27+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp	1573
$Xe^{28+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp	1573
$\mathbf{X}\mathbf{e}^{28+} + \mathbf{A}\mathbf{I}$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp	1573
$Ae^{-2} + Si$ $Ve^{28+} + N^{2}$	Sputtering	$500 \text{ keV}; 80 - 10^{4} \text{ keV}$	Exp E	1573
$Ae^{-8+} + IN1$ V = 28+ + $O = -28$	Sputtering	$300 \text{ KeV}; 80 - 10^{-1} \text{ KeV}$	Exp E	1573
$Ae^{-3+} + Cu$ $Ve^{31+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^{-10} \text{ keV}$	Exp E-m	1575
$Ae^{31+} + AI$ $Va^{31+} + S$	Sputtering	$300 \text{ keV}; 80 - 10^{-10} \text{ keV}$	Exp E-m	1575
$Ae^{31+} + Si$ $Ve^{31+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^{-10} \text{ keV}$	Exp Evp	1575
$\mathbf{X}\mathbf{e}^{31+} + \mathbf{C}\mathbf{u}$	Sputtering	200  keV; $80 - 10  keV$	Exp	1575
$\mathbf{X}\mathbf{e}^{35+} + \mathbf{A}\mathbf{I}$	Sputtering	200  keV; $80 - 10  keV$	Exp	1575
$\mathbf{X}_{\mathbf{A}}^{35+} \perp \mathbf{S}_{\mathbf{i}}^{\mathbf{i}}$	Sputtering	$300 \text{ keV}, 80 = 10^{4} \text{ keV}$	Exp Evn	1579 1579
$Xe^{35+} \perp Ni$	Sputtering	$300 \text{ keV}, 80 = 10^{4} \text{ keV}$	Exp Evn	1572
$\mathbf{X}\mathbf{e}^{35+} \perp \mathbf{C}\mathbf{u}$	Sputtering	$300 \text{ keV}, 80 = 10^{4} \text{ keV}$	Exp Evn	1572
$Xe^{40+} \pm \Lambda I$	Sputtering	$300 \text{ keV}, 80 - 10^{4} \text{ keV}$	Evn	1572
$\mathbf{X}\mathbf{e}^{40+} + \mathbf{S}\mathbf{i}$	Sputtering	$300 \text{ keV} \cdot 80 = 10^4 \text{ keV}$	Evn	1572
$Xe^{40+} + Ni$	Sputtering	$300 \text{ keV} \cdot 80 - 10^4 \text{ keV}$	Evn	1573
$Xe^{40+} + Cu$	Sputtering	$300 \text{ keV} \cdot 80 - 10^4 \text{ keV}$	Exp	1573
$Xe^{44+} + Al$	Sputtering	$300 \text{ keV} \cdot 80 - 10^4 \text{ keV}$	Exp	1573
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$Xe^{44+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	$\operatorname{Exp}$	1573
$Xe^{44+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp	1573
$Xe^{44+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp	1573
$Cs^+ + TiH_2$	Sputtering	14.5  keV	Exp	1438
$Cs^+ + TiD_2$	Sputtering	14.5  keV	Exp	1438
$Cs^+ + H_2 + H$	Sputtering	14.5  keV	Exp	1438
$\mathbf{W} + \mathbf{W}$	Sputtering	0.1-5.0 keV	Th	1470
$\Delta u^{52+} + C$	Secondary Electron Emission	2 keV/amu	Evn	1386
$Au^{52+} \perp Si$	Secondary Electron Emission	2  keV/amu	Evn	1386
$Au^{52+} + Au$	Secondary Electron Emission	2  keV/amu	Exp Exp	1386
Au $+$ Au + Au $+$ Au $+$ Au +	Secondary Electron Emission	2 keV/amu	Emp	1200
$Au^{+} + SiO_{2}$	Secondary Electron Emission	2  kev/amu	Ехр Б	1300
$Au^{58+} + C$	Secondary Electron Emission	2  kev/amu	ьхр Б	1300
$Au^{33} + 51$	Secondary Electron Emission	2 kev/amu	Exp	1380
$Au^{50+} + Au$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Au^{60+} + SiO_2$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Au^{64+} + C$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Au^{04+} + Si$	Secondary Electron Emission	2 keV/amu	Exp	1386
$Au^{64+} + Au$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Au^{64+} + SiO_2$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Au^{69+} + C$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Au^{69+} + Si$	Secondary Electron Emission	2  keV/amu	$\operatorname{Exp}$	1386
$Au^{69+} + Au$	Secondary Electron Emission	2  keV/amu	Exp	1386
$\mathbf{A}\mathbf{u}^{69+} + \mathbf{SiO}_2$	Secondary Electron Emission	2  keV/amu	Exp	1386
$Au^+ + ZnS$	Sputtering	$2 { m MeV}$	Exp	1396
Au + Au	Sputtering	0.16-64  keV	$\mathrm{Th}$	1469
$Au^{24+} + Al$	Secondary Electron Emission	11 MeV/u	Exp	1518
$Pb^{4+} + Si$	Sputtering	160-400  keV	Exp	1492
$Pb^{20+} + Si$	Sputtering	160-400  keV	Exp	1492
$Pb^{24+} + Si$	Sputtering	160-400  keV	Exp	1492
$Pb^{30+} + Si$	Sputtering	$160-400 {\rm ~keV}$	Exp	1492
$Pb^{32+} + Si$	Sputtering	$160-400 {\rm ~keV}$	Exp	1492
$Pb^{35+} + Si$	Sputtering	$160-400 {\rm ~keV}$	Exp	1492
$h\nu + H_2O$	Desorption	0.32-0.42  eV	Exp	1372
$h\nu + Si$	Desorption	98-690  eV	Exp	1373
$h\nu + TiO_2$	Desorption	98-690  eV	Exp	1373
$h\nu + SiO_2$	Desorption	98-690  eV	Exp	1373
$h\nu + H_2O + Si$	Desorption	98-690  eV	Exp	1373
$h\nu + H_2O + SiO_2$	Desorption	98-690  eV	Exp	1373
$h\nu + Pt$	Desorption		$\mathrm{Th}$	1374
$h\nu + NO + Pt$	Desorption		$\mathrm{Th}$	1374
$h\nu + C$	Desorption	150-600  eV	Exp	1375
$h\nu + H + C$	Desorption	150-600  eV	Exp	1375
$h\nu + D + C$	Desorption	150-600  eV	Exp	1375
$h\nu + RbI$	Desorption	4-6 eV	Exp	1376
$h\nu + Ne$	Desorption	16-22  eV	Exp	1377
$h\nu + Ar$	Desorption	16-22  eV	Exp	1377
$h\nu + Kr$	Desorption	16-22  eV	Exp	1377
$h\nu + Ti$	Secondary Electron Emission	0-600  eV; 4.1  keV	Exp	1379
$h\nu + V$	Secondary Electron Emission	0-600  eV; 4.1  keV	Exp	1379
$h\nu + Zr$	Secondary Electron Emission	0-600  eV; 4.1  keV	Exp	1379
$h\nu + MgO$	Desorption	4.7  eV	$\bar{\rm E/T}$	1418
$h\nu + C$	Desorption	$3.5  \mathrm{eV}$	Exp	1419
$h\nu + NO + C$	Desorption	$3.5 \ \mathrm{eV}$	Exp	1419
$h\nu + Si$	Desorption	108  eV	Exp	1420
$h\nu + O + Si$	Desorption	108  eV	Exp	1420
$h\nu + H_2O + Ne$	Desorption	6-1000  eV	Exp	1421
$h\nu + H_2O + Ar$	Desorption	6-1000  eV	Exp	1421

$h\nu + H_2O + Kr$	Desorption	6-1000  eV	$\operatorname{Exp}$	1421
$h\nu + H_2O + Xe$	Desorption	6-1000  eV	$\operatorname{Exp}$	1421
$h\nu + H_2O$	Desorption	$525-555 \mathrm{eV}$	$\operatorname{Exp}$	1422
$h\nu + D_2O$	Desorption	$525-555 \mathrm{eV}$	$\operatorname{Exp}$	1422
$h\nu + SiO_2$	Desorption	$390\text{-}450~\mathrm{eV}$	$\operatorname{Exp}$	1423
$h\nu + N_2O + SiO_2$	Desorption	$390\text{-}450~\mathrm{eV}$	$\operatorname{Exp}$	1423
e + Ti	Secondary Electron Emission	0-600  eV; 4.1  keV	$\operatorname{Exp}$	1379
e + V	Secondary Electron Emission	0-600  eV; 4.1  keV	$\operatorname{Exp}$	1379
e + Zr	Secondary Electron Emission	0-600  eV; 4.1  keV	$\operatorname{Exp}$	1379
e + BeO	Secondary Electron Emission	0-10  keV	E/T	1389
$e + SiO_2$	Secondary Electron Emission	0-10  keV	E/T	1389
e + LiF	Secondary Electron Emission	0-10  keV	E/T	1389
$\mathbf{e} + \mathbf{BaF}_2$	Secondary Electron Emission	0-10  keV	E/T	1389
e + MgO	Secondary Electron Emission	0-10  keV	E/T	1389
e + KCl	Secondary Electron Emission	0-10  keV	E/T	1389
e + KBr	Secondary Electron Emission	0-10  keV	E/T	1389
e + KI	Secondary Electron Emission	0-10  keV	E/T	1389
e + Al	Reflection	300-2000  eV	$\mathrm{Th}$	1405
e + Au	Reflection	300-2000  eV	$\mathrm{Th}$	1405
e + C	Secondary Electron Emission	1-30  keV	$\operatorname{Exp}$	1414
e + Ga	Secondary Electron Emission	1-30  keV	$\operatorname{Exp}$	1414
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Desorption	100  eV	$\operatorname{Exp}$	1415
e + LiF	Desorption	300-600  eV	$\operatorname{Exp}$	1416
e + NaCl	Desorption	300-600  eV	$\operatorname{Exp}$	1416
$\mathbf{e} + \mathbf{N}\mathbf{a} + \mathbf{SiO}_2$	Desorption	300  deg K; 200  eV	$\operatorname{Exp}$	1417
$\mathbf{e} + \mathbf{K} + \mathbf{SiO}_2$	Desorption	300  deg K; 200  eV	$\operatorname{Exp}$	1417
$\mathbf{e} + \mathbf{B}\mathbf{a} + \mathbf{SiO}_2$	Desorption	300  deg K; 200  eV	$\operatorname{Exp}$	1417
e + Ge	Sputtering	$0-150   \mathrm{eV}$	$\operatorname{Exp}$	1430
e + W	Sputtering	$0-150   \mathrm{eV}$	$\operatorname{Exp}$	1430
e + Cs + Ge	Sputtering	$0-150   \mathrm{eV}$	$\operatorname{Exp}$	1430
e + Cs + W	Sputtering	$0-150   \mathrm{eV}$	$\operatorname{Exp}$	1430
e + Al	Reflection	200-1000  eV	Th	1463
e + Cu	Reflection	200-1000  eV	Th	1463
e + Ag	Reflection	200-1000 eV	Th	1463
e + Au	Reflection	200-1000 eV	Th	1463
e + Au	Reflection	100-4000 eV	Th	1501
e + Si	Desorption	20-30 eV	Exp	1541
e + Cl	Desorption	20-30 eV	Exp	1541
e + Cl + Si	Desorption	20-30 eV	Exp	1541
$e + SiO_2$	Reflection	250-1000 eV	Th	1566
e + TiN	Secondary Electron Emission	0.5-5.0 keV	Exp	1571
$e + Al_2O_3$	Secondary Electron Emission	0.5-5.0 keV	Exp	1572
e + TiN	Secondary Electron Emission	0.5-5.0 KeV	Exp	1572
$H_2 + C$	Sputtering	10-250 eV	Exp	1368
$H_2 + UU_2$	Trapping, Detrapping	700 deg K	Exp	1385
$\mathbf{H}_2$ + SI	Surface Interactions	210-420 keV	Exp	1392
$\mathbf{H}_2 + \mathbf{W}$	Neutraliz., Ioniz., Dissoc.	4.5 eV	Exp	1432
$H_2 + C$	Sputtering	5-100 eV	Exp	1447
$n_2 + U$	Trapping, Detrapping	1  KeV	Exp E-	1453
$\mathbf{n}_2 + \mathbf{w}$ $\mathbf{u} + \mathbf{p}$	Trapping, Detrapping	1  KeV	Exp E-	1453
$\mathbf{n}_{2}$ + <b>B</b>	Trapping, Detrapping	1  KeV	Exp	1454
$n_2 + C$	Trapping, Detrapping	1 - 1.3  KeV	Exp	1455
$n_2 + 31$ $n_2 + r_2$	Trapping, Detrapping	1-1.3 KeV	Exp E	1400
$\mathbf{n}_2$ + <b>F</b> e	Trapping, Detrapping	1. ( KEV 1. 7 looV	Exp E-	1456
$n_2 + 33$ $n_1 + 1$ $n_7$	Trapping, Detrapping	1. ( KEV 12. 20. keV	Exp E	1400
$\mathbf{n}_2 + \mathbf{w}$ $\mathbf{u} + \mathbf{v}$	Trapping, Detrapping	12-20  KeV	Exp E-	1457
$\mathbf{n}_2 + \mathbf{U}$	sputtering	90-9000 ev	Exp	1408

$H_2 + C$	Chemical Reactions	$7.5-60 \mathrm{~eV}$	$\mathrm{Th}$	1468
$H_2 + C$	Sputtering	7.5-60  eV	$\mathrm{Th}$	1468
$\mathbf{H}_{2}^{+} + \mathbf{A}\mathbf{l}_{2}\mathbf{O}_{3}$	Reflection	390-1210  eV	Exp	1480
$\mathbf{H}_{2}^{+} + \mathbf{C}$	Sputtering	5-300  eV	Exp	1528
$H_2 + C$	Sputtering	7.5-60  eV	Exp	1530
$\mathbf{H}_{2}^{+} + \mathbf{W}$	Reflection	30-1000  eV	Exp	1532
$H_2 + Nb$	Adsorption, Desorption		Exp	1538
$\mathbf{H}_{2}^{+} + \mathbf{C}$	Trapping, Detrapping	200  eV	Exp	1540
$H_2 + Pd$	Reflection	$100-150 { m MeV}$	E/T	1544
$\mathbf{H}_{2}^{+} + \mathbf{C}$	Sputtering	3-13  eV	Exp	1553
$\mathbf{H}_{2}^{+} + \mathbf{C}$	Sputtering	5-180  eV	E/T	1557
$\mathbf{H}_{2}^{+} + \mathbf{W}$	Trapping, Detrapping	76  eV	Exp	1559
$H_3^+ + H_2O$	Sputtering	15  keV	Exp	1384
$H_3^+ + C$	Sputtering	5-100  eV	Exp	1447
$\mathbf{H}_{3}^{+} + \mathbf{W}$	Sputtering	9-12  keV	Exp	1459
$\mathbf{H}_{3}^{+} + \mathbf{W}$	Trapping, Detrapping	9-12  keV	Exp	1459
$\mathbf{H}_{3}^{+} + \mathbf{H}_{2}\mathbf{O}$	Reflection	15  keV	Exp	1499
$\mathbf{H}_{3}^{+} + \mathbf{C}\mathbf{H}_{4}$	Reflection	15  keV	Exp	1499
$\mathbf{H}_{3}^{+} + \mathbf{N}\mathbf{H}_{3}$	Reflection	15  keV	Exp	1499
$\mathbf{H}_{3}^{+} + \mathbf{H}_{2}\mathbf{O}$	Sputtering	15  keV	Exp	1499
$\mathbf{H}_{3}^{+} + \mathbf{C}\mathbf{H}_{4}$	Sputtering	15  keV	Exp	1499
$\mathbf{H}_{3}^{+} + \mathbf{N}\mathbf{H}_{3}$	Sputtering	15  keV	Exp	1499
$H_3^+ + C$	Sputtering	$5-300   \mathrm{eV}$	Exp	1528
$H_3^+ + C$	Sputtering	1-1.3  eV	Exp	1529
$\mathbf{H}_{3}^{+} + \mathbf{W}$	Reflection	30-1000  eV	Exp	1532
$H_3^+ + C$	Sputtering	3-13  eV	Exp	1553
$H_3^+ + C$	Sputtering	5-180  eV	E/T	1557
$\mathbf{H}_{3}^{+} + \mathbf{C}$	Sputtering	30-600  eV	Exp	1561
$\mathbf{D}^+ + \mathbf{W}$	Trapping, Detrapping	20-40  keV	Exp	1370
$D^+ + Ti$	Trapping, Detrapping	1.7-5.0  keV	Exp	1402
$\mathbf{D}^+ + \mathbf{V}$	Trapping, Detrapping	1.7-5.0  keV	Exp	1402
$\mathrm{D^{+}+Cr}$	Trapping, Detrapping	1.7-5.0  keV	Exp	1402
$D^+ + C$	Sputtering	5-100  eV	Exp	1447
$\mathbf{D}^+ + \mathbf{W}$	Trapping, Detrapping	500  eV	Exp	1448
$\mathbf{D}^+ + \mathbf{W}$	Trapping, Detrapping	500  eV	Exp	1449
$\mathbf{D}^+ + \mathbf{C}$	Sputtering	10-1000 eV	$\mathrm{Th}$	1450
$\mathbf{D}^+ + \mathbf{W}$	Trapping, Detrapping	200  eV	Exp	1451
$D^+ + Re$	Trapping, Detrapping	200  eV	Exp	1451
$\mathbf{D}^+ + \mathbf{W}$	Trapping, Detrapping	500  eV	Exp	1452
$\mathbf{D}^+ + \mathbf{C}$	Sputtering	0.2-1.0 keV	$\mathrm{Th}$	1460
$D^+ + Fe$	Sputtering	0.2-1.0 keV	$\mathrm{Th}$	1460
$\mathbf{D}^+ + \mathbf{W}$	Sputtering	0.2-1.0 keV	$\mathrm{Th}$	1460
$D^+ + C$	Sputtering	5-300  eV	Exp	1528
D + C	Sputtering	7.5-60  eV	$\operatorname{Exp}$	1530
$D^+ + Be$	Chemical Reactions	3-10  keV	Exp	1539
$D^+ + C$	Chemical Reactions	3-10  keV	Exp	1539
$D^+ + BeO$	Chemical Reactions	3-10  keV	Exp	1539
$\mathbf{D}^+ + \mathbf{WO}_3$	Chemical Reactions	3-10  keV	Exp	1539
$D^+ + WC$	Chemical Reactions	3-10 keV	Exp	1539
$D^+ + Be$	Trapping, Detrapping	3-10 keV	Exp	1539
$\mathbf{D}^+ + \mathbf{C}$	Trapping, Detrapping	3-10 keV	Exp	1539
$D^+ + BeO$	Trapping, Detrapping	3-10 keV	Exp	1539
$\mathbf{D}^+ + \mathbf{WO}_3$	Trapping, Detrapping	3-10 keV	Exp	1539
$D^+ + WC$	Trapping, Detrapping	3-10 keV	Exp	1539
$\mathbf{D}^+ + \mathbf{C}$	Sputtering	100-300  eV	Exp	1547
$D^+ + C$	Sputtering	30  eV	Exp	1548
$D^+ + SiC$	Sputtering	30  eV	Exp	1548

$\mathbf{D}^+ + \mathrm{TiC}_4$	Sputtering	30  eV	Exp	1548
$\mathbf{D}^+ + \mathbf{V}\mathbf{C}_4$	Sputtering	30  eV	Exp	1548
$\mathbf{D}^+ + \mathbf{W} \mathbf{C}_4$	Sputtering	30  eV	Exp	1548
$\mathbf{D}^+ + \mathbf{Zr}\mathbf{C}_4$	Sputtering	30  eV	Exp	1548
$D^+ + C$	Sputtering	2-5  keV	E/T	1549
$D^+ + C$	Sputtering	10-1000  eV	E/T	1551
$\mathbf{D}^+ + \mathbf{C}$	Sputtering	$1 - 10^4 {\rm eV}$	Exp	1552
$\mathbf{D}^+ + \mathbf{C}$	Sputtering	3-13 eV	Exp	1553
$\mathbf{D}^+ + \mathbf{C}$	Sputtering	1-100 eV	Th	1554
$D^+ + C$	Sputtering	10-150  eV	$\mathrm{Th}$	1555
$D^+ + C$	Surface Interactions	150-1500  eV	Exp	1556
$\mathbf{D}^+ + \mathbf{W}$	Surface Interactions	150-1500  eV	Exp	1556
$D^+ + C$	Trapping, Detrapping	150-1500  eV	Exp	1556
$\mathbf{D}^+ + \mathbf{W}$	Trapping, Detrapping	150-1500  eV	Exp	1556
$\mathbf{D}^+ + \mathbf{C}$	Sputtering	5-180 eV	E/T	1557
$\mathbf{D}^+ + \mathbf{W}$	Trapping, Detrapping	5-30  keV	Exp	1558
$D^+ + Be$	Trapping, Detrapping	1 keV	Exp	1560
$\mathbf{D}_2^+ + \mathbf{C}$	Sputtering	10-250  eV	Exp	1368
$\mathbf{D}_2 + \mathbf{UO}_2$	Trapping, Detrapping	$700 \deg K$	Exp	1385
$\mathbf{D}_2 + \mathbf{LiF}$	Reflection	$300 \deg K$	Exp	1408
$\mathbf{D}_2{}^+ + \mathbf{C}$	Sputtering	5-100 eV	Exp	1447
$\mathbf{D}_2{}^+ + \mathbf{C}$	Trapping, Detrapping	1 keV	Exp	1453
$\mathbf{D}_2^+ + \mathbf{W}$	Trapping, Detrapping	1 keV	Exp	1453
$\mathbf{D}_2{}^+ + \mathbf{W}\mathbf{C}$	Trapping, Detrapping	1  keV	Exp	1453
$\mathbf{D}_2^+ + \mathbf{B}$	Trapping, Detrapping	1 keV	Exp	1454
$\mathbf{D}_2{}^+ + \mathbf{C}$	Trapping, Detrapping	1-1.3  keV	Exp	1455
$\mathbf{D}_2{}^+ + \mathbf{Si}$	Trapping, Detrapping	1-1.3  keV	Exp	1455
$\mathbf{D}_2{}^+ + \mathbf{SiC}$	Trapping, Detrapping	1-1.3  keV	Exp	1455
$\mathbf{D}_2^+ + \mathbf{Fe}$	Trapping, Detrapping	1.7  keV	Exp	1456
$\mathbf{D}_2{}^+ + \mathbf{S}\mathbf{S}$	Trapping, Detrapping	1.7  keV	Exp	1456
$\mathbf{D}_2^+ + \mathbf{W}$	Trapping, Detrapping	12-20  keV	Exp	1457
$\mathbf{D}_2^+ + \mathbf{C}$	Sputtering	90-3000  eV	Exp	1458
$\mathbf{D}_2 + \mathbf{C}$	Chemical Reactions	7.5-60 eV	$\mathrm{Th}$	1468
$\mathbf{D}_2 + \mathbf{C}$	Sputtering	7.5-60  eV	$\mathrm{Th}$	1468
$\mathbf{D}_{2}^{+} + \mathbf{C}$	Sputtering	5-300  eV	$\operatorname{Exp}$	1528
$\mathbf{D}_2 + \mathbf{C}$	Sputtering	7.5-60  eV	$\operatorname{Exp}$	1530
$\mathbf{D}_{2^{+}} + \mathbf{C}$	Sputtering	3-13 eV	Exp	1553
$D_2^+ + C$	Sputtering	5-180  eV	E/T	1557
$\mathbf{D}_2^+ + \mathbf{W}$	Trapping, Detrapping	76  eV	$\operatorname{Exp}$	1559
$D_3^+ + C$	Sputtering	5-100  eV	$\operatorname{Exp}$	1447
$D_3^+ + W$	Sputtering	9-12 keV	$\operatorname{Exp}$	1459
$D_{3}^{+} + W$	Trapping, Detrapping	9-12 keV	Exp	1459
$D_{3}^{+} + C$	Sputtering	5-300 eV	Exp	1528
$D_{3}^{+} + C$	Sputtering	1-1.3 eV	Exp	1529
$D_{3}^{+} + C$	Sputtering	3-13 eV	Exp	1553
$D_{3}^{+} + C$	Sputtering	5-180 eV	E/T	1557
$D_3^+ + C$	Sputtering	30-600 eV	Exp	1561
$T^+ + C$	Sputtering	10-1000 eV	Th	1450
$\mathbf{T}^{+} + \mathbf{C}$	Sputtering	10-1000 eV	E/T	1551
$T^{+} + C$	Sputtering	10-150 eV	'Th	1555
CH + C	Reflection	0.01-10 eV	'I'h F	1550
CH + C	Adsorption, Desorption	$1 - 10^4 \text{ eV}$	Exp	1552
$CH_2 + C$	Reflection	0.01-10  eV	Th	1550
$\mathbf{CH}_2 + \mathbf{C}$	Adsorption, Desorption	$1 - 10^{\circ} \text{ eV}$	Exp	1552
$\mathbf{UH}_3 + \mathbf{W}$	Adsorption, Desorption	U-100 eV	Exp	1531
$CH_3 + C$	Kenection	0.01-10  eV	Th	1550
$\mathbf{CH}_3 + \mathbf{C}$	Adsorption, Desorption	$1 - 10^{-1} eV$	Exp	1552

$CH_4 + C$	Reflection	0.01-10  eV	$\mathrm{Th}$	1550
$CH_4 + C$	Adsorption, Desorption	$1 - 10^4 {\rm eV}$	Exp	1552
$CH_4 + Ni$	Neutraliz., Ioniz., Dissoc.		$\mathrm{Th}$	1563
$CD_3^+ + W$	Adsorption, Desorption	0-100  eV	Exp	1531
$CO + H_2O$	Desorption	0.1-0.9  eV	Exp	1542
$CO + H_2O$	Reflection	0.1-0.9  eV	Exp	1542
CO + Rh	Adsorption, Desorption		E/T	1564
$N_2^+ + C$	Secondary Electron Emission	100-400  keV/u	$\mathrm{Th}$	1365
$N_2^+ + H_2O$	Sputtering	15  keV	Exp	1384
$N_2^+ + C$	Secondary Electron Emission	30  keV	Exp	1436
$N_2 + Cu$	Reflection	$150 { m MeV}$	Exp	1444
$N_2^+ + C$	Secondary Electron Emission		$\mathrm{Th}$	1478
$N_2^+ + C$	Sputtering	30  keV	Exp	1486
$N_2^+ + C$	Secondary Electron Emission	30  keV	Exp	1495
$\mathbf{N}_2^+ + \mathbf{H}_2 \mathbf{O}$	Reflection	15  keV	Exp	1499
$\mathbf{N}_2{}^+ + \mathbf{C}\mathbf{H}_4$	Reflection	15  keV	Exp	1499
$N_2^+ + NH_3$	Reflection	15  keV	Exp	1499
$\mathbf{N}_2{}^+ + \mathbf{H}_2\mathbf{O}$	Sputtering	15  keV	Exp	1499
$N_2^+ + CH_4$	Sputtering	15  keV	Exp	1499
$N_2^+ + NH_3$	Sputtering	15  keV	Exp	1499
$N_2^+ + C$	Secondary Electron Emission	30  keV	Exp	1522
NO + Rh	Adsorption, Desorption		E/T	1564
$\mathbf{O}_2^+ + \mathbf{C}\mathbf{u}$	Sputtering	1  keV	$\mathrm{Th}$	1465
$C_2H_2 + C$	Reflection	0.01-10  eV	$\mathrm{Th}$	1550
$C_2H_5 + C$	Adsorption, Desorption	$1 - 10^4 {\rm eV}$	Exp	1552
HCl + Au	Reflection	$0.59{\text{-}}1.37 \text{ eV}$	Exp	1505
$\mathbf{C}_2^- + \mathbf{W}$	Sputtering	9-12  keV	Exp	1459
$\mathbf{C}_2^- + \mathbf{W}$	Trapping, Detrapping	9-12  keV	Exp	1459
$C_2 + C$	Reflection	0.01-10  eV	$\mathrm{Th}$	1550
$C_2H + C$	Reflection	0.01-10  eV	$\mathrm{Th}$	1550
$C_2H + C$	Adsorption, Desorption	$1 - 10^4 {\rm eV}$	Exp	1552
$C_2H_3 + C$	Reflection	0.01-10  eV	$\mathrm{Th}$	1550
$C_2H_3 + C$	Adsorption, Desorption	$1 - 10^4 {\rm eV}$	Exp	1552

## 2.4 Data Collection, Bibliographic and Progress Report

$\mathbf{A} + \mathbf{A}$	A + Al	Data Collection, Bibliography	$\mathrm{Th}$	1577
2.5	Fusion	<b>Research of General Interest</b>		
e + F	$\mathbf{H}_{3}^{+} + \mathbf{Al}$	Fusion Research of Gen. Interest 130-300 K	Exp	1578
e + I	$D_3^+ + Al$	Fusion Research of Gen. Interest 130-300 K	Exp	1578
e + F	$\mathbf{H}_5^+ + \mathbf{Al}$	Fusion Research of Gen. Interest 130-300 K	$\operatorname{Exp}$	1578
e + I	$D_5^+ + Al$	Fusion Research of Gen. Interest 130-300 K	Exp	1578

## 2.6 Particle Beam-Matter Interactions

$H^+ + Al + Al$	Part. Beam-Matter Interaction	100  keV	$\mathrm{Th}$	1579
$H^+ + Al + Al$	Part. Beam-Matter Interaction	98  keV	E/T	1580
$\mathrm{H^{+}} + \mathrm{Na} + \mathrm{Al}$	Part. Beam-Matter Interaction	1-13 v(a.u.)	$\mathrm{Th}$	1582
$\mathrm{H^{+}}+\mathrm{Mg}+\mathrm{Al}$	Part. Beam-Matter Interaction	1-13 v(a.u.)	$\mathrm{Th}$	1582
$\mathrm{H^{+}} + \mathrm{K} + \mathrm{Al}$	Part. Beam-Matter Interaction	1-13 v(a.u.)	$\mathrm{Th}$	1582

$H^+ + Al + Al$	Part. Beam-Matter Interaction	$0.1-1.5 \ \mathrm{MeV/amu}$	Exp	1592
$\mathrm{H^{+}}+\mathrm{Ag}+\mathrm{Al}$	Part. Beam-Matter Interaction	0.1-1.5  MeV/amu	Exp	1592
$H^+ + H_2O + Al$	Part. Beam-Matter Interaction	1.7-2.0 MeV	Exp	1601
H + Al + Al	Part. Beam-Matter Interaction	2-10 eV	$\mathrm{Th}$	1603
$H^+ + H_2O + Al$	Part. Beam-Matter Interaction	0.025-1000 MeV/u	E/T	1604
$\mathbf{H}^+ + \mathbf{N}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	0.025-1000  MeV/u	E/T	1604
$\mathrm{H^{+}} + \mathrm{O}_{2} + \mathrm{Al}$	Part. Beam-Matter Interaction	0.025-1000  MeV/u	E/T	1604
$\mathrm{H^{+}} + \mathrm{H_{2}O} + \mathrm{Al}$	Part. Beam-Matter Interaction	$10^{-3} - 1 \text{ MeV}$	$\dot{\mathrm{E}/\mathrm{T}}$	1606
$H^+ + C + Al$	Part. Beam-Matter Interaction	10-10,000 keV/amu	$\mathrm{Th}$	1607
$H^+ + Ni + Al$	Part. Beam-Matter Interaction	$0.166-2.72 \mathrm{MeV/amu}$	Exp	1610
$\mathbf{H}^{+} + \mathbf{H}_{2}\mathbf{O} + \mathbf{Al}$	Part. Beam-Matter Interaction	50-10,000 keV	Th	1611
$H^+ + Ti + Al$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$	1612
$H^+ + Fe + Al$	Part. Beam-Matter Interaction	1-10,000 keV/amu	$\mathrm{Th}$	1612
$H^+ + Ge + Al$	Part. Beam-Matter Interaction	1-10,000 keV/amu	$\mathrm{Th}$	1612
$\mathbf{H}^{+} + \mathbf{Pd} + \mathbf{Al}$	Part. Beam-Matter Interaction	1-10,000 keV/amu	$\mathrm{Th}$	1612
$H^+ + LiF + Al$	Part. Beam-Matter Interaction	1-10,000 keV/amu	$\mathrm{Th}$	1612
$\mathbf{H}^+ + \mathbf{Si}_3 \mathbf{N}_4 + \mathbf{Al}$	Part. Beam-Matter Interaction	1-10.000 keV/amu	$\mathrm{Th}$	1612
$H^+ + Au + Al$	Part. Beam-Matter Interaction	0.33-10 keV	Exp	1618
$H^+ + Al + Al$	Part. Beam-Matter Interaction	10 keV	Exp	1624
$H^+ + Au + Al$	Part. Beam-Matter Interaction	10  keV	Exp	1624
$H^+ + LiF + Al$	Part. Beam-Matter Interaction	100-400 keV	Th	1626
$H^+ + C + Al$	Part. Beam-Matter Interaction		E/T	1628
$H^+ + Al + Al$	Part. Beam-Matter Interaction		E/T	1628
$H^+ + Si + Al$	Part. Beam-Matter Interaction		E/T	1628
$H^+ + NdF_3 + Al$	Part. Beam-Matter Interaction	0.5-0.7 MeV	Exp	1634
$H^+ + SmF_3 + Al$	Part. Beam-Matter Interaction	0.5-0.7 MeV	Exp	1634
$H^+ + GdF_3 + Al$	Part. Beam-Matter Interaction	0.5-0.7 MeV	Exp	1634
$H^+ + HoF_3 + Al$	Part. Beam-Matter Interaction	0.5-0.7 MeV	Exp	1634
$H^+ + Si + Al$	Part. Beam-Matter Interaction	$150 { m MeV}$	Th	1637
$H^+ + Ar + Al$	Part. Beam-Matter Interaction	50-500 eV	E/T	1639
$H^+ + Kr + Al$	Part. Beam-Matter Interaction	50-500  eV	$\dot{\mathrm{E/T}}$	1639
$H^+ + Xe + Al$	Part. Beam-Matter Interaction	$50-500 \ eV$	$\dot{\mathrm{E/T}}$	1639
$H^+ + A + Al$	Part. Beam-Matter Interaction		$\mathrm{Th}$	1640
$H^+ + C_2H_5OH + Al$	Part. Beam-Matter Interaction	$2 { m MeV}$	E/T	1641
$H^+ + H_2O + Al$	Part. Beam-Matter Interaction		$\mathrm{Th}$	1643
$\mathbf{H}^+ + \mathbf{C}\mathbf{H}_4 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction		$\mathrm{Th}$	1643
$H^+ + Bi + Al$	Part. Beam-Matter Interaction	3-9  keV	Exp	1644
$H^+ + C + Al$	Part. Beam-Matter Interaction		$\mathrm{Th}$	1646
$H^+ + Ag + Al$	Part. Beam-Matter Interaction	$10^2 - 10^5 \text{ keV/amu}$	$\mathrm{Th}$	1647
$H^+ + C + Al$	Part. Beam-Matter Interaction	1 MeV/amu	Exp	1649
$H^+ + Al + Al$	Part. Beam-Matter Interaction	1-50 MeV	$\mathrm{Th}$	1654
$H^+ + Ni + Al$	Part. Beam-Matter Interaction		$\mathrm{Th}$	1655
$\mathrm{H^{+}+Gd+Al}$	Part. Beam-Matter Interaction		$\mathrm{Th}$	1655
$\mathrm{He^{+}} + \mathrm{Al}_{2}\mathrm{O}_{3} + \mathrm{Al}$	Part. Beam-Matter Interaction	10-5000  keV/amu	E/T	1584
$\mathrm{He^{+}}+\mathrm{SiO}_{2}+\mathrm{Al}$	Part. Beam-Matter Interaction	10-5000  keV/amu	E/T	1584
$\mathrm{He^{+}}+\mathrm{ZrO}_{2}+\mathrm{Al}$	Part. Beam-Matter Interaction	10-5000  keV/amu	E/T	1584
$He^+ + Al + Al$	Part. Beam-Matter Interaction	$0.1-3.0 { m MeV}$	Exp	1587
$\mathrm{He^{+}}+\mathrm{Al}_{2}\mathrm{O}_{3}+\mathrm{Al}$	Part. Beam-Matter Interaction	40-1250  keV/amu	Exp	1588
$He^{2+} + He + Al$	Part. Beam-Matter Interaction	25-500  eV	$\mathrm{Th}$	1590
$He^{2+} + Ne + Al$	Part. Beam-Matter Interaction	25-500  eV	$\mathrm{Th}$	1590
$He^{2+} + Ar + Al$	Part. Beam-Matter Interaction	25-500  eV	$\mathrm{Th}$	1590
$\mathrm{He^{+}} + \mathrm{Al} + \mathrm{Al}$	Part. Beam-Matter Interaction	0.1-1.5  MeV/amu	Exp	1591
$\mathrm{He^{+}}+\mathrm{Ag}+\mathrm{Al}$	Part. Beam-Matter Interaction	0.1-1.5  MeV/amu	Exp	1591
He + C + Al	Part. Beam-Matter Interaction		$\mathrm{Th}$	1598
$\mathrm{He^{+}}$ + $\mathrm{ZrO}_{2}$ + Al	Part. Beam-Matter Interaction	0-1500  keV/amu	E/T	1609
$\mathrm{He^{+}}$ + $\mathrm{Ta}_{2}\mathrm{O}_{5}$ + Al	Part. Beam-Matter Interaction	0-1500  keV/amu	E/T	1609
$\mathrm{He^{+}} + \mathrm{Nb}_{2}\mathrm{O}_{5} + \mathrm{Al}$	Part. Beam-Matter Interaction	0-1500  keV/amu	E/T	1609
$He^{2+} + Ni + Al$	Part. Beam-Matter Interaction	$0.166\text{-}2.72 \; \mathrm{MeV/amu}$	$\operatorname{Exp}$	1610
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$\mathrm{He^{+}}$ + Ti + Al	Part. Beam-Matter Interaction	1-10,000 keV/amu	$\mathrm{Th}$	1612
$\mathrm{He^{+}} + \mathrm{Fe} + \mathrm{Al}$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$	1612
$\mathrm{He^{+}+Ge+Al}$	Part. Beam-Matter Interaction	1-10,000 keV/amu	$\mathrm{Th}$	1612
$\mathrm{He^{+}} + \mathrm{Pd} + \mathrm{Al}$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$	1612
$\mathrm{He^{+}}+\mathrm{LiF}+\mathrm{Al}$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$	1612
$\mathrm{He^{+}}+\mathrm{Si}_{3}\mathrm{N}_{4}+\mathrm{Al}$	Part. Beam-Matter Interaction	1-10,000 keV/amu	$\mathrm{Th}$	1612
$\mathrm{He^{+}} + \mathrm{Al} + \mathrm{Al}$	Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	Exp	1613
$\mathrm{He^{+}}$ + Ti + Al	Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	$\operatorname{Exp}$	1613
$\mathrm{He^{+}}$ + Co + Al	Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	$\operatorname{Exp}$	1613
$\mathrm{He^{+}}+\mathrm{Cu}+\mathrm{Al}$	Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	$\operatorname{Exp}$	1613
$\mathrm{He^{+}}+\mathrm{Ag}+\mathrm{Al}$	Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	$\operatorname{Exp}$	1613
$\mathrm{He^{+}}$ + Ta + Al	Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	$\operatorname{Exp}$	1613
$\mathrm{He^{+}} + \mathrm{Au} + \mathrm{Al}$	Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	$\operatorname{Exp}$	1613
$\mathrm{He^{+}}+\mathrm{C}+\mathrm{Al}$	Part. Beam-Matter Interaction	$1.4-4.0 { m MeV}$	$\operatorname{Exp}$	1615
$\mathrm{He^{+}} + \mathrm{H} + \mathrm{Al}$	Part. Beam-Matter Interaction	$1.1-4.8 { m MeV}$	$\operatorname{Exp}$	1616
$\mathrm{He^{+}} + \mathrm{C} + \mathrm{Al}$	Part. Beam-Matter Interaction	$1.1-4.8 { m MeV}$	$\operatorname{Exp}$	1616
$He^{2+} + Fe + Al$	Part. Beam-Matter Interaction	$6-86 {\rm MeV}$	$\operatorname{Exp}$	1619
$He^{2+} + Ag + Al$	Part. Beam-Matter Interaction	$6-86 {\rm MeV}$	$\operatorname{Exp}$	1619
$He^{2+} + Au + Al$	Part. Beam-Matter Interaction	$6-86 {\rm MeV}$	$\operatorname{Exp}$	1619
He + Al + Al	Part. Beam-Matter Interaction	1-10,000  keV/u	$\mathrm{Th}$	1622
He + Zn + Al	Part. Beam-Matter Interaction	1-10,000  keV/u	$\mathrm{Th}$	1622
$He^+ + Al + Al$	Part. Beam-Matter Interaction	1-10,000  keV/u	$\mathrm{Th}$	1622
$\mathrm{He^{+}}$ + Zn + Al	Part. Beam-Matter Interaction	1-10,000  keV/u	$\mathrm{Th}$	1622
$He^+ + Al + Al$	Part. Beam-Matter Interaction	10  keV	$\operatorname{Exp}$	1624
$He^+ + Au + Al$	Part. Beam-Matter Interaction	10 keV	Exp	1624
$\mathrm{He^{+}}$ + $\mathrm{Ta}_{2}\mathrm{O}_{5}$ + Al	Part. Beam-Matter Interaction	100-1300 keV/amu	E/T	1629
$He^+ + Nb_2O_5 + AI$	Part. Beam-Matter Interaction	100-1300 keV/amu	E/T	1629
$He^+ + Ag + Al$	Part. Beam-Matter Interaction	$10^2 - 10^3 \text{ keV}/\text{amu}$	Th	1647
$He^{2+} + C + AI$	Part. Beam-Matter Interaction	1 MeV/amu	Exp	1649
$Li^2 + Ai_2O_3 + Ai_3$	Part. Beam-Matter Interaction	10-5000  keV/amu	E/T E/T	1584
$Li^{2+} + SiO_2 + Ai$	Part. Beam-Matter Interaction	10-5000  keV/amu	E/ 1 E /T	1584
$LI^{-1} + ZrO_2 + AI$	Part. Deam-Matter Interaction	10-5000  keV/amu	E/ I Evr	1504
$\mathbf{L}\mathbf{I}^{+} + \mathbf{A}\mathbf{I} + \mathbf{A}\mathbf{I}$	Part Boam Matter Interaction	0.1-1.5 MeV/amu	Exp	1501
$Li^+ + Ag + Ai$ $Li^+ + Ai + Ai$	Part Beam Matter Interaction	0.1-1.5 MeV/amu $0.1.1.5$ MeV/amu	Exp	1502
Li + Ai + Ai $Li^+ + Ai + Ai$	Part Beam-Matter Interaction	0.1-1.5  MeV/amu	Exp	1502
$Li^+ + C + Al$	Part Beam-Matter Interaction	0.1 1.0 Mic v / annu	$\frac{Dxp}{Th}$	1598
$Li^+ + A\sigma + Al$	Part Beam-Matter Interaction	0.025-1000 MeV/11	E/T	1604
$Li^{+} + H_{2}O + Al$	Part Beam-Matter Interaction	0.025-1000 MeV/u	E/T	1604
$Li^+ + N_2 + Al$	Part. Beam-Matter Interaction	0.025-1000  MeV/u	E/T	1604
$Li^+ + O_2 + Al$	Part. Beam-Matter Interaction	0.025-1000  MeV/u	—/ – E/T	1604
$Li^+ + Al^+ + Al$	Part. Beam-Matter Interaction		$\operatorname{Th}'$	1614
$Li^+ + H + Al$	Part. Beam-Matter Interaction	$1.1-4.8 { m MeV}$	Exp	1616
$Li^+ + C + Al$	Part. Beam-Matter Interaction	$1.1-4.8 { m MeV}$	Exp	1616
$\mathrm{Li^{+}} + \mathrm{Ta}_{2}\mathrm{O}_{5} + \mathrm{Al}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T	1629
$\mathrm{Li^{+} + Nb_{2}O_{5} + Al}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T	1629
$Li^{3+} + C + Al$	Part. Beam-Matter Interaction	$1 { m MeV/amu}$	$\operatorname{Exp}$	1649
$Li^+ + SiN + Al$	Part. Beam-Matter Interaction	$0.4-4.0 { m MeV}$	$\operatorname{Exp}$	1650
Li + He + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T	1656
Li + Be + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T	1656
Li + C + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T	1656
Li + Ne + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Li + Al + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Li + Si + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Li + Ar + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{L}\mathbf{i} + \mathbf{T}\mathbf{i} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656

Li + Fe + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Li + Ni + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Li + Cu + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Li + Ge + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Li + Kr + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Li + Mo + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Li + Ag + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Li + Sn + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Li + Xe + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Li + Gd + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Li + W + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Li + Pt + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Li + Au + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Li + Pb + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Li + U + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$Li + H_2 + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$Li + H_2O + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$Li + CH_4 + Al$	Part.	Beam-Matter	Interaction	0.001-1000  MeV	E/T	1656
$Li + CO_2 + Al$	Part.	Beam-Matter	Interaction	0.001-1000  MeV	E/T	1656
$Li + N_2 + Al$	Part.	Beam-Matter	Interaction	0.001-1000  MeV	E/T	1656
$Li + O_2 + Al$	Part.	Beam-Matter	Interaction	$0.001-1000 { m MeV}$	E/T	1656
$\mathbf{Li} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}$	Part.	Beam-Matter	Interaction	$0.001-1000 { m MeV}$	E/T	1656
$Be^+ + SiC + Al$	Part.	Beam-Matter	Interaction	40-680  keV/u	E/T	1593
$\mathrm{Be^{+}}$ + $\mathrm{Ta}_{2}\mathrm{O}_{5}$ + Al	Part.	Beam-Matter	Interaction	100-1300 keV/amu	E/T	1629
$Be^+ + Nb_2O_5 + Al$	Part.	Beam-Matter	Interaction	100-1300 keV/amu	E/T	1629
$Be^+ + He + Al$	Part.	Beam-Matter	Interaction	2-31 MeV	Exp	1653
Be + He + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T	1656
Be + Be + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T	1656
Be + C + AI	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T	1656
Be + Ne + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/I E/T	1656
$\mathbf{D}\mathbf{e} + \mathbf{A}\mathbf{I} + \mathbf{A}\mathbf{I}$	Part.	Deam-Matter	Interaction	0.001-1000 MeV	Е/ I Б/Т	1656
Be + SI + AI Bo + Ar + AI	Port	Beam Matter	Interaction	0.001-1000  MeV	E/T	1656
Be + AI + AI Bo + Ti + AI	Port	Beam Matter	Interaction	0.001-1000  MeV	E/T	1656
Be + Fe + Al	Part	Beam-Matter	Interaction	0.001-1000  MeV	E/T	1656
Be + Ni + Al	Part	Beam-Matter	Interaction	0.001-1000 MeV	E/T	1656
Be + Cu + Al	Part	Beam-Matter	Interaction	0.001-1000 MeV	E/T	1656
Be + Ge + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T	1656
Be + Kr + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T	1656
Be + Mo + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T	1656
Be + Ag + Al	Part.	Beam-Matter	Interaction	0.001-1000  MeV	E/T	1656
Be + Sn + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	$\dot{\mathrm{E/T}}$	1656
Be + Xe + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{\mathrm{E}/\mathrm{T}}$	1656
Be + Gd + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000~\mathrm{MeV}$	$\dot{E/T}$	1656
Be + W + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000~\mathrm{MeV}$	$\dot{E/T}$	1656
Be + Pt + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T	1656
Be + Au + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Be + Pb + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T	1656
Be + U + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$Be + H_2 + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T	1656
$Be + H_2O + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T	1656
$Be + CH_4 + Al$	Part.	Beam-Matter	Interaction	$0.001-1000 { m MeV}$	E/T	1656
$Be + CO_2 + Al$	Part.	Beam-Matter	Interaction	$0.001-1000 { m MeV}$	E/T	1656
$Be + N_2 + Al$	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T	1656
$Be + O_2 + Al$	Part.	Beam-Matter	Interaction	0.001-1000 MeV	Е/'Г Б./Т	1656
$\mathbf{Be} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}$	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{B}^{*+} + \mathbf{AI}_2\mathbf{O}_3 + \mathbf{AI}_3$	Part.	Beam-Matter	Interaction	10-5000 keV/amu	E/T	1584

$B^{4+} + SiO_2 + Al$	Part.	Beam-Matter Interaction	10-5000  keV/amu	E/T	1584
$B^{4+} + ZrO_2 + Al$	Part.	Beam-Matter Interaction	10-5000 keV/amu	E/T	1584
$B^+ + Al + Al$	Part.	Beam-Matter Interaction	0.1-1.5 MeV/amu	Exp	1591
$B^+ + Ag + Al$	Part.	Beam-Matter Interaction	0.1-1.5 MeV/amu	Exp	1591
$B^+ + Al + Al$	Part.	Beam-Matter Interaction	0.1-1.5 MeV/amu	Exp	1592
$B^+ + Ag + Al$	Part.	Beam-Matter Interaction	0.1-1.5 MeV/amu	Exp	1592
$B^+ + Fe + Al$	Part.	Beam-Matter Interaction	6-86 MeV	Exp	1619
$B^+ + Ag + Al$	Part.	Beam-Matter Interaction	6-86 MeV	Exp	1619
$B^+ + Au + Al$	Part.	Beam-Matter Interaction	6-86 MeV	Exp	1619
$B^+ + SiN + Al$	Part.	Beam-Matter Interaction	$0.4-4.0 { m MeV}$	Exp	1650
B + He + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
B + Be + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E}/T$	1656
B + C + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E}/T$	1656
B + Ne + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E}/T$	1656
B + Al + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E}/T$	1656
B + Si + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	$\dot{E}/T$	1656
B + Ar + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
B + Ti + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
B + Fe + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
B + Ni + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
B + Cu + Al	Part.	Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
B + Ge + Al	Part.	Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
B + Kr + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
B + Mo + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
B + Ag + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
B + Sn + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
B + Xe + Al	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
B + Gd + Al	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$\mathbf{B} + \mathbf{W} + \mathbf{Al}$	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
B + Pt + Al	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$\mathbf{B} + \mathbf{A}\mathbf{u} + \mathbf{A}\mathbf{l}$	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{B} + \mathbf{P}\mathbf{b} + \mathbf{A}\mathbf{I}$	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{B} + \mathbf{U} + \mathbf{A}\mathbf{I}$	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{B} + \mathbf{H}_2 + \mathbf{A}\mathbf{I}$	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1050
$B + H_2O + AI$	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1050
$\mathbf{B} + \mathbf{C}\mathbf{H}_4 + \mathbf{A}\mathbf{I}$	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/1 E/T	1000
$\mathbf{D} + \mathbf{C}\mathbf{O}_2 + \mathbf{A}\mathbf{I}$	Part.	Beam Matter Interaction	0.001-1000 MeV	Е/ 1 Е/Т	1000
$\mathbf{D} + \mathbf{N}_2 + \mathbf{A}\mathbf{I}$	Part.	Beam Matter Interaction	0.001-1000 MeV	Е/ 1 Е/Т	1000
$\mathbf{D} + \mathbf{O}_2 + \mathbf{A}\mathbf{I}$	Fait.	Beam Matter Interaction	0.001-1000  MeV	E/ I E/T	1656
$\mathbf{D} + \mathbf{A}\mathbf{I}_2\mathbf{O}_3 + \mathbf{A}\mathbf{I}$ $\mathbf{C}^{4+} + \mathbf{C} + \mathbf{A}\mathbf{I}$	Port	Boam Matter Interaction	100.40.000  keV/m	E/T	1585
$C^{5+} + C + Al$	Part	Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$C^{6+} + C + Al$	Part	Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$C^+ + Al_2O_2 + Al_2$	Part.	Beam-Matter Interaction	40-1250  keV/amu	Eyn	1588
$C^{+} + C + Al$	Part.	Beam-Matter Interaction	$0.025-1000 \text{ MeV}/\mu$	E/T	1604
$C^+ + ZrO_2 + Al$	Part.	Beam-Matter Interaction	0-1500  keV/amu	E/T	1609
$C^+ + Si + Al$	Part.	Beam-Matter Interaction	1.8 MeV/amu	Éxp	1620
$C^+ + GaAs + Al$	Part.	Beam-Matter Interaction	0.5-1 MeV	Exp	1625
$\mathbf{C}^{2+} + \mathbf{C} + \mathbf{Al}$	Part.	Beam-Matter Interaction	4.3 MeV/amu	Exp	1630
$C^+ + Ge + Al$	Part.	Beam-Matter Interaction	0-60 MeV	Exp	1632
$C^+ + Au + Al$	Part.	Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp	1632
$C^+ + Au + Al$	Part.	Beam-Matter Interaction	$1-1000 {\rm ~keV}$	Th	1642
$\mathrm{C^{+}+SiN+Al}$	Part.	Beam-Matter Interaction	$0.4-4.0 { m MeV}$	Exp	1650
$C^+ + C + Al$	Part.	Beam-Matter Interaction	$1-2 {\rm MeV}$	Th	1651
$C^+ + Al + Al$	Part.	Beam-Matter Interaction	$1-2 {\rm MeV}$	Th	1651
$\mathbf{C}^{2+} + \mathbf{C} + \mathbf{Al}$	Part.	Beam-Matter Interaction	$2.65$ - $6.0 \mathrm{MeV/u}$	Exp	1652
C + He + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T	1656

C + Be + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
C + C + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
C + Ne + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
C + Al + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
C + Si + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
C + Ar + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
C + Ti + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
C + Fe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
C + Ni + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Cu + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Ge + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Kr + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Mo + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Ag + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Sn + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Xe + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Gd + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + W + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Pt + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Au + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + Pb + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
C + U + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$\mathbf{C} + \mathbf{H}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$C + H_2O + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$\mathbf{C} + \mathbf{C}\mathbf{H}_4 + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$\mathbf{C} + \mathbf{CO}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$\mathbf{C} + \mathbf{N}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$\mathbf{C} + \mathbf{O}_2 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{C} + \mathbf{A}\mathbf{I}_2\mathbf{O}_3 + \mathbf{A}\mathbf{I}_2$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{N}^{6+} + \mathbf{A}\mathbf{I}_2\mathbf{O}_3 + \mathbf{A}\mathbf{I}_2$	Part. Beam-Matter Interaction	10-5000 keV/amu	E/T	1584
$\mathbf{N}^{6+} + \mathbf{S}_1\mathbf{O}_2 + \mathbf{A}_1$	Part. Beam-Matter Interaction	10-5000 keV/amu	E/T	1584
$N^{\circ +} + ZrO_2 + AI$	Part. Beam-Matter Interaction	10-5000  keV/amu	E/1 E	1584
N' + Ge + AI	Part. Beam-Matter Interaction	0-60 MeV	Exp E	1632
$N^+ + Ag + AI$	Part. Deam-Matter Interaction	0.60  MeV	Exp E-m	1622
$\mathbf{N} + \mathbf{A}\mathbf{u} + \mathbf{A}\mathbf{I}$	Part. Deam-Matter Interaction	0-00 MeV	Exp Б/Т	1052
N + He + AI $N + B_0 + AI$	Part Boam Matter Interaction	0.001-1000  MeV	Е/ I F /T	1656
$\mathbf{N} + \mathbf{D}\mathbf{e} + \mathbf{A}\mathbf{I}$	Part Boam Matter Interaction	0.001-1000  MeV	Е/ I F /T	1656
N + C + AI $N + N_0 + AI$	Part Boam Matter Interaction	0.001 + 1000  MeV	Б/ I F /T	1656
N + Al + Al	Part Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
N + Si + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
N + Ar + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
N + Ti + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
N + Fe + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
N + Ni + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
N + Cu + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
N + Ge + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	$\mathbf{E}' \mathbf{T}$	1656
N + Kr + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	$\dot{\mathrm{E/T}}$	1656
N + Mo + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	$\dot{\mathrm{E/T}}$	1656
N + Ag + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	$\dot{\mathrm{E}/\mathrm{T}}$	1656
N + Sn + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	$\dot{\mathrm{E}/\mathrm{T}}$	1656
N + Xe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	$\dot{\mathrm{E}/\mathrm{T}}$	1656
N + Gd + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	$\dot{E/T}$	1656
N + W + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	$\dot{E/T}$	1656
N + Pt + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T	1656
N + Au + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T	1656
N + Pb + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T	1656

N + U + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$N + H_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
$N + H_2O + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$N + CH_4 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$N + CO_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$N + N_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$N + O_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$N + Al_2O_3 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$O^+ + Al_2O_3 + Al$	Part. Beam-Matter Interaction	40-1250  keV/amu	$\operatorname{Exp}$	1588
$O^+ + Al + Al$	Part. Beam-Matter Interaction		$\mathrm{Th}$	1614
$O^+ + Fe + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp	1619
$O^+ + Ag + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	$\operatorname{Exp}$	1619
$O^+ + Au + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	$\operatorname{Exp}$	1619
$O^+ + GaAs + Al$	Part. Beam-Matter Interaction	$0.5-1 { m MeV}$	$\operatorname{Exp}$	1625
$\mathbf{O}^+ + \mathbf{Ta}_2\mathbf{O}_5 + \mathbf{Al}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T	1629
$\mathbf{O}^+ + \mathbf{N}\mathbf{b}_2\mathbf{O}_5 + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T	1629
$O^{3+} + C + Al$	Part. Beam-Matter Interaction	$4.3 \ \mathrm{MeV/amu}$	Exp	1630
$O^+ + Ge + Al$	Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp	1632
$O^+ + Au + Al$	Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	$\operatorname{Exp}$	1632
$O^+ + SiN + Al$	Part. Beam-Matter Interaction	$0.4-4.0 { m MeV}$	$\operatorname{Exp}$	1650
$O^{3+} + C + Al$	Part. Beam-Matter Interaction	$2.65$ - $6.0 \ \mathrm{MeV/u}$	$\operatorname{Exp}$	1652
O + He + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
O + Be + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
O + C + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
O + Ne + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
O + Al + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
O + Si + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
O + Ar + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
O + Ti + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
O + Fe + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
O + Ni + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
O + Cu + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
O + Ge + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
O + Kr + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
O + Mo + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
O + Ag + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
O + Sn + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T D/T	1656
O + Xe + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T D/T	1656
O + Gd + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T E/T	1656
O + W + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1650
O + Pt + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1650
O + Au + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	已/ 1 下/T	1656
O + PO + AI	Part. Beam-Matter Interaction	0.001-1000  MeV	Е/ I F /T	1656
O + U + AI	Part Beam Matter Interaction	0.001-1000  MeV	Е/ I Б/Т	1656
$O + H_2 + AI$	Part Beam Matter Interaction	0.001-1000  MeV	Е/ I Б/Т	1656
O + OH + Al	Part Boam Matter Interaction	0.001-1000  MeV	$\mathbf{E}/\mathbf{T}$	1656
$O + CO_2 + Al$	Part Boam Matter Interaction	0.001-1000  MeV	E/T	1656
$\mathbf{O} + \mathbf{N}_2 + \mathbf{A}_1$	Part Boam Matter Interaction	0.001-1000  MeV	E/T	1656
$\mathbf{O} + \mathbf{O}_2 + \mathbf{A}_1$ $\mathbf{O} + \mathbf{O}_2 + \mathbf{A}_1$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$O + A_{12}O_{2} + A_{1}$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{F}^+ + \mathbf{T}_{\mathbf{a}_2}\mathbf{O}_2 + \mathbf{A}\mathbf{I}$	Part Beam-Matter Interaction	0-1500  keV/amu	E/T	1600
$F^+ + Nb_2O_2 + Al$	Part. Beam-Matter Interaction	0-1500  keV/amu	E/T	1609
$F^+ + Ge + Al$	Part. Beam-Matter Interaction	0-60 MeV	Exp	1632
$F^+ + Ag + Al$	Part. Beam-Matter Interaction	0-60 MeV	Exp	1632
$F^+ + Au + Al$	Part. Beam-Matter Interaction	0-60 MeV	Exp	1632
F + He + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
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F + Be + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$\mathbf{F} + \mathbf{C} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
$\mathbf{F} + \mathbf{Ne} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
F + Al + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
F + Si + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E}/T$	1656
$\mathbf{F} + \mathbf{Ar} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
$\mathbf{F} + \mathbf{Ti} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
$\mathbf{F} + \mathbf{Fe} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	$\dot{E/T}$	1656
F + Ni + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	$\dot{E/T}$	1656
F + Cu + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
$\mathbf{F} + \mathbf{Ge} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
F + Kr + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
$\mathbf{F} + \mathbf{Mo} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
$\mathbf{F} + \mathbf{Ag} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
F + Sn + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
$\mathbf{F} + \mathbf{Xe} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{\mathrm{E/T}}$	1656
$\mathbf{F} + \mathbf{Gd} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$\mathbf{F} + \mathbf{W} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$\mathbf{F} + \mathbf{Pt} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$\mathbf{F} + \mathbf{A}\mathbf{u} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
F + Pb + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
F + U + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$\mathbf{F} + \mathbf{H}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$\mathbf{F} + \mathbf{H}_2 \mathbf{O} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$\mathbf{F} + \mathbf{CH}_4 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$\mathbf{F} + \mathbf{CO}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$\mathbf{F} + \mathbf{N}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$\mathbf{F} + \mathbf{O}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$\mathbf{F} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$Ne^{8+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$Ne^{9+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$Ne^{10+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$Ne^{7+} + C + Al$	Part. Beam-Matter Interaction	2  MeV/u	$\mathrm{Th}$	1600
$Ne^{8+} + C + Al$	Part. Beam-Matter Interaction	2  MeV/u	$\mathrm{Th}$	1600
$Ne^{9+} + C + Al$	Part. Beam-Matter Interaction	2  MeV/u	$\mathrm{Th}$	1600
$Ne^{10+} + C + Al$	Part. Beam-Matter Interaction	2  MeV/u	$\mathrm{Th}$	1600
$Ne^{4+} + C + Al$	Part. Beam-Matter Interaction	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1630
$Ne^{4+} + C + Al$	Part. Beam-Matter Interaction	$2.65-6.0 { m MeV/u}$	Exp	1652
Ne + He + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Ne + Be + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Ne + C + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Ne + Ne + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ne + Al + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ne + Si + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ne + Ar + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ne + Ti + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ne + Fe + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ne + Ni + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ne + Cu + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
INE + GE + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T E/T	1056
Ne + Kr + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T E/T	1056
1 Ne + 1 VIO + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	Ľ/ Г Б /Т	1050
Ne + Ag + Al	Fart. Deam-Matter Interaction	0.001-1000  MeV 0.001.1000 MeV	⊡/ I ⋤/┳	1000 1656
1 Ne + 5 I + A I No + Yo + A	Fart. Deam-Matter Interaction	0.001-1000 MeV 0.001-1000 MeV	⊡/ I ⋤ /т	1050 1656
$\mathbf{Ne} + \mathbf{Ae} + \mathbf{AI}$ $\mathbf{No} + \mathbf{Cd} + \mathbf{AI}$	Part Boam Matter Interaction	0.001-1000 MeV 0.001-1000 MeV	Ľ/ I F /T	1000 1656
$M_{0} \perp W \perp M$	Part Beam Matter Interaction	0.001-1000  MeV 0.001-1000  MeV	Б/Т Е/Т	1656
$100 \pm 10 \pm AI$	ran. Deam-matter interaction	0.001-1000 MEV	12/ I	1090

Ne + Pt + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T	1656
Ne + Au + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Ne + Pb + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Ne + U + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Ne + H_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
$Ne + H_2O + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
$Ne + CH_4 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
$Ne + CO_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Ne + N_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Ne + O_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Ne + Al_2O_3 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + He + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Be + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + C + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Ne + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Al + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Na + Si + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Na + Ar + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Na + Ti + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Na + Fe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Na + Ni + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Cu + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Ge + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Kr + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Mo + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Ag + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Sn + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Xe + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Na + Gd + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Na + W + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
Na + Pt + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Na + Au + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Na + Pb + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Na + U + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$Na + H_2 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$Na + H_2O + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$Na + CH_4 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$Na + CO_2 + AI$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$Na + N_2 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$Na + O_2 + AI$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{N}\mathbf{a} + \mathbf{A}\mathbf{I}_2\mathbf{O}_3 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1656
$Mg^{22} + C + AI$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/I	1585
$Mg^{-1} + C + AI$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/I	1585
$Mg^{22} + C + AI$	Part. Beam-Matter Interaction	100-40,000  KeV/u	E/1 E-m	1080
$Mg^{*+} + C + Al$	Part. Deam-Matter Interaction	4.5  MeV/amu	Exp E/T	1050
Mg + He + AI	Part. Deam-Matter Interaction	0.001-1000  MeV	Е/ I Г/Т	1656
Mg + De + Al	Part Room Matter Interaction	0.001-1000  MeV	E/I F/T	1656
Mg + C + AI	Part Boam Matter Interaction	0.001-1000  MeV	$\mathbf{E}/\mathbf{I}$ $\mathbf{F}/\mathbf{T}$	1656
$M_{\alpha} \perp \Lambda \downarrow \perp \Lambda \downarrow$	Part Beam-Matter Interaction	0.001-1000  MeV	Б/Т Е/Т	1656
$M_{\sigma} + S_{i} + A_{i}$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$M_{\sigma} + \Delta r + \Delta l$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$M_{\sigma} + T_{i} + \Delta l$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$M_{\sigma} + F_{e} + \Delta l$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$M\sigma + Ni + Al$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Mg + Cu + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Mg + Ge + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
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Mg + Kr + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
Mg + Mo + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	$\dot{\mathrm{E/T}}$	1656
Mg + Ag + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	$\dot{\mathrm{E}/\mathrm{T}}$	1656
Mg + Sn + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Mg + Xe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Mg + Gd + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Mg + W + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Mg + Pt + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Mg + Au + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Mg + Pb + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Mg + U + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$Mg + H_2 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$Mg + H_2O + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$Mg + CH_4 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Mg + CO_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Mg + N_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Mg + O_2 + Al$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$Mg + Al_2O_3 + Al$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$Al^+ + Al_2O_3 + Al$	Part. Beam-Matter Interaction	40-1250  keV/amu	$\operatorname{Exp}$	1588
$Al^+ + Fe + Al$	Part. Beam-Matter Interaction	6-86 MeV	Exp	1619
$Al^+ + Ag + Al$	Part. Beam-Matter Interaction	6-86  MeV	Exp	1619
$Al^+ + Au + Al$	Part. Beam-Matter Interaction	6-86 MeV	Exp	1619
AI + He + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
AI + Be + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
AI + C + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
AI + Ne + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
AI + AI + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T E/T	1656
AI + SI + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1656
AI + AF + AI	Part. Deam-Matter Interaction	0.001-1000 MeV	Е/ 1 Е /Т	1000
AI + II + AI	Part. Deam-Matter Interaction	0.001-1000 MeV	Б/ I Б /Т	1656
AI + Ie + AI AI + Ni + AI	Part Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
AI + Cu + AI	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Al + Ge + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Al + Kr + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Al + Mo + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Al + Ag + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Al + Sn + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Al + Xe + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	$\mathbf{E'}/\mathbf{T}$	1656
Al + Gd + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	$\mathbf{E'}/\mathbf{T}$	1656
Al + W + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Al + Pt + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
Al + Au + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Al + Pb + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
Al + U + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T	1656
$Al + H_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$Al + H_2O + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Al + CH_4 + Al$	Part. Beam-Matter Interaction	0.001 - 1000  MeV	E/T	1656
$Al + CO_2 + Al$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$Al + N_2 + Al$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$AI + O_2 + AI$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$AI + AI_2O_3 + AI$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{S}\mathbf{I}^{12\mathbf{T}} + \mathbf{C} + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	100-40,000 keV/u	E/T	1585
$S1^{10+} + C + AI$	Part. Beam-Matter Interaction	100-40,000 keV/u	E/T	1585
$\mathbf{S}_{\mathbf{I}^{++}}^{\mathbf{I}^{++}} + \mathbf{C} + \mathbf{A}_{\mathbf{I}}$	Part. Beam-Matter Interaction	100-40,000 keV/u	E/T	1585
$\mathbf{SI}^{+} + \mathbf{AI}_2\mathbf{U}_3 + \mathbf{AI}$	Part. Beam-Matter Interaction	40-1250 KeV/amu 84 927 MaV	Exp E	1588
$\mathbf{S}\mathbf{I}$ + $\mathbf{r}\mathbf{e}$ + $\mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	84-237 MeV	Exp	1594

$\mathrm{Si^{+}+Ga+Al}$	Part.	Beam-Matter Interaction	$84\text{-}237~\mathrm{MeV}$	$\operatorname{Exp}$	1594
$Si^+ + Fe + Al$	Part.	Beam-Matter Interaction	$6-86 {\rm ~MeV}$	$\operatorname{Exp}$	1619
$Si^+ + Ag + Al$	Part.	Beam-Matter Interaction	$6-86 {\rm ~MeV}$	$\operatorname{Exp}$	1619
$Si^+ + Au + Al$	Part.	Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp	1619
$Si^{5+} + C + Al$	Part.	Beam-Matter Interaction	4.3 MeV/amu	Exp	1630
$Si^{5+} + C + Al$	Part.	Beam-Matter Interaction	$2.65-6.0 { m MeV/u}$	Exp	1652
Si + He + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Be + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Si + C + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Si + Ne + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Si + Al + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Si + Si + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Si + Ar + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Si + Ti + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Si + Fe + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Si + Ni + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Cu + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Ge + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Kr + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Mo + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Ag + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Sn + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Xe + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Gd + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + W + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Pt + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Si + Au + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m ~MeV}$	E/T	1656
Si + Pb + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Si + U + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Si + H_2 + Al$	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Si + H_2O + Al$	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$Si + CH_4 + Al$	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$Si + CO_2 + Al$	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$Si + N_2 + Al$	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
$Si + O_2 + Al$	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{Si} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}$	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
P + He + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
P + Be + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
P + C + AI	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
P + Ne + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T D/T	1656
P + AI + AI	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1050
P + SI + AI	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1650
$\mathbf{P} + \mathbf{A}\mathbf{r} + \mathbf{A}\mathbf{I}$	Part.	Beam Matter Interaction	0.001-1000 MeV	Е/ 1 Б /Т	1000
P + II + AI $D + E_2 + AI$	Part.	Beam Matter Interaction	0.001-1000 MeV	Е/ 1 Б /Т	1000
$\mathbf{r} + \mathbf{r}\mathbf{e} + \mathbf{A}\mathbf{I}$ $\mathbf{D} + \mathbf{N}\mathbf{i} + \mathbf{A}\mathbf{I}$	Part.	Beam-Matter Interaction	0.001-1000  MeV	Б/Т Б/Т	1656
$\mathbf{I} + \mathbf{N}\mathbf{I} + \mathbf{A}\mathbf{I}$ $\mathbf{P} + \mathbf{C}\mathbf{u} + \mathbf{A}\mathbf{I}$	Dort	Beam Matter Interaction	0.001-1000  MeV	Б/Т Б/Т	1656
$\mathbf{P} + \mathbf{C}\mathbf{a} + \mathbf{A}\mathbf{I}$	Dort	Beam Matter Interaction	0.001-1000  MeV	Б/Т Б/Т	1656
$P \pm Kr \pm \Lambda$	Port	Beam Matter Interaction	0.001-1000  MeV	$\mathbf{E}/\mathbf{T}$	1656
$P + M_0 + \Delta l$	Part	Beam-Matter Interaction	0.001-1000 MeV	Б/Т Е/Т	1656
$P + A\sigma + Al$	Part	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
P + Sn + Al	Part	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
P + Xe + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
P + Gd + Al	Part	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
P + W + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
P + Pt + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
P + Au + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E'T	1656

P + Pb + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
P + U + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$P + H_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$P + H_2O + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$\mathbf{P} + \mathbf{CH}_4 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$P + CO_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$\mathbf{P} + \mathbf{N}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$P + O_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$P + Al_2O_3 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
$S^+ + Fe + Al$	Part. Beam-Matter Interaction	$84\text{-}237~\mathrm{MeV}$	Exp	1594
$S^+ + Ga + Al$	Part. Beam-Matter Interaction	$84\text{-}237~\mathrm{MeV}$	$\operatorname{Exp}$	1594
$S^{6+} + C + Al$	Part. Beam-Matter Interaction	2  MeV/u	$\operatorname{Exp}$	1636
$S^{7+} + C + Al$	Part. Beam-Matter Interaction	2  MeV/u	$\operatorname{Exp}$	1636
$S^{8+} + C + Al$	Part. Beam-Matter Interaction	2  MeV/u	$\operatorname{Exp}$	1636
$S^+ + SiN + Al$	Part. Beam-Matter Interaction	$0.4-4.0 { m MeV}$	$\operatorname{Exp}$	1650
S + He + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
S + Be + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
S + C + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
S + Ne + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
S + Al + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
S + Si + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
S + Ar + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
S + Ti + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
S + Fe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
S + Ni + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
S + Cu + Al	Part. Beam-Matter Interaction	0.001 - 1000  MeV	E/T	1656
S + Ge + Al	Part. Beam-Matter Interaction	0.001 - 1000  MeV	E/T	1656
S + Kr + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
S + Mo + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
S + Ag + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
S + Sn + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
S + Xe + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
S + Gd + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
S + W + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{S} + \mathbf{Pt} + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
S + Au + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
S + Pb + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
S + U + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{S} + \mathbf{H}_2 + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{S} + \mathbf{H}_2 \mathbf{O} + \mathbf{A} \mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$S + CH_4 + AI$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$S + CO_2 + AI$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$\mathbf{S} + \mathbf{N}_2 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1050
$\mathbf{S} + \mathbf{O}_2 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1050
$\mathbf{S} + \mathbf{AI}_2\mathbf{O}_3 + \mathbf{AI}_2$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1050
CI + He + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T	1050
CI + Be + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/1 E/T	1000
CI + C + AI	Part. Deam-Matter Interaction	0.001-1000 MeV	Е/ I Е /Т	1000
$C_1 + M_2 + A_1$ $C_1 + A_1 + A_1$	Part Boam Matter Interaction	0.001-1000  MeV	ці/ т Е / т	1656
CI + AI + AI CI + SI + AI	Part Boam Matter Interaction	0.001-1000  MeV	ці/ т Е / т	1656
$C_1 + S_1 + A_1$ $C_1 + A_r + A_1$	Part Boam Matter Interaction	0.001-1000  MeV	ці/ т Е / т	1656
CI + AI + AI CI + Ti + AI	Part Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Cl + Fe + \Delta l$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
$Cl + Ni + \Delta l$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Cl + Cu + Al	Part Beam-Matter Interaction	0 001-1000 MeV	E/T	1656
Cl + Ge + Al	Part Beam-Matter Interaction	0 001-1000 MeV	E/T	1656
	i are, beam-matter interaction	0.001-1000 1000 4	ъ/ т	1000

Cl + Kr + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Cl + Mo + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Cl + Ag + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Cl + Sn + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Cl + Xe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T	1656
Cl + Gd + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Cl + W + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Cl + Pt + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Cl + Au + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Cl + Pb + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
Cl + U + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Cl + H_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Cl + H_2O + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T	1656
$Cl + CH_4 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
$Cl + CO_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	$\dot{\mathrm{E}/\mathrm{T}}$	1656
$Cl + N_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
$Cl + O_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
$Cl + Al_2O_3 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$	1656
$Ar^{13+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	$\dot{E/T}$	1585
$Ar^{14+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	$\dot{\mathrm{E}/\mathrm{T}}$	1585
$Ar^{15+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	$\dot{E/T}$	1585
$Ar^{16+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	$\dot{\mathrm{E}/\mathrm{T}}$	1585
$Ar^{17+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	$\dot{\mathrm{E}/\mathrm{T}}$	1585
$Ar^{18+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	$\dot{\mathrm{E/T}}$	1585
$Ar^{18+} + C + Al$	Part. Beam-Matter Interaction	13.6 MeV/u	Exp	1623
$Ar^{8+} + C + Al$	Part. Beam-Matter Interaction	4.3 MeV/amu	Exp	1630
$Ar^{13+} + C + Al$	Part. Beam-Matter Interaction	4.3-20 MeV/amu	E/T	1631
$Ar^{14+} + C + Al$	Part. Beam-Matter Interaction	4.3-20  MeV/amu	E/T	1631
$Ar^{15+} + C + Al$	Part. Beam-Matter Interaction	4.3-20  MeV/amu	E/T	1631
$Ar^{16+} + C + Al$	Part. Beam-Matter Interaction	4.3-20 MeV/amu	E/T	1631
$Ar^{17+} + C + Al$	Part. Beam-Matter Interaction	$4.3-20 \ \mathrm{MeV}/\mathrm{amu}$	E/T	1631
$Ar^{18+} + C + Al$	Part. Beam-Matter Interaction	$4.3-20 \ \mathrm{MeV/amu}$	E/T	1631
$Ar^+ + C + Al$	Part. Beam-Matter Interaction	$400 { m MeV/amu}$	E/T	1633
$Ar^+ + Al + Al$	Part. Beam-Matter Interaction	400 MeV/amu	E/T	1633
$Ar^+ + Cu + Al$	Part. Beam-Matter Interaction	400 MeV/amu	E/T	1633
$Ar^+ + Sn + Al$	Part. Beam-Matter Interaction	400 MeV/amu	E/T	1633
$Ar^+ + Pb + Al$	Part. Beam-Matter Interaction	400 MeV/amu	E/T	1633
Ar + He + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Ar + Be + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Ar + C + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Ar + Ne + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Ar + Al + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Ar + Si + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T	1656
Ar + Ar + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ar + Ti + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ar + Fe + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ar + Ni + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ar + Cu + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ar + Ge + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ar + Kr + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ar + Mo + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T	1656
Ar + Ag + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T E/T	1656
Ar + Sn + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T E/T	1050
Ar + Ae + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T E/T	1050
Ar + Ga + Al Ar + W + Al	Fart. Deam-Matter Interaction	0.001-1000 MeV	с/ 1 F /т	1050 1656
Ar + W + AI $Ar + Dt + AI$	Part Deam Matter Interaction	0.001-1000  MeV 0.001.1000 MeV	С/ 1 Б /Т	1000
$\mathbf{A}\mathbf{r} + \mathbf{r}\mathbf{t} + \mathbf{A}\mathbf{l}$	rant. Deam-Matter Interaction	0.001-1000 MeV	$\mathbf{L}/1$	1020

Ar + Au + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
Ar + Pb + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
Ar + U + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
$Ar + H_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
$Ar + H_2O + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
$Ar + CH_4 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \mathrm{MeV}$	E/T	1656
$Ar + CO_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
$Ar + N_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
$Ar + O_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
$Ar + Al_2O_3 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T	1656
$Ca^{15+} + SiO_2 + Al$	Part. Beam-Matter Interaction	11.4  MeV/u	Exp	1583
$Ca^{16+} + SiO_2 + Al$	Part. Beam-Matter Interaction	11.4  MeV/u	$\operatorname{Exp}$	1583
$Ca^{17+} + SiO_2 + Al$	Part. Beam-Matter Interaction	11.4  MeV/u	$\operatorname{Exp}$	1583
$Ca^{18+} + SiO_2 + Al$	Part. Beam-Matter Interaction	11.4  MeV/u	$\operatorname{Exp}$	1583
$Ca^{19+} + SiO_2 + Al$	Part. Beam-Matter Interaction	11.4  MeV/u	$\operatorname{Exp}$	1583
$Ca^+ + SiC + Al$	Part. Beam-Matter Interaction	40-680  keV/u	E/T	1593
$Ca^+ + C + Al$	Part. Beam-Matter Interaction	$5-250 { m MeV}$	Exp	1617
$Ca^+ + Ni + Al$	Part. Beam-Matter Interaction	$5-250 { m MeV}$	$\operatorname{Exp}$	1617
$Ca^+ + Au + Al$	Part. Beam-Matter Interaction	$5-250 { m MeV}$	$\operatorname{Exp}$	1617
$Ca^{6+} + C + Al$	Part. Beam-Matter Interaction	$4.3 \ \mathrm{MeV/amu}$	$\operatorname{Exp}$	1630
$Ti^+ + SiC + Al$	Part. Beam-Matter Interaction	40-680  keV/u	E/T	1593
$\mathrm{Fe}^{19+} + \mathrm{C} + \mathrm{Al}$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$\mathbf{F}\mathbf{e}^{20+} + \mathbf{C} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$\mathbf{F}\mathbf{e}^{21+} + \mathbf{C} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$Fe^{22+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$\mathrm{Fe}^{23+} + \mathrm{C} + \mathrm{Al}$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$\mathrm{Fe}^{24+} + \mathrm{C} + \mathrm{Al}$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$\mathrm{Fe}^{25+} + \mathrm{C} + \mathrm{Al}$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$\mathrm{Fe}^{26+} + \mathrm{C} + \mathrm{Al}$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T	1585
$Fe^+ + Fe + Al$	Part. Beam-Matter Interaction	10  keV	$\mathrm{Th}$	1627
$Fe^{9+} + C + Al$	Part. Beam-Matter Interaction	4.3 MeV/amu	Exp	1630
$Fe^+ + SiN + AI$	Part. Beam-Matter Interaction	0.4-4.0 MeV	Exp	1650
$Ni^{13+} + C + Al$	Part. Beam-Matter Interaction	1 MeV/u	Th	1596
$Ni^{1}$ + C + Al	Part. Beam-Matter Interaction	l MeV/u	Th	1596
$Ni^{22+} + C + AI$	Part. Beam-Matter Interaction	I MeV/u	Th	1596
$Ni^{1++} + C + AI$	Part. Beam-Matter Interaction	20-100 MeV/u	Exp	1648
$NI^{++} + C + AI$	Part. Beam-Matter Interaction	20-100  MeV/u	Exp	1648
$Cu^+ + H_2 + Al$	Part. Beam-Matter Interaction	100  keV/u	E/I E/T	1605
$Cu^+ + N_2 + Al$ $Cu^+ + E_2 + Al$	Part. Beam-Matter Interaction	100  KeV/u	E/1 E-m	1610
$Cu^+ + Fe + AI$ $Cu^+ + Ag + AI$	Part Boam Matter Interaction	6.86 MoV	Exp Evp	1610
$Cu^+ + Ag + Al$ $Cu^+ + Au + Al$	Part Boam Matter Interaction	6 86 MoV	Exp Evp	1610
$\operatorname{Zn}^+ \pm \operatorname{SiO}_2 \pm \operatorname{Al}$	Part Beam-Matter Interaction	60 keV	Exp	1621
$\mathbf{Kr}^+ + \Delta \mathbf{I} + \Delta \mathbf{I}$	Part Beam-Matter Interaction	20-160 keV	Evn	1589
$\mathbf{Kr}^{32+} + \mathbf{C} + \mathbf{Al}$	Part Beam-Matter Interaction	$20-100 \text{ MeV}/\mu$	Exp	1648
$\mathbf{Kr}^{34+} + \mathbf{C} + \mathbf{Al}$	Part Beam-Matter Interaction	20-100 MeV/u	Exp	1648
$Xe^+ + C + Al$	Part Beam-Matter Interaction	$0.1 - 10^3 \text{ MeV/u}$	$\frac{1}{Th}$	1597
$Ba^+ + Fe + Al$	Part. Beam-Matter Interaction	6-86 MeV	Exp	1619
$Ba^+ + Ag + Al$	Part. Beam-Matter Interaction	6-86 MeV	Exp	1619
$Ba^+ + Au + Al$	Part. Beam-Matter Interaction	6-86 MeV	Exp	1619
$Au^+ + C + Al$	Part. Beam-Matter Interaction	$0.1-10^3 \mathrm{~MeV/u}$	Th	1597
$Au^+ + C + Al$	Part. Beam-Matter Interaction	1-1000  keV	$\mathrm{Th}$	1608
$Au^+ + Fe + Al$	Part. Beam-Matter Interaction	$6-86 { m MeV}$	Exp	1619
$Au^+ + Ag + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp	1619
$Au^+ + Au + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp	1619
$Au^+ + C + Al$	Part. Beam-Matter Interaction	$1-1000 {\rm ~keV}$	$\mathrm{Th}$	1642
$Pb^{56+} + Si + Al$	Part. Beam-Matter Interaction	$29 { m MeV/u}$	$\mathrm{E}/\mathrm{T}$	1595

$Pb^+ + C + Al$	Part.	Beam-Matter I	Interaction	$0.1 - 10^3 \text{ MeV/u}$	Th	1597
$\mathbf{U}^{91+} + \mathbf{Si} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	29 MeV/u	E/T	1595
$U^+ + C + Al$	Part.	Beam-Matter I	Interaction	$0.1 - 10^3 \text{ MeV/u}$	Th	1597
$\mathbf{U}^{81+} + \mathbf{B} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	60-200 MeV/u	Exp	1599
$\mathbf{U}^{81+} + \mathbf{C} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	60-200 MeV/u	Exp	1599
$\mathbf{U}^{81+} + \mathbf{Ne} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	60-200  MeV/u	Exp	1599
$U^{81+} + Si + Al$	Part.	Beam-Matter I	Interaction	60-200  MeV/u	Exp	1599
$\mathbf{U}^{81+} + \mathbf{Cl} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	60-200  MeV/u	Exp	1599
$U^{81+} + Ti + Al$	Part.	Beam-Matter I	Interaction	60-200  MeV/u	Exp	1599
$\mathbf{U}^{81+} + \mathbf{Cu} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	60-200  MeV/u	Exp	1599
$\mathbf{U}^{81+} + \mathbf{Br} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	60-200  MeV/u	Exp	1599
$\mathbf{U}^{81+} + \mathbf{Pd} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	60-200  MeV/u	Exp	1599
$\mathbf{U}^{81+} + \mathbf{Xe} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	60-200  MeV/u	Exp	1599
$\mathbf{U}^{81+} + \mathbf{Au} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	60-200  MeV/u	Exp	1599
e + Ar + Al	Part.	Beam-Matter I	Interaction	$10^2 - 10^5 \text{ eV}$	E/T	1586
e + Al + Al	Part.	Beam-Matter I	Interaction	$0.01-10 { m MeV}$	$\mathrm{Th}$	1602
e + Si + Al	Part.	Beam-Matter I	Interaction	$0.01-10 { m MeV}$	$\mathrm{Th}$	1602
e + C + Al	Part.	Beam-Matter I	Interaction	500  eV	$\mathrm{Th}$	1635
$\mathbf{H}_{2}^{+} + \mathbf{C} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	0.5 MeV/amu	$\mathrm{Th}$	1645
$D^+ + Ni + Al$	Part.	Beam-Matter I	Interaction	0.166-2.72  MeV/amu	Exp	1610
$D^+ + Au + Al$	Part.	Beam-Matter I	Interaction	$0.33-10 \ \text{keV}$	Exp	1618
$\mathbf{N}_{2}^{+} + \mathbf{C} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	100-400  keV/u	Th	1581
$\mathbf{N}_{2}^{+} + \mathbf{C} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction		Th	1638
$\mathbf{O}_2^+ + \mathbf{GaAs} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	$0.5-1 { m MeV}$	Exp	1625
$\mathbf{O}_2{}^{3+} + \mathbf{GaAs} + \mathbf{Al}$	Part.	Beam-Matter I	Interaction	$0.5-1 { m MeV}$	Exp	1625
$A^+ + A + Al$	Part.	Beam-Matter I	Interaction	0.025-1000  MeV/u	E/T	1604
$C_2^+ + Si + Al$	Part.	Beam-Matter I	Interaction	1.8 MeV/amu	Exp	1620
$\mathrm{C_{2}^{+}+GaAs+Al}$	Part.	Beam-Matter I	Interaction	$0.5-1 { m MeV}$	Exp	1625
$C_2^+ + C + Al$	Part.	Beam-Matter I	Interaction	1-2 MeV	$\mathrm{Th}$	1651
$C_2^+ + Al + Al$	Part.	Beam-Matter I	Interaction	1-2 MeV	$\mathrm{Th}$	1651
He + He Z = ?-? + Al	Part.	Beam-Matter I	Interaction	25-500  eV	Th	1590
Ne + He Z = ?-? + Al	Part.	Beam-Matter I	Interaction	25-500  eV	$\mathrm{Th}$	1590
Al + He Z = ?-? + Al	Part.	Beam-Matter I	Interaction	25-500  eV	Th	1590

## 2.7 Interactions of Atomic Particles with Fields

H + Al	Atom Field Interaction	0.001-0.009 a.u.	$\mathrm{Th}$	1664
$H^* + Al$	Atom Field Interaction	0.001-0.009 a.u.	$\mathrm{Th}$	1664
H + Al	Atom Field Interaction	8.9-36 GHz	$\mathrm{Th}$	1666
H + Al	Atom Field Interaction	$10^{-3} - 0.2$ a.u.	$\mathrm{Th}$	1667
H + Al	Atom Field Interaction	$0 - 10^{13} { m Ga}$	$\mathrm{Th}$	1668
H + Al	Atom Field Interaction		$\mathrm{Th}$	1669
H + Al	Atom Field Interaction	$1.93 \mathrm{~eV}$	$\mathrm{Th}$	1672
H + Al	Atom Field Interaction		$\mathrm{Th}$	1676
$H^* + Al$	Atom Field Interaction		$\mathrm{Th}$	1676
$\mathrm{H^{+} + H + Al}$	Atom Field Interaction	1.21  keV	$\mathrm{Th}$	1683
H + Al	Atom Field Interaction		$\mathrm{Th}$	1687
$H^* + Al$	Atom Field Interaction		$\mathrm{Th}$	1687
$H^- + Al$	Atom Field Interaction	$0.75\text{-}1.05~\mathrm{eV}$	$\mathrm{Th}$	1688
$H^- + Al$	Atom Field Interaction	$0-500 \ cm^{-1}$	$\mathrm{Th}$	1693
H + Al	Atom Field Interaction	$10^8 \text{ V/m}$	$\mathrm{Th}$	1695
H + Al	Atom Field Interaction		$\mathrm{Th}$	1704
H + Al	Atom Field Interaction		$\mathrm{Th}$	1706
$H^- + Al$	Atom Field Interaction		$\mathrm{Th}$	1710
H + Al	Atom Field Interaction		$\mathrm{Th}$	1710

Atom Field Interaction	
Atom Field Interaction	1 n
Atom Field Interaction	10
Atom Field Interaction	1-1
Atom Field Interaction	0-6
Atom Field Interaction	810
Atom Field Interaction	11.
Atom Field Interaction	11.
Atom Field Interaction	2-3
Atom Field Interaction	318
Atom Field Interaction	1 k
Atom Field Interaction	85-
Atom Field Interaction	41.
Atom Field Interaction	
Atom Field Interaction	
Atom Field Interaction	1.9
Atom Field Interaction	1.9
Atom Field Interaction	10
Atom Field Interaction	500
Atom Field Interaction	1-6
Atom Field Interaction	
Atom Field Interaction	
Atom Field Interaction	8.9
Atom Field Interaction	
Atom Field Interaction	l n
Atom Field Interaction	l n
Atom Field Interaction	10-
Atom Field Interaction	-E
Atom Field Interaction	
Atom Field Interaction	1 1
Atom Field Interaction	10
Atom Field Interaction	10
Atom Field Interaction	0.2
Atom Field Interaction	0.2
Atom Field Interaction	1-1
Atom Field Interaction	800
Atom Field Interaction	000
Atom Field Interaction	871
Atom Field Interaction	0.1
Atom Field Interaction	8.9
Atom Field Interaction	1 n
Atom Field Interaction	3x
Atom Field Interaction	3x
Atom Field Interaction	-E
Atom Field Interaction	
Atom Field Interaction	1-1
Atom Field Interaction	800
Atom Field Interaction	195
Atom Field Interaction	1-2
Atom Field Interaction	
Atom Field Interaction	0-1
Atom Field Interaction	$1x^{2}$
Atom Field Interaction	-E
Atom Field Interaction	300
Atom Field Interaction	1-1
Atom Field Interaction	500
	Atom Field Interaction Atom Field Interaction

	Exp	1715
1 mK	Th	1723
10 a.u.	Th	1730
1-10 T	Th	1733
$0-60\ 000\ cm^{-1}$	Th	1740
810 nm	тп F/T	1671
11 9 40 50 eV		1674
11.2-49.50 eV		1074
11.2-49.50 eV		1074
2-30 eV	Th	1675
318.8 nm	Exp	1677
1 keV	Th	1689
85-90  eV	$\mathrm{Th}$	1696
41.85-51.15  eV	$\mathrm{Th}$	1709
	$\mathrm{Th}$	1710
	$\operatorname{Exp}$	1711
1.9-2.7 mK	E/T	1720
1.9-2.7 mK	E/T	1720
10 a.u.	Th	1730
$5000 \text{ \AA}$	$\mathrm{Th}$	1731
1-6  kV/cm	Exp	1737
/	Exp	1747
	Th	1749
8.9-36 GHz	Th	1666
	Th	1670
1 mK	Th	1682
1 mK	Th	1723
$10^{-4} K$	Fyn	1720
$F F F - 1/2m^{5}$	- Exp Th	1724
$-E - E E = 1/3n_0$	111 Th	1734
		1676
1 37 37/		1070
1 MeV/u		1718
10 a.u.		1730
1-10 1	Th	1733
0.2-2.5 eV	E/T	1735
1-10 '1'	Th	1733
	Th	1676
800 nm	Exp	1660
	$\mathrm{Th}$	1676
871.7  eV	$\mathrm{Th}$	1707
	$\mathrm{Th}$	1714
8.9-36 GHz	$\mathrm{Th}$	1666
1  mK	$\mathrm{Th}$	1682
$3x10^{-5} { m K}$	$\operatorname{Exp}$	1722
$3x10^{-5}$ K	$\operatorname{Exp}$	1722
-E - E E= $1/3n_0^5$	$\mathrm{Th}$	1734
	$\mathrm{Th}$	1717
1-10 T	$\mathrm{Th}$	1733
800 nm	Exp	1660
195 K	Th	1739
$1-2 \ 10^{14} \ \mathrm{W}/cm^2$	$\mathrm{Th}$	1741
,	$\mathrm{Th}$	1744
0-1 T	Th	1662
$1x10^{-6}$ K	Exp	1681
$-E - E E = 1/3n_0^5$	Th	1734
300 K	Th	1728
1-10 T	Th	1733
5000-50 000 K	Th	1759
5000-00,000 IL	T 11	1104

$Ti^{2+} + Al$	Atom Field Interaction	$5000-50,000 { m K}$	$\mathrm{Th}$	1752
V + Al	Atom Field Interaction		$\mathrm{Th}$	1729
$Cr^{23+} + Al$	Atom Field Interaction	1-10 T	$\mathrm{Th}$	1733
$Cr^+ + Al$	Atom Field Interaction	5,000-100,000 K	$\mathrm{Th}$	1748
Ni + Al	Atom Field Interaction		$\mathrm{Th}$	1729
$Ge^{31+} + Al$	Atom Field Interaction	1-10 T	$\mathrm{Th}$	1733
Kr + Al	Atom Field Interaction	800 nm	$\mathrm{Th}$	1697
Rb + Al	Atom Field Interaction	0-1 T	$\mathrm{Th}$	1662
Rb + Rb + Al	Atom Field Interaction	10  cm/s	Exp	1665
$Rb + Rb^* + Al$	Atom Field Interaction	10  cm/s	Exp	1665
Rb + Al	Atom Field Interaction	8.9-36 GHz	$\mathbf{Th}$	1666
Rb + Rb + Al	Atom Field Interaction	$2x10^{-4}$ K	E/T	1719
$Rb + Rb^* + Al$	Atom Field Interaction	$2x10^{-4}$ K	$\mathbf{E'T}$	1719
Rb + Rb + Al	Atom Field Interaction	$10^{-4}$ K	-7 - Th	1725
$Rb + Rb^* + Al$	Atom Field Interaction	$10^{-4}$ K	Th	1725
Rb + Rb + Al	Atom Field Interaction	10 11	Th	1727
$Rb + Rb^* + Al$	Atom Field Interaction		Th	1727
Rb + Al	Atom Field Interaction	$-E - E E = 1/3n_0^5$	Th	1734
Nb + Al	Atom Field Interaction		Th	1729
$Pd \perp Al$	Atom Field Interaction		Th	1720
$I = \bot AI$	Atom Field Interaction		Th	1676
$\mathbf{X}_{0} \perp \mathbf{A}_{1}$	Atom Field Interaction	$1.03 \mathrm{eV}$	Th	1672
Xe + Al	Atom Field Interaction	1.55 CV	Th	1676
Ae + Al $V_{e} + Al + Al$	Atom Field Interaction	0.005.0.01 e.u	111 Th	1694
Ae + AI + AI	Atom Field Interaction	0.005 - 0.01 a.u.	111 Th	1694
Ae + AI + AI	Atom Field Interaction	0.005-0.01 a.u.	1 II Furn	1004
$Ae^{+} + AI$ $Ve^{53+} + AI$	Atom Field Interaction	1 10 T	Exp Th	1712
Ae + AI	Atom Field Interaction	1-10 1 1 2 1014 W/ $am^2$	111 Th	1733
Ae + Al	Atom Field Interaction	1-2 10 W/Cm	1 II E-m	1741
Ae + Al	Atom Field Interaction	1.55 eV	Exp E/T	1740
Ae + Al	Atom Field Interaction	0-4000  V/cm	E/I	1751
$Ae^{+} + AI$	Atom Field Interaction	0-4000  V/cm	E/1 Th	1701
Cs + Al	Atom Field Interaction	0-1 1		1002
Cs + Al	Atom Field Interaction	0.001-0.009 a.u.		1004
$Cs^* + AI$	Atom Field Interaction	0.001-0.009 a.u.	Th	1664
Cs + Cs + Al	Atom Field Interaction	$1.5x10^{-4}$ K	Th	1721
$Cs + Cs^* + Al$	Atom Field Interaction	$1.5x10^{-4}$ K	Th	1721
Cs + Rb + Al	Atom Field Interaction	$0.5x10^{-4} - 1.5x10^{-4}$ K	Th	1726
$Cs + Rb^* + Al$	Atom Field Interaction	$0.5x10^{-4} - 1.5x10^{-4}$ K	Th	1726
Cs + Al	Atom Field Interaction	$-E - E E = 1/3n_0^3$	Th	1734
$Ba^+ + Al$	Atom Field Interaction	0-1 T	$^{Th}$	1662
Ba + Al	Atom Field Interaction	50-70 GHz	Exp	1680
$Ba^* + Al$	Atom Field Interaction	50-70 GHz	Exp	1680
Ta + Al	Atom Field Interaction		Th	1729
Au + Al	Atom Field Interaction	0-1 T	$\mathrm{Th}$	1662
$Au^+ + Al$	Atom Field Interaction		$\operatorname{Exp}$	1673
Tl + Al	Atom Field Interaction	0-1 T	$\mathrm{Th}$	1662
$Pb^{2+} + Al$	Atom Field Interaction	$25,200 \mathrm{K}$	$\operatorname{Exp}$	1732
$Pb^{81+} + Al$	Atom Field Interaction	1-10 T	$\mathrm{Th}$	1733
$Bi^{82+} + Al$	Atom Field Interaction	1-10 T	$\mathrm{Th}$	1733
Fr + Al	Atom Field Interaction	0-1 T	$\mathrm{Th}$	1662
$\mathbf{U}^{91+} + \mathbf{Al}$	Atom Field Interaction	1-10 T	$\mathrm{Th}$	1733
e + He + Al	Atom Field Interaction	4-22  eV	$\mathrm{Th}$	1658
$\mathrm{e} + \mathrm{He^+} + \mathrm{Al}$	Atom Field Interaction	200-500  eV	$\mathrm{Th}$	1663
e + H + Al	Atom Field Interaction		$\mathrm{Th}$	1706
$\mathbf{e} + \mathbf{C}^{6+} + \mathbf{Al}$	Atom Field Interaction	$10^{-5} - 10^0 \text{ eV}$	E/T	1738
$\mathbf{e} + \mathbf{H}_2{}^+ + \mathbf{A} \mathbf{l}$	Atom Field Interaction	800-1850 nm	Th	1742
$H_2 + Al$	Atom Field Interaction	2-30  eV	$\mathrm{Th}$	1675

$H_2 + Al$	Atom Field Interaction	758 nm	$\mathrm{Th}$	1686
$\mathbf{H}_{2}^{+} + \mathbf{A}\mathbf{l}$	Atom Field Interaction	758 nm	Th	1686
$\mathbf{H}_{2}^{+} + \mathbf{A}\mathbf{l}$	Atom Field Interaction	0.043 a.u.	Th	1692
$H_2 + Al$	Atom Field Interaction	800 nm	Th	1694
$\mathbf{H}_{2}^{+} + \mathbf{Al}$	Atom Field Interaction	790 nm	E/T	1701
$\mathbf{H}_{2}^{+} + \mathbf{Al}$	Atom Field Interaction	$10^{14} \text{ W/cm}^2$	Th	1703
$H_2 + Al$	Atom Field Interaction	41.7  eV	Exp	1708
$\mathbf{H}_{2}^{+} + \mathbf{Al}$	Atom Field Interaction	$2\text{-}2000 \ 10^5 \text{ T}$	Th	1713
$\mathbf{H}_{2}^{+} + \mathbf{Al}$	Atom Field Interaction		Th	1716
$\mathbf{H}_{2}^{+} + \mathbf{Al}$	Atom Field Interaction	0-60 $U_p$	Th	1736
$H_2 + Al$	Atom Field Interaction		Th	1746
$\mathbf{H}_{2}^{+} + \mathbf{Al}$	Atom Field Interaction		Exp	1747
$\mathbf{H}_{3}^{2+} + \mathbf{Al}$	Atom Field Interaction		Th	1657
$H_3 + Al$	Atom Field Interaction		Th	1702
$H_2O + Al$	Atom Field Interaction	1 K	Exp	1691
$\mathbf{D}_2 + \mathbf{Al}$	Atom Field Interaction	800 nm	$\mathrm{Th}$	1694
$\mathbf{D}_2 + \mathbf{Al}$	Atom Field Interaction	41.7  eV	$\operatorname{Exp}$	1708
$D_2O + Al$	Atom Field Interaction	1 K	$\operatorname{Exp}$	1691
$\mathrm{He}_{2}^{2+} + \mathrm{Al}$	Atom Field Interaction	0-4 a.u.	$\mathrm{Th}$	1743
$CH_4 + Al$	Atom Field Interaction	163-297 K	$\mathrm{Th}$	1661
$\mathbf{CO}_2^+ + \mathbf{Al}$	Atom Field Interaction	$3x10^{13} - 6x10^{16} \text{ W/}cm^2$	$\operatorname{Exp}$	1699
$N_2 + Al$	Atom Field Interaction	790 nm	$\operatorname{Exp}$	1685
$N_2 + Al$	Atom Field Interaction	400-1200 nm	$\operatorname{Exp}$	1690
$N_2 + Al$	Atom Field Interaction	800 nm	$\mathrm{Th}$	1694
$N_2 + Al$	Atom Field Interaction	$1-2 \ 10^{14} \ \mathrm{W}/cm^2$	$\mathrm{Th}$	1741
NH + NH + Al	Atom Field Interaction	$10^{-6} \text{ K}$	$\mathrm{Th}$	1750
$O_2 + Al$	Atom Field Interaction	550-1800 nm	$\operatorname{Exp}$	1659
$O_2 + Al$	Atom Field Interaction	800 nm	$\mathrm{Th}$	1694
$O_2 + Al$	Atom Field Interaction	$1-2 \ 10^{14} \ W/cm^2$	$\mathrm{Th}$	1741
$Li_2 + Al$	Atom Field Interaction	$12,500 \ cm^{-1}$	E/T	1679
OH + Al	Atom Field Interaction		E/T	1678
$CH_3I + Al$	Atom Field Interaction	$10^{12} - 10^{13} \text{ W/cm}^2$	$\operatorname{Exp}$	1700
$CH_3Cl + Al$	Atom Field Interaction	$10^{12} - 10^{13} \text{ W/cm}^2$	$\operatorname{Exp}$	1700
$CH_3Br + Al$	Atom Field Interaction	$10^{12} - 10^{13} \mathrm{W/cm^2}$	$\operatorname{Exp}$	1700
$Na_2 + Al$	Atom Field Interaction	$2.5-7.5, 10^{11} \text{ W/cm}^2$	Th	1705
HI + Al	Atom Field Interaction	$10^{13} \text{ W/cm}^2$	$\mathrm{Th}$	1698
$CH_3F + Al$	Atom Field Interaction	$10^{12} - 10^{13} \text{ W/}cm^2$	Exp	1700

# Chapter 3

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$\mathbf{O}^{5+}$	Energy Levels, Wavelengths	Exp
${f S}^{12+}$	Energy Levels, Wavelengths	Exp
$Ar^{13+}$	Energy Levels, Wavelengths	Exp
$\mathbf{K}^{15+}$	Energy Levels, Wavelengths	Exp
$Ca^{13+-16+}$	Energy Levels, Wavelengths	Exp
${f Fe}^{7+}$	Energy Levels, Wavelengths	Exp
$Fe^{10+-11+}$	Energy Levels, Wavelengths	Exp
$Fe^{14+-17+}$	Energy Levels, Wavelengths	Exp
$Fe^{22+-23+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Co}^{15+}$	Energy Levels, Wavelengths	Exp
$Ni^{16+}$	Energy Levels, Wavelengths	Exp

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Energy Levels, Wavelengths	Th
Energy Levels, Wavelengths	Th
	Energy Levels, Wavelengths Energy Levels, Wavelengths

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Energy Levels, Wavelengths

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16.	Kr S. A. Blundell, W. R. John Relativistic Many-Body Zinc Isoelectronic Seque Phys. Rev. A 77, 032507 (2 Cu Z= 82-83 Zn Z= 41-42 Zn Z= 44-50	Energy Levels, Wavelengths son, M. S. Safronova, U. I. Safronova Calculations of the Energies of n=4 States Along the ence 2008) Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Th Th Th		
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	<sup>9</sup> Be Be <sup>25</sup> Mg Mg <sup>43</sup> Ca Ca <sup>87</sup> Sr Sr	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th Th Th Th Th
22.	P. H. Mokler, J. R. Crespo Osborne, J. Ullrich, H. Wata <b>Two-Electron QED Cont</b> like Kr <sup>34+</sup> Long	López-Urrutia, F. J. Currell, N. Nakamura, S. Ohtani, C. J. anabe tributions to the Ground-State Binding Energy in He-	

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23. F. L. Yang, YG. Yi Electric Quadrupole Transitions of K-like Ions (Z=22-42) Acta Phys. Sin. 57-3, 1622-1625 (2008) KZ = 22-42 Energy Levels, Wavelengths Th 24. HL. Li, P. Li, Z. Cheng, HR. Ma Relativistic Configuration Interaction Calculations on Ko X-ray Satellites of Manganese Commun. Theor. Phys. 49-1, 217-220 (2008) Mn <sup>16+<math>-233+</math></sup> Energy Levels, Wavelengths Th 25. U. Feldman, J. E. Seely, E. Landi, Yu. Rakchenko Bright EUV Lines Emitted by Highly Ionized Tungsten Ions as Diagnostic Indi- cators of the Tungsten Transport in ITER Core Plasmas (T <sub>e</sub> > 7 keV) Nucl. Fusion 48, 045004 (2008) W <sup>68+<math>-71+</math></sup> Energy Levels, Wavelengths Th 26. J. Bieroń, C. Froese Fischer, P. Jönsson, P. Pyykkö Comment on the Magnetic Dipole Hyperfine Interaction in the Gold Atom Ground State J. Phys. B 41, 115002 (2008) Au Energy Levels, Wavelengths Th 27. A. Z. Msezane, Z. Felfli, D. Sokolovski Near-Threshold Resonances in Electron Elastic Scattering Cross Sections for Au and Pt Atoms: Identification of Electron Affinities J. Phys. B 41, 105201 (2008) Pt <sup>-</sup> Energy Levels, Wavelengths Th Au <sup>-</sup> Energy Levels, Wavelengths Th 28. N. C. Dob, A. Hibbert E1 Transitions Among the Levels of the 3d <sup>5</sup> , 3d <sup>4</sup> 4s and 3d <sup>4</sup> 4p Configurations in Fe IV J. J. Zhu, B. C. Gou, Y. D. Wang Energies, Fine Structure, Hyperfine Structure and Auger Widths of the Core- Exercited States for the Li Lisoeletronic Sequence J. Phys. B 41, 065702 (2008) Fe <sup>3++</sup> Energy Levels, Wavelengths Th <sup>45</sup> Na <sup>4+</sup> Energy Levels, Wavelengths Th <sup>45</sup> Na <sup>6+</sup> Energy Levels, Wavelengths		$\mathbf{Kr}^{34+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
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$ \begin{array}{c c c c c } Mn^{16+-23+} & Energy Levels, Wavelengths & Th \\ \hline \begin{timessay}{l c c c } Interpretation of the Tungsten Irransport in ITER Core Plasmas (T_c > 7 keV) \\ Nucl. Fusion 48, 045004 (2008) \\ \hline $W^{58+-71+}$ & Energy Levels, Wavelengths & Th \\ \hline \begin{timessay}{l c c c } Interpretation Int$	24.	HL. Li, P. Li, Z. Cheng, H Relativistic Configuratio Manganese Commun. Theor. Phys. 49-	-R. Ma on Interaction Calculations on $\mathbf{K}\alpha$ X-ray Satellites of 1, 217-220 (2008)	
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28. N. C. Deb, A. Hibbert E1 Transitions Among the Levels of the $3d^5$ , $3d^44s$ and $3d^44p$ Configurations in Fe IV J. Phys. B 41, 081007 (2008) Fe <sup>3+</sup> Energy Levels, Wavelengths E/2 29. J. J. Zhu, B. C. Gou, Y. D. Wang Energies, Fine Structure, Hyperfine Structure and Auger Widths of the Core- Excited States for the Li Isoelectronic Sequence J. Phys. B 41, 065702 (2008) Li Z= 10-20 Energy Levels, Wavelengths Th $^{19}Ne^{7+}$ Energy Levels, Wavelengths Th $^{23}Na^{8+}$ Energy Levels, Wavelengths Th $^{25}Mg^{9+}$ Energy Levels, Wavelengths Th $^{26}Mg^{9+}$ Energy Levels, Wavelengths Th $^{29}Si^{11+}$ Energy Levels, Wavelengths Th $^{39}Si^{13+}$ Energy Levels, Wavelengths Th $^{33}Si^{3+}$ Energy Levels, Wavelengths Th $^{35}Cl^{14+}$ Energy Levels, Wavelengths Th $^{35}Ar^{15+}$ Energy Levels, Wavelengths Th $^{39}K^{16+}$ Energy Levels, Wavelengths Th $^{39}K^{16+}$ Energy Levels, Wavelengths Th $^{30}Ca^{17+}$ Energy Levels, Wavelengths Th $^{30}K^{16+}$ Energy Levels, Wavelengths Th		$\mathbf{Pt}^{-}$ $\mathbf{Au}^{-}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th
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$ \begin{array}{cccccc} {\bf Li} \ {\bf Z} = 10\mathcal{10} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{19}{\rm Ne}^{7+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{23}{\rm Na}^{8+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{25}{\rm Mg}^{9+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{27}{\rm Al}^{10+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{29}{\rm Si}^{11+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{29}{\rm Si}^{11+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{31}{\rm P}^{12+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{33}{\rm S}^{13+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{35}{\rm Cl}^{14+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{35}{\rm Ar}^{15+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{39}{\rm K}^{16+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ {}^{40}{\rm Ca}^{17+} & {\rm Energy} \ {\rm Levels}, \ {\rm Wavelengths} & {\rm Th} \\ \end{array} $	29.	J. J. Zhu, B. C. Gou, Y. D. Energies, Fine Structure Excited States for the La J. Phys. B 41, 065702 (2008)	Wang e, Hyperfine Structure and Auger Widths of the Core- i Isoelectronic Sequence	
		$\begin{array}{l} {\bf Li}\; {\bf Z}{=}\; {\bf 10}{-}{\bf 20} \\ {}^{19}{\bf Ne}^{7+} \\ {}^{23}{\bf Na}^{8+} \\ {}^{25}{\bf Mg}^{9+} \\ {}^{27}{\bf Al}^{10+} \\ {}^{29}{\bf Si}^{11+} \\ {}^{31}{\bf P}^{12+} \\ {}^{33}{\bf S}^{13+} \\ {}^{35}{\bf Cl}^{14+} \\ {}^{35}{\bf Ar}^{15+} \\ {}^{39}{\bf K}^{16+} \\ {}^{40}{\bf Ca}^{17+} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th Th Th Th Th Th Th

30.	S. Mandal, G. Dixit, B. K. S <b>Theoretical Spectroscopi</b> <b>Low-Lying States in Ti I</b> J. Phys. B 41, 055701 (2008)	ahoo, R. K. Chaudhuri, S. Majumder ic Studies of the Atomic Transitions and Lifetimes of V	
	${f Ti}^{3+}$	Energy Levels, Wavelengths	Th
31.	T. Kato, H. Funaba, K. Sato A. Sasaki, F. Koike, K. Nish <b>EUV Spectroscopy of Xe</b> stitute for Fusion Science Collapse J. Phys. B 41, 035703 (2008)	o, D. Kato, MY. Song, N. Yamamoto, H. Tanuma, H. Ohashi, ihara, K. Fahy, G. O'Sullivan Ions from the Large Helical Device at the National In- for Stable Plasmas and Plasmas Undergoing Radiation	
	$Xe^{9+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{X}\mathbf{e}^{10+-10+}$ $\mathbf{X}\mathbf{e}^{23+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
32.	M. A. Baig, M. Hanif, M. As Laser-Optogalvanic Stud Krypton J. Phys. B 41, 035004 (2008)	$\frac{1}{100}$ slam lies of the 4p <sup>5</sup> ns and nd Autoionizing Resonances in	
	Kr	Energy Levels, Wavelengths	Exp
33.	<ul> <li>Yu. Ralchenko, I. N. Draga</li> <li>Feldman, G. E. Holland</li> <li>EUV Spectra of Highly-O</li> <li>J. Phys. B 41, 021003 (2008)</li> </ul>	anic, J. N. Tan, J. D. Gillaspy, J. M. Pomeroy, J. Reader, U. Charged Ions $\mathbf{W}^{54+}$ - $\mathbf{W}^{63+}$ Relevant to ITER Diagnostics	
	${f Hf}^{59+61+}_{{f Ta}^{60+62+}}_{{f W}^{54+63+}}_{{f Au}^{66+68+}}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp Exp
34.	<ol> <li>ZW. Wang, XR. Li, MH. Hu, Y. Liu, YN. Wang Transition Energy and Oscillator Strength of 1s<sup>2</sup>2p–1s<sup>2</sup>nd for Fe<sup>23+</sup> Ion Chin. Phys. Lett. 25, 2004-2007 (2008)</li> </ol>		
	$\mathbf{Fe}^{23+}$	Energy Levels, Wavelengths	Th
35.	M. Ascoli, E. E. Eyler, D. K <b>High-Resolution Saturat</b> <b>UV Laser</b> Meas. Sci. Technol. 19, 0456	awall, D. DeMille ion Spectroscopy of Singly-Ionized Iron with a Pulsed 502 (2008)	
	${ m Fe}^+$	Energy Levels, Wavelengths	Exp
36.	MH. Hu, ZW. Wang Behaviours of the Excite from $\mathbf{Z} = 11$ to $20$ Chin. Phys. B 17-3, 908-914	ed States 1s <sup>2</sup> np Along Lithium Isoelectronic Sequence (2008)	
	Li Z= 11-20	Energy Levels, Wavelengths	Th
37.	M. Huttula, K. Jänkälä, A. J Core Shell Electron Spection and Auger Decay of New J. Phys. 10, 013009 (20)	Mäkinen, H. Aksela, S. Aksela troscopy on High Temperature Vapors: 2s Photoioniza- Atomic Aluminium 08)	

	Al	Energy Levels, Wavelengths	Exp
38.	G. W. F. Drake, ZC. Yan <b>Properties of Halo Nucle</b> Nucl. Phys. A790, 151-160	ei from Atomic Isotope Shifts (2007)	
	He Z= 2-5 He $Li^{0+-2+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th
39.	D. Lukić, M. Schnell, D. W. Schippers, M. Lestinsky, F. Dielectronic Recombination ments and Theoretical C. Astrophys. J. 664, 1244-125	<ul> <li>V. Savin, C. Brandau, E. W. Schmidt, S. Böhm, A. Müller, S. Sprenger, A. Wolf, Z. Altun, N. R. Badnell</li> <li>tion of Fe XV Forming Fe XIV: Laboratory Measure- Calculations</li> <li>2 (2007)</li> </ul>	
	$\mathrm{Fe}^{13+}$	Energy Levels, Wavelengths	Exp
40.	M. F. Gu, P. Beiersdorfer, C Wavelength Measuremen Astrophys. J. 657, 1172-117	G. V. Brown, H. Chen, D. B. Thorn, S. M. Kahn <b>nts of Ni L-Shell Lines Between 9 and 15 Å</b> 7 (2007)	
	$Ni^{18+-25+}$	Energy Levels, Wavelengths	Exp
41.	L. T. Hudson, J. D. Gillasp, C. T. Chander, J. A. Kimpt <b>Detection of Faint X-ray</b> <b>tial Discrimination Tech</b> Nucl. Instrum. Methods Ph	y, J. M. Pomeroy, C. I. Szabo, J. N. Tan, B. Radics, E. Takacs, on, M. N. Kinnane, L. F. Smale <b>Spectral Features Using Wavelength, Energy, and Spa- niques</b> ys. Res. A 580, 33-36 (2007)	
	${f Fe}^{19+}$	Energy Levels, Wavelengths	Exp
42.	K. M. Aggarwal, F. P. Keen Energy Levels, Radiative Astron. Astrophys. 475, 393	an e Rates and Excitation Rates for Transitions in Ni XI 3-399 (2007)	
	$\mathbf{Ni}^{10+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
43.	C. Lovis, F. Pepe <b>A New List of Thorium</b> Astron. Astrophys. 468, 111	and Argon Spectral Lines in the Visible 5-1121 (2007)	
	${f Ar^{0++}\over Th^{0+2+}}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
44.	M. Aldenius, S. G. Johansso Accurate Ritz Waveleng frared Lines of Astrophy Astron. Astrophys. 467, 753	n ths of Parity-Forbidden [Fe II], [Ti II], and [Cr II] In- sical Interest 8-760 (2007)	
	$\mathbf{Ti}^+$	Energy Levels, Wavelengths	Exp
	$\mathbf{Cr}^+$ $\mathbf{Fe}^+$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
45.	K. M. Aggarwal, F. P. Keen Energy Levels and Radia	an ative Rates for Inner Shell Transitions of Fe XVI	

Astron. Astrophys. 463-1, 399-404 (2007)

	$\mathbf{Fe}^{15+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
46.	F. P. Keenan, D. B. Jess, K. Fe XIII Emission Lines in Ultraviolet Research Tele Mon. Not. R. Astron. Soc.	M. Aggarwal, R. J. Thomas, J. W. Brosius, J. M. Davila Active Region Spectra Obtained with the Solar Extreme- escope and Spectrograph 376-1, 205-214 (2007)	
	$\mathbf{Fe}^{12+}$	Energy Levels, Wavelengths	Exp
47.	X. B. Ding, C. Z. Dong, F. H Importance of Spectator Xenon Atomic Ions Phys. Lett. A 371, 124-127 (	Koike, T. Kato Satellites in 3d-4f X-ray Spectra from Highly Charged (2007)	
	$Xe^{24+-29+}$	Energy Levels, Wavelengths	E/T
48.	G. W. F. Drake, D. C. Morte A Multiplet Table for Net Astrophys. J., Suppl. Ser. 1	on eutral Helium ( <sup>4</sup> He I) with Transition Rates 70, 251-260 (2007)	
	${}^{4}\mathrm{He}$ He	Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T E/T
49.	M. F. Gu Many-Body Perturbation and Ni L-Shell Ions Astrophys. J., Suppl. Ser. 10	n Theory Wavelengths of High-n X-ray Transitions of Fe 69-1, 154-158 (2007)	
	${f Fe}^{16+\_23+}$ ${f Ni}^{18+\_25+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th
50.	H. Chen, M. F. Gu, E. Beha Laboratory Measuremen Astrophys. J., Suppl. Ser. 10	r, G. V. Brown, S. M. Kahn, P. Beiersdorfer ts of High-n Iron L-Shell X-ray Lines 68-2, 319-336 (2007)	
	${ m Fe}^{17+-23+}$	Energy Levels, Wavelengths	E/T
51.	S. Osmekhin, J. Nikkinen, R Aksela, S. Aksela <b>Electron Correlation in t</b> <b>Transitions of Xe</b> J. Electron Spectrosc. Relat.	. Sankari, M. Määttä, E. Kukk, A. Huttula, S. Heinäsmäki, H. he $4d^{-1}6p \rightarrow 5s^{-2}6p$ and $5s^{-1}5p^{-1}6p$ Resonance Auger . Phenom. 161, 105-108 (2007)	
	Xe	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
52.	C. J. Sansonetti Comment on "Argon I L 5865 nm" J. Res. Nat. Inst. Stand. Te	ines Produced in a Hollow Cathode Source, 332 nm to chnol. 112, 297-302 (2007)	
	Ar	Energy Levels, Wavelengths	Exp
53.	K. Alnama, JH. Fillion, D. Rydberg Transitions in 2 and 380-420 nm Regions J. Quant. Spectrosc. Radiat	Gauyacq Neon Observed by Optogalvanic Effect in the 830-870 . Transfer 105, 139-147 (2007)	
	Ne	Energy Levels, Wavelengths	Exp

54.	E. P. Ivanova Energy Levels of Ions of S Opt. Spectrosc. 103, 733-740	Silver and Rhodium Isoelectronic Sequences with $\mathbf{Z} < 86$ 0 (2007)	
	Rh Z= 55-85 step 5 Pd Z= 60-83 Ag Z= 52-86	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th
55.	L. Özdemir, G. Ürer <b>Transition Energies, Wav</b> <b>ities Between 1s<sup>2</sup>, 1sns at</b> J. Quant. Spectrosc. Radiat	welengths, Oscillator Strengths and Transition Probabil- nd 1snp ( $2 \le n \le 9$ ) States for He-like Silicon . Transfer 103, 281-301 (2007)	
	${f Si}^{12+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
56.	<ul> <li>P. Mueller, I. A. Sulai, A. C</li> <li>G. W. F. Drake, M. Dubois,</li> <li>ZT. Lu, T. P. O'Connor, M</li> <li>Nuclear Charge Radius of</li> <li>Phys. Rev. Lett. 99, 252501</li> </ul>	. C. Villari, J. A. Alcántara-Núñez, R. Alves-Condé, K. Bailey, C. Eléon, G. Gaubert, R. J. Holt, R. V. F. Janssens, N. Lecesne, IG. Saint-Laurent, JC. Thomas, LB. Wang of <sup>8</sup> He (2007)	
	He	Energy Levels, Wavelengths	Exp
57.	H. Nakatsuji, H. Nakashima, Solving the Schrödinger Integration Based on the Phys. Rev. Lett. 99, 240402	Y. Kurokawa, A. Ishikawa Equation of Atoms and Molecules Without Analytical Free Iterative-Complement-Interaction Wave Function (2007)	
	$\begin{array}{l} {\bf He} \\ {\bf Li}^{0++} \\ {\bf Be}^{0++} \\ {\bf B}^{0++} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th
58.	H. Bruhns, J. Braun, K. Kul <b>Testing QED Screening a</b> Phys. Rev. Lett. 99, 113001	biček, J. R. Crespo López-Urrutia, J. Ullrich and Two-Loop Contributions with He-like Ions (2007)	
	$\mathbf{Cl}^{16+} \ \mathbf{Ar}^{16+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
59.	M. Stanke, D. Kędziera, S. H Lowest Excitation Energ Phys. Rev. Lett. 99, 043001	Bubin, L. Adamowicz y of <sup>9</sup> Be (2007)	
	${}^9\mathrm{Be}$ Be	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th
60.	S. W. Epp, J. R. Crespo Ló M. Kuhlmann, M. V. Yurko Wurth, J. Ullrich <b>Soft X-ray Laser Spectro</b> Phys. Rev. Lett. 98, 183001	pez-Urrutia, G. Brenner, V. Mäckel, P. H. Mokler, R. Treusch, v, J. Feldhaus, J. R. Schneider, M. Wellhöfer, M. Martins, W. <b>Scopy on Trapped Highly Charged Ions at FLASH</b> (2007)	
	$\mathbf{Fe}^{23+}$	Energy Levels, Wavelengths	Exp
61.	A. N. Artemyev, V. M. Shah <b>QED Calculation of the</b> 2 Phys. Rev. Lett. 98, 173004	oaev, I. I. Tupitsyn, G. Plunien, V. A. Yerokhin $2\mathbf{p}_{3/2} - 2\mathbf{p}_{1/2}$ Transition Energy in Boronlike Argon (2007)	

 $\mathbf{Ar}^{13+}$ 

 $\mathbf{X}\mathbf{e}^{26+}$ 

Th

62. H. Elo	
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A Simple Formula for Calculating the Ionization Potential of Two-Electron Ions Naturwissenschaften 94-9, 779-780 (2007)

	He Z= 3-29	Energy Levels, Wavelengths	Th
63.	J. Huang, Q. Zhao, G. Jiang Energy Levels, Transition Strengths for Xe XXVII At. Data Nucl. Data Tables	n Probabilities, and Electron Impact Excitation Collision 93, 864-906 (2007)	

64. U. Feldman, G. A. Doschek

Improved Low-Lying Energy Levels Determined From Solar Coronal Forbidden and Spin-Forbidden Lines in the 500-1500 Å Range At. Data Nucl. Data Tables 93, 779-806 (2007)

Energy Levels, Wavelengths

Be Z= 10-14	Energy Levels, Wavelengths	Exp
B Z= 10-16	Energy Levels, Wavelengths	Exp
B Z= 24-26	Energy Levels, Wavelengths	$\operatorname{Exp}$
C Z= 12-14	Energy Levels, Wavelengths	$\operatorname{Exp}$
C Z= 16-18	Energy Levels, Wavelengths	Exp
N Z= 13-14	Energy Levels, Wavelengths	Exp
N Z= 16-20	Energy Levels, Wavelengths	Exp
N Z= 24-26	Energy Levels, Wavelengths	Exp
O Z= 18-20	Energy Levels, Wavelengths	Exp
O Z= 24-26	Energy Levels, Wavelengths	$\operatorname{Exp}$
F Z= 24-27	Energy Levels, Wavelengths	$\operatorname{Exp}$
${f Ne}^{4+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Ne^{4+-6+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Na^{5+7+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Mg^{4+-8+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Al^{5+9+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$\mathbf{Si}^{6+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Si^{6+-10+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$\mathbf{S}^{8+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$S^{8+-12+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$\mathbf{S}^{11+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Cl^{9+-11+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$\mathbf{Ar}^{6+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Ar^{10+-12+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$K^{11+-13+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Ca^{8+}$	Energy Levels, Wavelengths	Exp
$Ca^{12+-14+}$	Energy Levels, Wavelengths	Exp
$Ti^{14+-15+}$	Energy Levels, Wavelengths	Exp
$Cr^{15+-17+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Cr}^{19+}$	Energy Levels, Wavelengths	Exp
$Mn^{16+-18+}$	Energy Levels, Wavelengths	Exp
$Mn^{20+}$	Energy Levels, Wavelengths	Exp
$Fe^{10+-12+}$	Energy Levels, Wavelengths	Exp
$Fe^{10+-22+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Fe}^{20+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Fe}^{22+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$Ni^{12+-14+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$

	${f Ni^{18+}}\ {f Ni^{20+}}\ {f Ni^{22+}}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp
65.	P. Quinet, É. Biémont, P. P. <b>Relativistic Atomic Data</b> <b>Ions from Yb</b> <sup>40+</sup> <b>to</b> U <sup>62+</sup> At. Data Nucl. Data Tables	almeri, E. Träbert for EUV and X-ray Lines in the Highly Charged Zn-like 93, 711-729 (2007)	
	Zn Z= 70-92	Energy Levels, Wavelengths	Th
66.	<ul> <li>K. M. Aggarwal, V. Tayal, C</li> <li>Energy Levels and Radia</li> <li>Nickel</li> <li>At. Data Nucl. Data Tables</li> </ul>	G. P. Gupta, F. P. Keenan ative Rates for Transitions in Mg-like Iron, Cobalt and 93, 615-710 (2007)	
	$egin{array}{lll} {f Fe}^{14+} \ {f Co}^{15+} \ {f Ni}^{16+} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th
67.	<ul> <li>P. Palmeri, P. Quinet, É. Bi</li> <li>Wavelengths and Transit</li> <li>Cu-like Ions (70≤Z≤92)</li> <li>At. Data Nucl. Data Tables</li> </ul>	émont, E. Träbert tion Probabilities for $n=4 \rightarrow n'=4$ Transitions in Heavy 93-3, 537-547 (2007)	
	Cu Z= 70-92	Energy Levels, Wavelengths	Th
68.	G. Liang, G. Zhao, J. Zeng Electron Impact Collision At. Data Nucl. Data Tables	n Strengths in Si IX, Si X, and Si XI 93-3, 375-536 (2007)	
	$Si^{8+-10+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
69.	P. Palmeri, P. Quinet, É. Bi Wavelengths and Transit At. Data Nucl. Data Tables	émont, E. Träbert cion Probabilities in Heavy Ge-like Ions (70≤Z≤92) 93-3, 355-374 (2007)	
	Ge Z= 70-92	Energy Levels, Wavelengths	$\mathrm{Th}$
70.	A. K. Bhatia, E. Landi Atomic Data and Spectr At. Data Nucl. Data Tables	al Line Intensities for Si XI 93, 275-353 (2007)	
	${f Si}^{10+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
71.	P. Quinet, É. Biémont, P. P. Multiconfiguration Dirac Spectra of Highly Charg At. Data Nucl. Data Tables	almeri, E. Träbert c-Fock Wavelengths and Transition Rates in the X-ray ed Ga-like Ions from Yb <sup>39+</sup> to U <sup>61+</sup> 93, 167-182 (2007)	
	Ga Z= 70-92	Energy Levels, Wavelengths	$\mathrm{Th}$
72.	M. Mohan, A. K. Singh, A. Level Energies, Oscillato At. Data Nucl. Data Tables	K. S. Jha, P. Jha r Strengths, and Lifetimes for Transitions in Ti VI 93, 105-126 (2007)	
	${f Ti}^{5+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$

73. G. V. Shpatakovskaya

Ionization Potentials and Partition Functions of Ions in a Semiclassical Model JETP Letters 86-1, 9-13 (2007)

$Al^{0+-12+}$	Energy Levels, Wavelengths	Th
$Fe^{0+-25+}$	Energy Levels, Wavelengths	Th

74. D. F. A. Winters, M. Vogel, D. M. Segal, R. C. Thompson, W. Nörtershäuser Laser Spectroscopy of Hyperfine Structure in Highly Charged Ions: A Test of QED at High Fields

Can. J. Phys. 85, 403-408 (2007)

$^{35}$ Cl $^+$	Energy Levels, Wavelengths	$\mathrm{Th}$
$\mathbf{Cl}^+$	Energy Levels, Wavelengths	$\mathrm{Th}$
$^{37}\mathrm{Ar}^{2+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
$\mathbf{Ar}^{2+}$	Energy Levels, Wavelengths	Th
$^{207}\mathbf{Pb}^+$	Energy Levels, Wavelengths	Th
$\mathbf{Pb^+}$	Energy Levels, Wavelengths	Th
$^{207}\mathbf{Pb}^{81+}$	Energy Levels, Wavelengths	Th
$\mathbf{Pb}^{81+}$	Energy Levels, Wavelengths	Th
$^{209}{ m Bi}^{80+}$	Energy Levels, Wavelengths	Th
$\mathbf{Bi}^{80+}$	Energy Levels, Wavelengths	Th
$\mathbf{Bi}^{82+}$	Energy Levels, Wavelengths	Th
$^{231}$ Pa $^{40+}$	Energy Levels, Wavelengths	Th
$\mathbf{Pa}^{40+}$	Energy Levels, Wavelengths	Th
$^{231}$ Pa $^{88+}$	Energy Levels, Wavelengths	Th
$\mathbf{Pa}^{88+}$	Energy Levels, Wavelengths	Th

75. G. Severn, D. Lee, N. Hershkowitz

Xenon Ion Laser-Induced Fluorescence Using a Visible Tunable Diode Laser Near 680 nm

Rev. Sci. Instrum. 78-11, 116105 (2007)

 $\mathbf{Xe}^+$ 

Energy Levels, Wavelengths

Exp

76. V. A. Dzuba, W. R. Johnson

Coupled-Cluster Single-Double Calculations of the Relativistic Energy Shifts in C IV, Na I, Mg II, Al III, Si IV, Ca II, and Zn II Phys. Rev. A 76, 062510 (2007)

$\mathbf{C}^{3+}$	Energy Levels, Wavelengths	Th
Na	Energy Levels, Wavelengths	Th
${f Mg}^+$	Energy Levels, Wavelengths	Th
$\mathbf{Al}^{2+}$	Energy Levels, Wavelengths	Th
${f Si}^{3+}$	Energy Levels, Wavelengths	Th
$\mathbf{Ca}^+$	Energy Levels, Wavelengths	Th
${ m Zn^+}$	Energy Levels, Wavelengths	Th

77. S. Kotochigova, K. P. Kirby, I. Tupitsyn Ab Initio Fully Relativistic Calculations of X-ray Spectra of Highly Charged Ions Phys. Rev. A 76, 052513 (2007)

 $\mathbf{Fe}^{18+}$ 

### Energy Levels, Wavelengths

Th

78. R. Soria Orts, J. R. Crespo López Urrutia, H. Bruhns, A. J. González Martínez, Z. Harman, U. D. Jentschura, C. H. Keitel, A. Lapierre, H. Tawara, I. I. Tupitsyn, J. Ullrich, A. V. Volotka

Zeeman Splitting and g Factor of the  $1s^22s^22p$   $^2P_{3/2}$  and  $^2P_{1/2}$  Levels in  $Ar^{13+}$  Phys. Rev. A 76, 052501 (2007)

	$\mathbf{Ar}^{13+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
79.	C. T. Chantler, J. M. Lamin Hydrogenic Lamb Shift i Phys. Rev. A 76, 042116 (20	ng, D. D. Dietrich, W. A. Hallett, R. McDonald, J. D. Silver <b>n Iron Fe</b> <sup>25+</sup> <b>and Fine-Structure Lamb Shift</b> 007)	
	$Fe^{24+-25+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
80.	E. W. Schmidt, D. Bernhar Jaroshevich, C. Krantz, M. I Electron-Ion Recombinat and Multiconfiguration I Phys. Rev. A 76, 032717 (20	rdt, A. Müller, S. Schippers, S. Fritzsche, J. Hoffmann, A. S. Lestinsky, D. A. Orlov, A. Wolf, D. Lukić, D. W. Savin tion of Si IV Forming Si III: Storage-Ring Measurement Dirac-Fock Calculations 007)	
	${f Si}^{2+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
81.	N. Berrah, R. C. Bilodeau, Ackerman, O. Zatsarinny, T <b>Shape Resonances in the</b> Phys. Rev. A 76, 032713 (20	I. Dumitriu, J. D. Bozek, N. D. Gibson, C. W. Walter, G. D. W. Gorczyca Absolute K-Shell Photodetachment of B <sup>-</sup> 007)	
	$B^-$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
82.	P. Olalde-Velasco, E. Ménde Beryllium doubly excited olds Phys. Rev. A 76, 032701 (20	z-Martínez, J. Jiménez-Mier, R. Wehlitz, S. B. Whitfield I autoionizing resonances between the 2p and 3p thresh- 007)	
	Be	Energy Levels, Wavelengths	Exp
83.	A. Sankari, S. Alitalo, S. Fri Excitation-Energy Deper (n=5,6) States Across th Phys. Rev. A 76, 069902 (20	tzsche, J. Nikkinen, A. Kivimäki, S. Aksela, H. Aksela <b>idence of the Resonant Auger Transitions to the <math>4p^4({}^{1}D)np</math></b> <b>ie <math>3d^{-1}_{3/2}5p</math> and <math>3d^{-1}_{5/2}6p</math> Resonances in Kr</b> 2007)	
	Kr	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
84.	V. A. Korol, M. G. Kozlov <b>Relativistic Corrections</b> Phys. Rev. A 76, 022103 (20	to the Isotope Shift in Light Ions 007)	
	Li B <sup>+</sup> C <sup>+</sup> <sup>3+</sup> N <sup>4+</sup> O <sup>5+</sup> Na Mg <sup>0+</sup> + Al <sup>2+</sup> Si <sup>3+</sup>	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th Th Th Th Th
85.	A. E. Kramida, A. N. Ryabt A Critical Compilation of Phys. Scr. 76, 544-557 (2007	sev of Energy Levels and Spectral Lines of Neutral Boron 7)	
	${}^{10}\mathbf{B}$ ${}^{11}\mathbf{B}$ $\mathbf{B}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T E/T E/T

86.	F. Peng, S. Q. Song, G. Jian <b>Transition Properties of</b> Phys. Scr. 76, 501-509 (200)	the K $\alpha$ X-ray from Al through Al XII 7)	
	$Al^{0+-11+}$	Energy Levels, Wavelengths	Th
87.	G. P. Gupta, A. Msezane Fine-Structure Energy L Phys. Scr. 76, 225-232 (200'	evels, Oscillator Strengths and Lifetimes in Mn XIII 7)	
	$Mn^{12+}$	Energy Levels, Wavelengths	Th
88.	J. C. Wang, M. Lu, D. Estev Photoionization and Elec Phys. Rev. A 75, 062712 (20	res, M. Habibi, G. Alna'washi, R. A. Phaneuf, A. L. D. Kilcoyne etron-Impact Ionization of $Ar^{5+}$ 007)	
	$\mathbf{Ar}^{5+}$	Energy Levels, Wavelengths	Exp
89.	V. A. Yerokhin, A. N. Arter <b>QED Treatment of Elect</b> Phys. Rev. A 75, 062501 (20	nyev, V. M. Shabaev ron Correlation in Li-like Ions 007)	
	Li Z= 3-92	Energy Levels, Wavelengths	Th
90.	<ul> <li>M. Stanke, D. Kędziera, S. Bubin, L. Adamowicz</li> <li>Ionization Potential of <sup>9</sup>Be Calculated Including Nuclear Motion and Relativistic Corrections</li> <li>Phys. Rev. A 75, 052510 (2007)</li> </ul>		
	${}^{9}\mathbf{Be}$ ${}^{9}\mathbf{Be}^{0++}$ ${}^{8}\mathbf{Be}^{0++}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	${f Th}\ {f Th}\ {f Th}\ {f Th}\ {f Th}$
91.	. V. A. Dzuba, V. V. Flambaum Core-Valence Correlations for Atoms with Open Shells Phys. Rev. A 75, 052504 (2007)		
	$Xe^{0+-7+}$	Energy Levels, Wavelengths	Th
92.	2. N. A. B. Faye, A. S. Ndao, A. Konté, M. Biaye, A. Wague Energy Levels in the Resonant Photoionization of Heliumlike Ne <sup>8+</sup> Phys. Rev. A 75, 042713 (2007)		
	$\mathbf{Ne}^{8+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
93.	. S. R. Lundeen, C. W. Fehrenbach <b>Polarizability of Kr<sup>6+</sup> from High-L Kr<sup>5+</sup> Fine-Structure Measurements</b> Phys. Rev. A 75, 032523 (2007)		
	$rac{\mathbf{Kr}^{5+}}{\mathbf{Kr}^{6+}}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
94.	K. Fahy, E. Sokell, G. O'Sul Extreme-Ultraviolet Spe an Electron-Beam Ion Th	livan, A. Aguilar, J. M. Pomeroy, J. N. Tan, J. D. Gillaspy ctroscopy of Highly Charged Xenon Ions Created Using cap	

Phys. Rev. A 75, 032520 (2007)

	$egin{array}{llllllllllllllllllllllllllllllllllll$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	$\begin{array}{c} Exp\\ Exp\\ Exp \end{array}$	
95.	L. E. Wright, E. L. Snow, S Optical Spectroscopy of Phys. Rev. A 75, 022503 (2	. R. Lundeen, W. G. Sturrus High-L Rydberg States of Argon 007)		
	$f Ar \ Ar^+$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp	
96.	<ul> <li>D6. T. Trickl, A. H. Kung, Y. T. Lee</li> <li>Krypton Atom and Testing the Limits of Extreme-Ultraviolet Tunable-Laser</li> <li>Spectroscopy</li> <li>Phys. Rev. A 75, 022501 (2007)</li> </ul>			
	$^{78}$ Kr	Energy Levels, Wavelengths	Exp	
	<sup>80</sup> Kr	Energy Levels, Wavelengths	Exp	
	$^{82}$ Kr	Energy Levels, Wavelengths	Exp	
	<sup>83</sup> Kr	Energy Levels, Wavelengths	Exp	
	$^{84}$ Kr	Energy Levels, Wavelengths	Exp	
	$^{86}$ Kr	Energy Levels, Wavelengths	Exp	
	Kr	Energy Levels, Wavelengths	$\operatorname{Exp}$	
97.	7. Z. Zhou, SI Chu Spin-Dependent Localized Hartree-Fock Density-Functional Approach for the Accurate Treatment of Inner-Shell Excitation of Closed-Shell Atoms Phys. Rev. A 75, 014501 (2007)			
	Be	Energy Levels, Wavelengths	Th	
		Energy Levels, Wavelengths	Th	
	Ne M-	Energy Levels, Wavelengths	Th	
	Mg	Energy Levels, wavelengths	1 11	
98.	18. S. Fritzsche, J. Nikkinen, SM. Huttula, H. Aksela, M. Huttula, S. Aksela Interferences in the 3p <sup>4</sup> nl Satellite Emission Following the Excitation of Argon across the 2p <sup>5</sup> <sub>1/2</sub> 4s and 2p <sup>5</sup> <sub>3/2</sub> 3d J=1 Resonances Phys. Rev. A 75, 012501 (2007)			
	Ar	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$	
99.	99. C. J. Sansonetti, M. B. Greene Infrared Spectrum and Revised Energy Levels for Neutral Krypton Phys. Scr. 75-5, 577-603 (2007)			
	Kr	Energy Levels, Wavelengths	Exp	
100.	K. Pachucki Helium Energy Levels In Phys. Rev. A 74, 062510 (2	ncluding $\mathbf{m}\alpha^6$ Corrections 007)		
	<sup>4</sup> He He	Energy Levels, Wavelengths Energy Levels, Wavelengths	${ m Th}$ Th	
101.	D. S. Kim, Y. S. Kim <b>Resonant Structures of C</b> <b>ization of the N</b> <sup>3+</sup> <b>Ion</b> J. Korean Phys. Soc. 51-1,	Overlapping Autoionization Rydberg Series in Photoion- 312-317 (2007)		

 $\mathbf{N}^{5+}$ 

	He	Energy Levels, Wavelengths	Th
109.	L. Argenti, R. Moccia <sup>3</sup> S, <sup>3</sup> P <sup>o,e</sup> , <sup>3</sup> D <sup>e,o</sup> Resonance J. Phys. B 40, 3655-3675 (2)	ce Series in Helium 007)	
	Kr	Energy Levels, Wavelengths	$\mathrm{E/T}$
108.	L. Partanen, M. Huttula, H <b>The M</b> <sub>4,5</sub> <b>N–NNN Auger</b> J. Phys. B 40, 3795-3805 (2)	. Aksela, S. Aksela Transitions in Kr 007)	
	$W^{39+-47+}$	Energy Levels, Wavelengths	Exp
107.	<ul> <li>Yu. Ralchenko, J. Reader, J.</li> <li>Spectra of W<sup>39+</sup>-W<sup>47+</sup> is</li> <li>Source</li> <li>J. Phys. B 40, 3861-3875 (2)</li> </ul>	J. M. Pomeroy, J. N. Tan, J. D. Gillaspy in the 12–20 nm Region Observed with an EBIT Light 007)	
	${ m Ne^+}$	Energy Levels, Wavelengths	Exp
106.	T. Kaneyasu, Y. Hikosaka, I Autoionization of the No J. Phys. B 40, 4047-4060 (2	E. Shigemasa, F. Penent, P. Lablanquie, T. Aoto, K. Ito e <sup>+</sup> <b>Rydberg States Formed via Valence Photoemission</b> 007)	
	Li B Ne <sup>+3+</sup> Na	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th
105.	Z. Zhou, SI Chu Inner-Shell Excitation of Fock Density-Functional J. Phys. B 40, 4379-4389 (2	Open-Shell Atoms: A Spin-Dependent Localized Hartree- Approach 007)	
	Ni Ge	Energy Levels, Wavelengths Energy Levels, Wavelengths	$\begin{array}{c} Exp\\ Exp \end{array}$
104.	T. Kessler, K. Brück, C. Ba Y. Liu, D. R. Schultz, D. W <b>Three-Step Resonant P</b> <b>Potential and Odd-Parit</b> J. Phys. B 40, 4413-4432 (2)	<ul> <li>ktash, J. R. Beene, Ch. Geppert, C. C. Havener, H. F. Krause,</li> <li>Y. Stracener, C. R. Vane, K. Wendt</li> <li>hotoionization Spectroscopy of Ni and Ge: Ionization</li> <li>y Rydberg Levels</li> <li>007)</li> </ul>	
	Zn Z= 30-92	Energy Levels, Wavelengths	Th
103.	J. P. Marques, F. Parente, I Hyperfine Quenching of Eur. Phys. J. D 41, 457-465	P. Indelicato <b>the 4s4p</b> ${}^{3}\mathbf{P}_{0}$ <b>Level in Zn-like Ions</b> 5 (2007)	
	$\mathbf{Cr}^{12+}$	Energy Levels, Wavelengths	Th
102.	<b>Fine-Structure Energy</b> <b>Chromium</b> Eur. Phys. J. D 44, 449-457	Levels, Oscillator Strengths and Lifetimes in Mg-like 7 (2007)	
102.	V. Tayal, G. P. Gupta		

110.	K. Jänkälä, S. Fritzsche, Aksela <b>Many-Electron Effect</b> <b>minium</b> J. Phys. B 40, 3435-3451	M. Huttula, J. Schulz, S. Urpelainen, S. Heinäsmäki, S. Aksela, H. s in 2p Photoionization and Auger Decay of Atomic Alu-	
	Al	Energy Levels, Wavelengths	Exp
111.	A. E. Kingston, A. Hibb <b>Transitions from the</b> J. Phys. B 40, 3389-3399	ert $\mathbf{3p}^{6}\mathbf{3d}$ Ground State of Potassium-like Vanadium 9 (2007)	
	$\mathbf{V}^{4+}$	Energy Levels, Wavelengths	Th
112.	P. Oliver, A. Hibbert Breit-Pauli Oscillator Cl I I Phys. B 40, 2847-2870	• Strengths for Transitions Among Fine-Structure Levels of	
	Cl	Energy Levels Wavelengths	Th
113.	A. Jarosz, D. Stefańska, M A. Krzykowski, L. Piątk <b>High Precision Invest</b> <b>a Chromium Atom</b> J. Phys. B 40, 2785-2793	M. Elantkowska, J. Ruczkowski, A. Buczek, B. Furmann, P. Glowacki, owski, E. Stachowska, J. Dembczyński Sigations of the Hyperfine Structure of Metastable Levels in 7 (2007)	
	<sup>53</sup> Cr Cr	Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T $E/T$
114.	H. Yoshii, T. Aoto, Y. M Satellite Structures o electron Spectroscopy J. Phys. B 40, 2765-2783	forioka, T. Hayaishi f Kr and Xe Studied by High-Resolution Threshold Photo- y 3 (2007)	
	$rac{\mathbf{Kr}^+}{\mathbf{Xe}^+-^{2+}}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
<ul> <li>115. I. Orban, E. Lindroth, P. Glans, R. Schuch Spectroscopic Study of Doubly Excited States in Mg-like Si Using Dielectron Recombination J. Phys. B 40, 1063-1080 (2007)</li> </ul>			
	${f Si}^{2+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
116.	M. Gallardo, M. Raineri <b>New Classified Lines</b> Spectrosc. Lett. 40-6, 87	, J. Reyna Almandos, S. Padilla, J. M. Luque Raigón and Energy Levels in the Ne IV Spectrum 79-891 (2007)	
	$\mathrm{Ne}^{3+}$	Energy Levels, Wavelengths	Exp
117.	D. R. Beck Ab Initio Electric Dip Transitions J. Phys. B 40, 651-657 (	pole f Values for Fe II $(3d+4s)^7 J=9/2 \rightarrow (3d+4s)^6 4p J=11/2$ 2007)	
	${f Fe}^+$	Energy Levels, Wavelengths	$\mathrm{Th}$

118. S. Song, G. Wang, A. Ye, G. Jiang Multi-Configuration Dirac-Fock Calculations of the Hyperfine Structure Constants A and B of Neutral Cu, Ag and Au J. Phys. B 40, 475-484 (2007)

 $^{63}\mathbf{Cu}$ Energy Levels, Wavelengths  $\mathrm{Th}$  $^{65}$ Cu Energy Levels, Wavelengths  $\mathrm{Th}$  $^{66}$ Cu Energy Levels, Wavelengths  $\mathrm{Th}$ Energy Levels, Wavelengths ThCu  $^{107}$ Ag Energy Levels, Wavelengths Th  $^{108}Ag$ Energy Levels, Wavelengths  $\mathrm{Th}$  $^{109}$ Ag Energy Levels, Wavelengths Th  $^{110}\mathbf{Ag}$ Energy Levels, Wavelengths Th Energy Levels, Wavelengths Th $\mathbf{A}\mathbf{g}$ <sup>195</sup>Au Energy Levels, Wavelengths Th  $^{197}$ Au Energy Levels, Wavelengths Th  $^{199}\mathbf{Au}$ Energy Levels, Wavelengths  $\mathrm{Th}$ Energy Levels, Wavelengths  $\mathrm{Th}$ Au

119. Q. Wu, G. W. F. Drake

Hyperfine Structure of the 2 <sup>3</sup>P State of <sup>3</sup>He With and Without an External Magnetic Field

J. Phys. B 40, 393-402 (2007)

	<sup>3</sup> He He	Energy Levels, Wavelengths Energy Levels, Wavelengths	$_{\mathrm{Th}}$
120.	Yu. Ralchenko <b>Density Dependen</b> J. Phys. B 40, F175-F	ce of the Forbidden Lines in Ni-like Tungsten F180 (2007)	
	$\mathbf{W}^{46+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
121.	F. O. Borges, G. H. C <b>The Study of 3s3p</b> <sup>4</sup> <b>Produced Plasmas</b> Braz. J. Phys. 37-2A,	Cavalcanti, E. E. Farias, A. G. Trigueiros Configuration in the P-Sequence, Co XIII–Ni XIV, by Laser- , 335-336 (2007)	
	${f Co}^{12+} {f Ni}^{13+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
122.	T. Shirai, J. Reader, A Spectral Data for C J. Phys. Chem. Ref. 1	A. E. Kramida, J. Sugar Gallium: Ga I through Ga XXXI Data 36-2, 509-615 (2007)	
	$Ga^{0+3+}$	Energy Levels, Wavelengths	E/T
	$Ga^{0+6+}$	Energy Levels, Wavelengths	E/T
	${f Ga}^{4+}$	Energy Levels, Wavelengths	E/T
	$Ga^{5+-12+}$	Energy Levels, Wavelengths	E/T
	$Ga^{12+-25+}$	Energy Levels, Wavelengths	E/T
	$Ga^{13+-28+}$	Energy Levels, Wavelengths	E/T
	$Ga^{28+-30+}$	Energy Levels, Wavelengths	E/T
	$\mathbf{Ga}^{29+}$	Energy Levels, Wavelengths	E/T
	$\mathbf{Ga}^{30+}$	Energy Levels, Wavelengths	E/T

123. E. B. Saloman

**Energy Levels and Observed Spectral Lines of Krypton, Kr I through Kr XXXVI** J. Phys. Chem. Ref. Data 36-1, 215-386 (2007)

$^{84}$ Kr	Energy Levels, Wavelengths	E/T
$^{86}$ Kr	Energy Levels, Wavelengths	E/T
$Kr^{0+-2+}$	Energy Levels, Wavelengths	E/T
$Kr^{0+-9+}$	Energy Levels, Wavelengths	E/T
$Kr^{3+-6+}$	Energy Levels, Wavelengths	E/T
$Kr^{7+-8+}$	Energy Levels, Wavelengths	E/T
$Kr^{9+-17+}$	Energy Levels, Wavelengths	E/T
$Kr^{10+-16+}$	Energy Levels, Wavelengths	E/T
$Kr^{11+-34+}$	Energy Levels, Wavelengths	E/T
$Kr^{18+-32+}$	Energy Levels, Wavelengths	E/T
$\mathbf{Kr}^{33+}$	Energy Levels, Wavelengths	E/T
$Kr^{33+-35+}$	Energy Levels, Wavelengths	E/T

124. S.-H. Chen, X.-Y. Han, X.-L. Wang, J.-M. Li

Theoretical Study of Relativistic Retardation Effects: The Abnormal Fine Structure of O II Chin. Phys. Lett. 24, 1214-1216 (2007)

O <sup>+</sup> Energy Levels, Wavelengths	$\mathrm{Th}$
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125. X.-L. Wu, K.-Z. Yu, B.-C. Gou, M. Zhang

Calculations on the Hyperfine Constants of the Ground States for Lithium-like System

Chin. Phys. 16, 2389-2393 (2007)

Li Z= 3-9	Energy Levels, Wavelengths	Th
$^{7}$ Li	Energy Levels, Wavelengths	Th
${}^{9}\mathbf{Be^{+}}$	Energy Levels, Wavelengths	Th
$^{11}\mathbf{B}^{2+}$	Energy Levels, Wavelengths	Th
$^{13}C^{3+}$	Energy Levels, Wavelengths	Th
$^{15}N^{4+}$	Energy Levels, Wavelengths	Th
$^{17}O^{5+}$	Energy Levels, Wavelengths	Th
$^{19}{ m F}^{6+}$	Energy Levels, Wavelengths	Th

126. G.-L. Wang, X.-X. Zhou

K-Shell Photoionization of Boron-like Carbon Ions: Analysis of 1s-2p Resonances Chin. Phys. 16, 2361-2366 (2007)

$\mathbf{C}^+$	Energy Levels Wavelengths	Th
U	Energy Levels, wavelengths	111

127. A. Iwamae, M. Atake, A. Sakaue, R. Katai, M. Goto, S. Morita Polarization Separated Zeeman Spectra from Magnetic Dipole Transitions in Highly Charged Argon in the Large Helical Device Phys. Plasmas 14-4, 042504 (2007)

$\mathbf{Ar}^{9+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Ar}^{10+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Ar}^{13+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Ar}^{14+}$	Energy Levels, Wavelengths	Exp

128. R. Radtke, C. Biedermann, G. Fussmann, J. L. Schwob, P. Mandelbaum, R. Doron Measured Line Spectra and Calculated Atomic Physics Data for Highly Charged Tungsten Ions
Atomic and Plasma Material Interaction Data for Fusion Vol. 12 International Atomic

Atomic and Plasma-Material Interaction Data for Fusion, Vol. 13, International Atomic Energy Agency, (2007)

$W^{25+-45+}$	Energy Levels, Wavelengths	E/T	
$W^{28+-45+}$	Energy Levels, Wavelengths	É/T	
129.	K. J. Öberg <b>Development of Experim</b> <b>Spectroscopy</b> Thesis of Univ. Lund , (200	nental Methods, Data Analysis and Standards in Atomic	
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	$rac{\mathrm{Ne}^{+-2+}}{\mathrm{Y}^{2+}}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
130.	P. R. Young, A. K. Dupree, <b>High-Ionization Forbidde</b> Astrophys. J. 650, 1091-109	B. R. Espey, S. J. Kenyon en Lines in the UV Spectrum of AG Draconis 5 (2006)	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp Exp
131.	F. P. Keenan, J. J. Drake, S I. Ryans, D. S. Bloomfield <b>Soft X-ray Emission Line</b> <b>Spectrum of Capella</b> Astrophys. J. 645-1, 597-604	S. Chung, N. S. Brickhouse, K. M. Aggarwal, A. Msezane, R. S. es of Fe XV in Solar Flare Observations and the Chandra 4 (2006)	
	$\mathbf{Fe}^{14+}$	Energy Levels, Wavelengths	Exp
132.	D. W. Savin, G. Gwinner, M. Zhou, S. Kieslich, A. Müller, M. F. Gu Dielectronic Recombinate ments and Theoretical C. Astrophys. J. 642-2, 1275-12	M. Grieser, R. Repnow, M. Schnell, D. Schwalm, A. Wolf, SG. S. Schippers, J. Colgan, S. D. Loch, N. R. Badnell, M. H. Chen, ion of Fe XXIII Forming Fe XXII: Laboratory Measure- calculations 285 (2006)	
	$\mathbf{Fe}^{21+}$	Energy Levels, Wavelengths	Exp
133.	M. F. Gu, T. Holczer, E. Be Inner-Shell Absorption I ory Approach Astrophys. J. 641-2, 1227-12	har, S. M. Kahn ines of Fe VI–Fe XVI: A Many-Body Perturbation The- 232 (2006)	
	${ m Fe}^{5+-15+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
134.	E. Landi, M. F. Gu Atomic Data for High-E Astrophys. J. 640-2, 1171-12	nergy Configurations in Fe XVII-XXIII 179 (2006)	
	${ m Fe}^{16+-22+}$	Energy Levels, Wavelengths	Th
135.	K. M. Aggarwal, F. P. Keen <b>Energy Levels and Radia</b> Astron. Astrophys. 460-3, 9	an ative Rates for Transitions in Ni XIX 59-965 (2006)	
	$\mathbf{Ni}^{18+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
136.	K. M. Aggarwal, F. P. Keen <b>Energy Levels and Radia</b> Astron. Astrophys. 460-1, 3	an, T. Kato, I. Murakami ative Rates for Transitions in Fe IX 31-337 (2006)	
	$\mathbf{Fe}^{8+}$	Energy Levels, Wavelengths	$\mathrm{Th}$

137.	G. Del Zanna Benchmarking Atomic I Astron. Astrophys. 459-1, 3	Data for Astrophysics: Fe XVIII 307-316 (2006)	
	${f Fe}^{17+}$	Energy Levels, Wavelengths	E/T
138.	V. Jonauskas, P. Bogdanov Rose, G. J. Ferland, P. H. I <b>Energy Levels and Tran</b> Astron. Astrophys. 455-3, 7	ich, F. P. Keenan, R. Kisielius, M. E. Foord, R. F. Heeter, S. J. Norrington sition Probabilities for Boron-like Fe XXII 1157-1160 (2006)	
	$\mathbf{Fe}^{21+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
139.	G. Del Zanna Benchmarking Atomic I Astron. Astrophys. 447-2, '	Data for Astrophysics: Fe XXIV 761-768 (2006)	
	${f Fe}^{23+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
140.	R. J. Blackwell-Whitehead Lyubchik, Y. V. Pavlenko, <b>Experimental Ti I Oscill</b> ysis Mon. Not. R. Astron. Soc.	, H. Lundberg, G. Nave, J. C. Pickering, H. R. A. Jones, Y. S. Viti ator Strengths and Their Application to Cool Star Anal- 373-4, 1603-1609 (2006)	
	Ti	Energy Levels, Wavelengths	Exp
141.	M. Aldenius, S. G. Johanss Accurate Laboratory UI straints on Varying Fun Mon. Not. R. Astron. Soc.	on, M. T. Murphy Itraviolet Wavelengths for Quasar Absorption-Line Con- damental Constants 370-1, 444-452 (2006)	
	$egin{array}{lll} \mathbf{Mg}^{0+-+} & & \ \mathbf{Ti}^+ & & \ \mathbf{Cr}^+ & & \ \mathbf{Mn}^+ & & \ \mathbf{Fe}^+ & & \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp Exp Exp
	$\mathbf{Zn}^+$	Energy Levels, Wavelengths	Exp
142.	C. Z. Dong, T. Kato, S. Fri Lifetimes and Branchin Aluminium-like Iron Gr Mon. Not. R. Astron. Soc.	tzsche, F. Koike <b>g Fractions of the High Angular Momentum States of</b> <b>roup Elements</b> 369-4, 1735-1740 (2006) Energy Levels, Wavelengths	Th
	Al $Z = 24-32$ step 2	Energy Levels, wavelengths	In
143.	U. I. Safronova, T. E. Cowa Relativistic Many-Body of 4s <sup>2</sup> 4p States in Ga-lik Phys. Lett. A 348, 293-298	an, M. S. Safronova Calculations of Energies, E2, and M1 Transition Rates ce Ions (2006)	
	Ga Z= $31-92$ Ga Z= $31-98$	Energy Levels, Wavelengths Energy Levels, Wavelengths	${ m Th}$ Th
144.	K. Kawatsura, K. Takahiro Ejected-Electron Spectr Ions with He	, M. Sataka, M. Imai, K. Komaki, H. Sugai, H. Shibata <b>a from Rydberg States in High-Energy Collisions of O</b> <sup>3+</sup>	

Nucl. Instrum. Methods Phys. Res. B 245, 44-46 (2006)

	$\mathbf{O}^{3+}$	Energy Levels, Wavelengths	Exp
145.	E. Träbert Atomic Spectroscopy of Hyperfine Interact. 173, 13	Trapped, Highly Charged, Heavy Ions -18 (2006)	
	B Z= 14-54	Energy Levels, Wavelengths	Exp
146.	G. W. F. Drake, ZC. Yan Studies of Light Halo N Hyperfine Interact. 172, 14	uclei by the Isotope Shift Method 1-147 (2006)	
	He	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
147.	E. Landi, K. J. H. Phillips Chianti - an Atomic Da Flare Spectra from the Astrophys. J., Suppl. Ser.	tabase for Emission Lines. VIII. Comparison with Solar Solar Maximum Mission Flat Crystal Spectrometer 166-1, 421-440 (2006)	
	${ m Fe}^{17+-21+}$	Energy Levels, Wavelengths	Exp
148.	N. Verma, A. K. S. Jha, M. <b>New Relativistic Atomi</b> Astrophys. J., Suppl. Ser.	. Mohan <b>c Data for Fe IX</b> 164-1, 297-305 (2006)	
	${f Fe}^{8+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
149.	S. G. Karshenboim, S. I. Shelyuto, T. W. Hänsch Study of Hyperfine Stru State QED Nucl. Phys. B - Proc. Supp	Eidelman, P. Fendel, V. G. Ivanov, N. N. Kolachevsky, V. A. acture in Simple Atoms and Precision Tests of the Bound pl. 162, 260-263 (2006)	
	$^{1}$ H H $^{3}$ He $^{+}$ He $^{+}$ D T	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th Th Th
150.	M. Raineri, M. Gallardo, J. Spectral Analysis of th Xe IX J. Quant. Spectrosc. Radia	G. Reyna Almandos <b>4d<sup>9</sup>6s Configuration in Eight Times Ionized Xenon,</b> at. Transfer 102, 391-395 (2006)	
	${f Xe}^{8+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
151.	J. Zeng, G. Zhao, J. Yuan Configuration Interactic of Lowly Charged Gold J. Quant. Spectrosc. Radia	on Effects on the Energy Levels and Oscillator Strengths Ions: Au <sup>11+</sup> as an Example at. Transfer 102, 172-180 (2006)	
	$\mathbf{A}\mathbf{u}^{11+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
152.	M. E. Foord, R. F. Heeter, A. Liedahl, K. B. Fournier, P. Keenan, S. J. Rose, W. I Study of X-ray Photoic Modeling Codes J. Quant. Spectrosc. Radia	HK. Chung, P. A. M. van Hoof, J. E. Bailey, M. E. Cuneo, D. V. Jonauskas, R. Kisielius, C. Ramsbottom, P. T. Springer, F. H. Goldstein Dized Fe Plasma and Comparisons with Astrophysical at. Transfer 99, 712-729 (2006)	

	${f Fe}^{15+\_17+} {f Fe}^{17+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	${ m E/T} { m E/T}$
153.	G. X. Chen, K. Kirby, E. Sil J. M. Laming <b>The 3C/3D Line Ratio</b> <b>Results</b> Phys. Rev. Lett. 99, 109902	ver, N. S. Brickhouse, J. D. Gillaspy, J. N. Tan, J. M. Pomeroy, in Ni XIX: New Ab Initio Theory and Experimental 2 (2006)	
	$\mathbf{Ni}^{18+}$	Energy Levels, Wavelengths	Exp
154.	<ul> <li>R. Soria Orts, Z. Harman, J. González Martínez, U. D. Jer</li> <li>H. Tawara, I. I. Tupitsyn, J. Exploring Relativistic M</li> <li>Phys. Rev. Lett. 97, 103002</li> </ul>	J. R. Crespo López-Urrutia, A. N. Artemyev, H. Bruhns, A. J. ntschura, C. H. Keitel, A. Lapierre, V. Mironov, V. M. Shabaev, Ullrich, A. V. Volotka <b>Fany-Body Recoil Effects in Highly Charged Ions</b> 2 (2006)	
	$Ar^{13+-14+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
155.	K. Pachucki Improved Theory of Heli Phys. Rev. Lett. 97, 013002	ium Fine Structure 2 (2006)	
	He	Energy Levels, Wavelengths	Th
156.	A. G. Trigueiros, F. O. Borg Extended Analysis of the by Laser-Produced Plasm J. Quant. Spectrosc. Radiat	ges, G. H. Cavalcanti, E. E. Farias <b>3s3p<sup>3</sup> Configuration in the Si I Sequence (V X–Cu XVI)</b> <b>nas</b> 5. Transfer 97, 29-33 (2006)	
	Si Z= 23-29 Si Z= 25-29	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
157.	K. C. Prince, M. Coreno, R. Žitnik <b>Detection of the</b> ${}^{1}\mathbf{P}^{e}$ <b>Seri</b> <b>Stark Effect</b> Phys. Rev. Lett. 96, 093001	. Richter, M. de Simone, V. Feyer, A. Kivimäki, A. Mihelič, M. es of Doubly Excited Helium States Below N=2 via the . (2006)	
	Не	Energy Levels, Wavelengths	Exp
158.	C. Froese Fischer, G. I. Tach <b>Relativistic Energy Level</b> <b>like to Argon-like Sequen</b> At. Data Nucl. Data Tables	niev, A. Irimia s, Lifetimes, and Transition Probabilities for the Sodium- nces 92, 607-812 (2006)	
159.	Na Z= 11-26 Mg Z= 12-26 Al Z= 13-26 Si Z= 14-26 P Z= 15-26 S Z= 16-26 Cl Z= 17-26 Ar Z= 18-26 E. Landi, A. K. Bhatia	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th Th Th Th
	Atomic Data and Spectr At. Data Nucl. Data Tables	al Line Intensities for Ar XI 92, 305-374 (2006)	

$Ar^1$	10+
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160.	W. O. Younis, S. H. Allam Fine-Structure Calculat tion Probabilities for Se At. Data Nucl. Data Table	a, Th. M. El-Sherbini tions of Energy Levels, Oscillator Strengths, and Transi- odium-like Ions (Co XVII–Kr XXVI) es 92, 187-205 (2006)	
	Na Z= 27-36	Energy Levels, Wavelengths	$\mathrm{Th}$
161.	F. Wang, B. C. Gou Relativistic Energy, Fin Lying Core-Excited Sta Isoelectronic Sequence At. Data Nucl. Data Table	e Structure, and Hyperfine-Structure Studies of the High- ates ${}^{5}P(n)$ (n=1-3) and ${}^{5}S^{\circ}(m)$ (m=1-3) for the Be-like es 92, 176-185 (2006)	
	$\begin{array}{l} \mathbf{Be} \ \mathbf{Z} = \ 7\text{-}10 \\ ^{14}\mathbf{N}^{3+} \\ ^{17}\mathbf{O}^{4+} \\ ^{20}\mathbf{F}^{5+} \\ ^{22}\mathbf{Ne}^{6+} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	$Th \\ Th \\ Th \\ Th \\ Th \\ Th \\ Th$
162.	U. I. Safronova, A. S. Safro Relativistic Many-Body Transition Wavelengths in Nickel-like Ions At. Data Nucl. Data Table	bonova, S. M. Hamasha, P. Beiersdorfer 7 Calculations of Multipole (E1, M1, E2, M2, E3, and M3) 8 and Rates Between $3\ell^{-1}4\ell'$ Excited and Ground States es 92, 47-104 (2006)	
	Ni Z= 36-92	Energy Levels, Wavelengths	$\mathrm{Th}$
163.	L. M. He, W. Cao Many-Body Calculation High Rydberg States Can. J. Phys. 84, 1097-110	n of Helium <sup>1</sup> D $^{3}$ D Term Intervals for 1snd (n=12 $\sim$ 20) 06 (2006)	
	He	Energy Levels, Wavelengths	$\mathrm{Th}$
164.	D. C. Morton, Q. Wu, G. V Energy Levels for the S Can. J. Phys. 84-2, 83-105	W. F. Drake Stable Isotopes of Atomic Helium ( <sup>4</sup> He I and <sup>3</sup> He I) (2006)	
	<sup>3</sup> He <sup>4</sup> He He	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th
165.	P. Beiersdorfer, M. Bitter, Grazing-Incidence Spec troscopy on the Nation Rev. Sci. Instrum. 77-10,	L. Roquemore, J. K. Lepson, MF. Cu ctrometer for Soft X-ray and Extreme Ultraviolet Spec- al Spherical Torus Experiment 10F306 (2006)	
	$\begin{array}{c} {\bf B}^{3+} \\ {\bf B}^{4+} \\ {\bf C}^{4+} \\ {\bf C}^{5+} \\ {\bf N}^{5+} \\ {\bf N}^{6+} \\ {\bf O}^{6+} \\ {\bf O}^{6+} \\ {\bf O}^{7+} \\ {\bf Ar}^{8+} \\ {\bf Fe}^{16+\_18+} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp Exp Exp Exp Exp Exp Exp
	$Ni^{18+}$	Energy Levels, Wavelengths	Exp

166. K. T. Cheng, M. H. Chen A Large-Scale Relativistic Configuration-Interaction Calculation for the 4s-4p **Transition Energies of Copperlike Heavy Ions** Radiat. Phys. Chem. 75-11, 1753-1756 (2006)  $W^{45+}$ Energy Levels, Wavelengths Th  $Au^{50+}$ Energy Levels, Wavelengths Th  $\mathbf{Pb}^{53+}$ Energy Levels, Wavelengths Th $Th^{61+}$ Energy Levels, Wavelengths Th $U^{63+}$ Energy Levels, Wavelengths Th 167. M. N. Kinnane, J. A. Kimpton, C. T. Chantler A Status Report on Experimental Tests of QED in Medium-Z Systems Radiat. Phys. Chem. 75-11, 1744-1748 (2006) **Ti**<sup>19+</sup> Energy Levels, Wavelengths Exp  $Ti^{20+}$ Energy Levels, Wavelengths Exp 168. N. Berrah, R. C. Bilodeau, J. D. Bozek, C. W. Walter, N. D. Gibson, G. D. Ackerman Double-Auger Decay, Feshbach and Shape Resonances in Negative Ions Radiat. Phys. Chem. 75-11, 1447-1450 (2006)  $He^{-}$ Energy Levels, Wavelengths Exp 169. M. Lu, G. Alna'washi, M. Habibi, M. F. Gharaibeh, R. A. Phaneuf, A. L. D. Kilcoyne, E. Levenson, A. S. Schlachter, C. Cisneros, G. Hinojosa Photoionization and Electron-Impact Ionization of Kr<sup>3+</sup> Phys. Rev. A 74, 062701 (2006)  ${}^{84}$ Kr<sup>3+</sup> Energy Levels, Wavelengths Exp  ${}^{86}$ Kr<sup>3+</sup> Energy Levels, Wavelengths Exp  $\mathbf{Kr}^{3+}$ Energy Levels, Wavelengths Exp 170. M. Schäfer, F. Merkt Millimeter-Wave Spectroscopy and Multichannel Quantum-Defect-Theory Analysis of High Rydberg States of Krypton: The Hyperfine Structure of <sup>83</sup>Kr<sup>+</sup> Phys. Rev. A 74, 062506 (2006)  $^{83}$ Kr E/TEnergy Levels, Wavelengths  $^{84}$ Kr E/TEnergy Levels, Wavelengths E/T $\mathbf{Kr}$ Energy Levels, Wavelengths  ${}^{83}$ Kr<sup>0+--+</sup> Energy Levels, Wavelengths E/T $Kr^{0+-+}$ Energy Levels, Wavelengths E/T171. T. Nakamura, M. Wada, K. Okada, A. Takamine, Y. Ishida, Y. Yamazaki, T. Kambara, Y. Kanai, T. M. Kojima, Y. Nakai, N. Oshima, A. Yoshida, T. Kubo, S. Ohtani, K. Noda, I. Katavama, V. Lioubimov, H. Wollnik, V. Varentsov, H. A. Schuessler Laser Spectroscopy of <sup>7,10</sup>Be<sup>+</sup> in an Online Ion Trap Phys. Rev. A 74, 052503 (2006)  $^{7}Be^{+}$ Energy Levels, Wavelengths Exp  ${}^{10}$ Be<sup>+</sup> Energy Levels, Wavelengths Exp  $\mathbf{Be}^+$ Energy Levels, Wavelengths Exp 172. M. L. Bissell, K. Baczynska, J. Billowes, P. Campbell, B. Cheal, T. Eronen, D. H. Forest, M. D. Gardner, I. D. Moore, B. Tordoff, G. Tungate, J. Aystö Model Independent Determination of the Spin of the <sup>180</sup>Ta Naturally Occurring Isomer

Phys. Rev. C 74, 047301 (2006)

	$^{180}\mathbf{Ta}$ $^{181}\mathbf{Ta}$ $\mathbf{Ta}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T E/T E/T
173.	Y. Ralchenko, J. N. Tan, J. Accurate Modeling of B Tungsten Phys. Rev. A 74, 042514 (20	D. Gillaspy, J. M. Pomeroy, E. Silver enchmark X-ray Spectra from Highly Charged Ions of 006)	
	$\mathbf{W}^{45+}$ $\mathbf{W}^{46+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	${ m E/T} { m E/T}$
174.	M. H. Chen, K. T. Cheng, W QED Corrections to the Phys. Rev. A 74, 042510 (20	V. R. Johnson, J. Sapirstein <b>4p-4d Transition Energies of Copperlike Heavy Ions</b> 006)	
	Cu Z= 70-92	Energy Levels, Wavelengths	$\mathrm{Th}$
175.	B. A. deHarak, J. G. Childe <b>Ejected Electron Spectru</b> Phys. Rev. A 74, 032714 (20	rs, N. L. S. Martin <b>um of He Below the N=2 Threshold</b> 006)	
	He	Energy Levels, Wavelengths	Exp
176.	K. Pachucki $\alpha^4 \mathbf{R}$ Corrections to Singl Phys. Rev. A 74, 022512 (20)	et States of Helium 006)	
	He	Energy Levels, Wavelengths	$\mathrm{Th}$
177.	H. C. Ho, W. R. Johnson, S <b>Third-Order Many-Body</b> <b>and Magnesium Isoelect</b> Phys. Rev. A 74, 022510 (20	A. Blundell, M. S. Safronova <b>Perturbation Theory Calculations for the Beryllium</b> <b>conic Sequences</b> 006)	
	Be Z= 4-7 $P^{3+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	${ m E/T} { m E/T}$
178.	P. Bogdanovich, D. Majus, 7 Investigation of Accurac tronic Sequence Phys. Scr. 74, 558-562 (2006	C. Pakhomovay of Configuration Interaction for the Oxygen Isoelec-b)	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th Th
179.	S. N. Nahar, A. K. Pradhan Dielectronic Satellite Sp Recombination Method Phys. Rev. A 73, 062718 (20	ectra of Heliumlike Iron and Nickel from the Unified	
	${f Fe}^{23+}$ ${f Ni}^{25+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th

180.	F. Yoshida, L. M Hasegawa	Iatsuoka, R. Takashima, T. Nagata, Y. Azuma, S. Obara, F. Koike, S.	
	Analysis of 1s(2 Be Atom	2s2p <sup>o</sup> P)nl Rydberg States in the K-Shell Photoionization of the	
	Phys. Rev. A 73,	062709 (2006)	
	$Be^{0+-+}$	Energy Levels, Wavelengths	Exp
181.	C. W. Walter, N.	D. Gibson, R. C. Bilodeau, N. Berrah, J. D. Bozek, G. D. Ackerman, A.	
	Shape Resonan Phys. Rev. A 73,	ce in K-Shell Photodetachment from C <sup>-</sup> 062702 (2006)	
	$\mathbf{C}^{-}$	Energy Levels, Wavelengths	Exp
182.	U. D. Jentschura, Quantum Elect States Phys. Rev. A 73,	V. A. Yerokhin rodynamic Corrections to the Hyperfine Structure of Excited S 062503 (2006)	
	$^{1}\mathbf{H}$	Energy Levels, Wavelengths	Th
	H	Energy Levels, Wavelengths	Th
	Phys. Rev. A 73,	052506 (2006)	
	$H_{13 c 5+}$	Energy Levels, Wavelengths	Th
	$^{13}C^{5+}$	Energy Levels, Wavelengths	Th
	$C^{0+}$	Energy Levels, Wavelengths	Th
	-10''	Energy Levels, Wavelengths	Th
	$0^{+}$	Energy Levels, Wavelengths	
	°° <b>3</b> °°'	Energy Levels, Wavelengths	
	$3^{-0+}$	Energy Levels, Wavelengths	1 n Th
	$Ca^{19+}$	Energy Levels, Wavelengths	1 II Th
	$53C_{n}23+$	Energy Levels, Wavelengths	111 Th
	$Cn^{23+}$	Energy Levels, Wavelengths	111 Th
	73Co <sup>31+</sup>	Energy Levels, Wavelengths	Th Th
	$\mathbf{C}\mathbf{e}^{31+}$	Energy Levels, Wavelengths	Th
	$129 \mathbf{Xe}^{53+}$	Energy Levels, Wavelengths	Th
	$^{131}$ <b>Xe</b> <sup>53+</sup>	Energy Levels, Wavelengths	Th
	$\mathbf{X}\mathbf{e}^{53+}$	Energy Levels, Wavelengths	Th
	$^{207}$ Pb <sup>81+</sup>	Energy Levels, Wavelengths	Th
	$\mathbf{Pb}^{81+}$	Energy Levels, Wavelengths	Th
	$^{209}{ m Bi}^{82+}$	Energy Levels, Wavelengths	Th
	${f Bi}^{82+}$	Energy Levels, Wavelengths	Th
	$^{235}\mathrm{U}^{91+}$	Energy Levels, Wavelengths	Th
	$\mathbf{U}^{91+}$	Energy Levels, Wavelengths	$\mathrm{Th}$

184. E. Takács, B. Blagojević, K. Makónyi, E.-O. Le Bigot, C. I. Szabó, Y.-K. Kim, J. D. Gillaspy **Direct Observation of the**  ${}^{2}\mathbf{D}_{3/2}-{}^{2}\mathbf{D}_{5/2}$  **Ground-State Splitting in Xe**<sup>9+</sup> Phys. Rev. A 73, 052505 (2006)

$\mathbf{X}\mathbf{e}^{9+}$	Energy Levels, Wavelengths	Exp
$\mathbf{X}\mathbf{e}^{31+}$	Energy Levels, Wavelengths	Exp

185.	K. Pachucki, J. Komasa Excitation Energy of <sup>9</sup> Be Phys. Rev. A 73, 052502 (2014)	e 006)	
	$^{9}$ Be Be	Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T $E/T$
186.	F. Yoshida, L. Matsuoka, H Obara, S. Hasegawa <b>Observation of Perturber</b> <b>Atoms</b> Phys. Rev. A 73, 042709 (2)	. Osaki, S. Kikkawa, Yu. Fukushima, T. Nagata, Y. Azuma, S. d 3snp Double Photoexcited Ryberg Series of Beryllium 006)	
	Be	Energy Levels, Wavelengths	Exp
187.	D. C. Morton, Q. Wu, G. W Nuclear Charge Radius i Phys. Rev. A 73, 034502 (2)	7. F. Drake for <sup>3</sup> He 006)	
	<sup>3</sup> He He	Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T $E/T$
188.	A. Aguilar, J. D. Gillaspy, C J. D. Bozek, A. L. D. Kilcoy <b>Absolute Photoionization</b> <b>Experiment and Theory</b> Phys. Rev. A 73, 032717 (2007)	G. F. Gribakin, R. A. Phaneuf, M. F. Gharaibeh, M. G. Kozlov, yne <b>n Cross Sections for Xe</b> <sup>4+</sup> , <b>Xe</b> <sup>5+</sup> , <b>and Xe</b> <sup>6+</sup> <b>Near 13.5 nm:</b> 006)	
	$\mathbf{Xe}^{4+-6+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
189.	R. Silwal, J. R. Brandenberg Hyperfine Structure in t Phys. Rev. A 73, 032508 (2)	$\mathbf{p}^{\text{ger}}$ <b>he 4p</b> <sup>5</sup> <b>5d States of</b> <sup>83</sup> <b>Kr</b> 006)	
	<sup>83</sup> Kr Kr	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
190.	W. M. Itano Quadrupole Moments at Sr <sup>+</sup> , Ba <sup>+</sup> , Yb <sup>+</sup> , Hg <sup>+</sup> , and Phys. Rev. A 73, 022510 (2000)	nd Hyperfine Constants of Metastable States of Ca+, d Au 006)	
	${}^{43}Ca^{+} \\ Ca^{+} \\ {}^{87}Sr^{+} \\ Sr^{+} \\ {}^{137}Ba^{+} \\ Ba^{+} \\ {}^{173}Yb^{+} \\ Yb^{+} \\ {}^{197}Au \\ Au \\ {}^{201}Hg^{+} \\ Hg^{+} \\ Hg^{+} $	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th Th Th Th Th Th Th

191. E. Träbert, P. Beiersdorfer, G. V. Brown, K. Boyce, R. L. Kelley, C. A. Kilbourne, F. S. Porter, A. Szymkowiak
Time-Resolved Soft-X-ray Spectroscopy of a Magnetic Octupole Transition in Nickel-like Xenon, Cesium, and Barium Ions

Phys. Rev. A 73, 022508 (2006)

	$\mathbf{Xe}^{26+} \\ \mathbf{Ba}^{28+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
192.	J. C. Berengut, V. V. Flam Calculation of Isotope S Phys. Rev. A 73, 012504 (:	abaum, M. G. Kozlov Bhifts and Relativistic Shifts in C I, C II, C III, and C IV 2006)	
	$C^{0+-3+}$	Energy Levels, Wavelengths	Th
193.	J. Sapirstein, K. T. Cheng Hydrogenic and Screen Phys. Rev. A 73, 012503 (2010)	ed Self-Energies for d States 2006)	
	H Z= 10-100	Energy Levels, Wavelengths	$\mathrm{Th}$
	Li Z= 10-100	Energy Levels, Wavelengths	Th
	Na $Z = 20-100$ Cu $Z = 40-100$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th
194.	L. Pan, D. R. Beck Mo VI J=3/2, 5/2 Ener Phys. Scr. 73, 607-613 (200	rgy Levels, Oscillator Strengths and Landé g-Values 96)	
	${f Mo}^{5+}$	Energy Levels, Wavelengths	Th
195.	W. Wang, X. L. Cheng, X. Calculation of Waveleng tronic Sequence from $I^4$ Phys. Scr. 73, 565-570 (200	D. Yang gths and Oscillator Strengths for the Magnesium Isoelec- $^{1+}$ to Ce <sup>46+</sup> $^{06}$	
	Mg Z= 53-58	Energy Levels, Wavelengths	Th
196.	G. P. Gupta, A. Msezane Oscillator Strengths and Phys. Scr. 73, 556-564 (200	d Lifetimes in Kr XXV 06)	
	$\mathbf{Kr}^{24+}$	Energy Levels, Wavelengths	Th
197.	R. R. Kildiyarova, S. S. Ch <b>Revised and Extended</b> Phys. Scr. 73, 421-428 (200	urilov <b>Analysis of the 3d<sup>2</sup>4f Configuration in Ni VIII</b> 06)	
	$Ni^{7+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
198.	R. R. Kildiyarova, S. S. Ch Analysis of the $3d^44f$ C Phys. Scr. 73, 249-262 (200	urilov, Y. N. Joshi, A. N. Ryabtsev onfiguration in Ni VI 06)	
	$egin{array}{l} \mathbf{Ni}^{5+} \ \mathbf{Cu}^{6+} \ \mathbf{Zn}^{7+} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T E/T E/T
199.	U. I. Safronova, Yu. Ralche Atomic Data for Dielect Phys. Scr. 73, 143-159 (200	enko, I. Murakami, T. Kato, D. Kato t <b>ronic Recombination into C-like Oxygen</b> 06)	
	$O^{2+}$	Energy Levels, Wavelengths	Th

200.	ZH. Yang, SB. Du, XT. <b>Research on EUV Spectr</b> Acta Phys. Sin. 55-5, 2206-2	Zeng, ST. Ren, ZY. Song, H. Su, YD. Wang ra of Highly Ionized Titanium 2209 (2006)	
	$Ti^{11+-12+}$	Energy Levels, Wavelengths	Exp
	$Ti^{14+-18+}$	Energy Levels, Wavelengths	Exp
201.	Z. Cheng, P. Li, XH. Deng Energy Levels of Highly Commun. Theor. Phys. 46-4	<b>Ionized Ar XIV</b> 4, 723-726 (2006)	
	$\mathbf{Ar}^{13+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
202.	I. D. Petrov, T. Peters, T. H H. Hotop <b>Lineshapes of the Even n</b> Eur. Phys. J. D 40, 181-193	Halfmann, S. Aloïse, P. O'Keeffe, M. Meyer, V. L. Sukhorukov, mp <sup>5</sup> <sub>1/2</sub> n(p'/f') Autoionizing Resonances of Ar, Kr and Xe (2006)	
	Ne	Energy Levels, Wavelengths	E/T
	$\mathbf{Ar}$	Energy Levels, Wavelengths	$\dot{E}/T$
	Kr	Energy Levels, Wavelengths	E/T
	Xe	Energy Levels, Wavelengths	E/T
203.	R. M. Jennerich, A. N. Keise Hyperfine Structure and Nitrogen Eur. Phys. J. D 40, 81-89 (2 14N 15N	er, D. A. Tate <b>Isotope Shifts in Near-Infrared Transitions of Atomic</b> 2006) Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp
	N N	Energy Levels, Wavelengths	Exp Evp
	1	Energy Levels, wavelengths	Бхр
204.	L. Partanen, M. Huttula, S Effects of Electron Correct J. Phys. B 39, 4515-4524 (20	M. Huttula, H. Aksela, S. Aksela elation on the $M_{4,5}NN_{4,5}$ Auger Transitions in Xenon 006)	
	Xe	Energy Levels, Wavelengths	E/T
205.	U. I. Safronova, A. S. Safron <b>Multipole (E1, M1, E2, M</b> $3\ell^{-1}5\ell'$ Excited and Grou J. Phys. B 39, 4491-4513 (20)	ova, P. Beiersdorfer <b>A2, E3, M3) Transition Wavelengths and Rates Between</b> <b>and States in Nickel-like Ions</b> 006)	
	Ni Z= 28-100	Energy Levels, Wavelengths	Th
206.	M. Andersson, P. Jönsson, H. Hyperfine Induced Inter: Ga II	I. Sabel ference Effects in the 4s4d $^{3}D_{2}$ –4s4f $^{3}F_{2,3}$ Transitions in	
	J. Phys. B 39, 4239-4247 (20	JUD)	
	$\mathbf{Ga}^+$	Energy Levels, Wavelengths	Th
207.	M. A. Baig, M. Hanif, M. As Laser Optogalvanic Obse ing Resonances in Ar, Ka J. Phys. B 39, 4221-4229 (20	slam, S. A. Bhatti rvations and MQDT Analysis of mp <sup>5</sup> nd J=3 Autoioniz- r and Xe 006)	

	Ar Kr Xe	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp
208.	A. Caló, S. Atanassova, R. S <b>The Kr Valence Photoele</b> <b>the 3d Threshold</b> J. Phys. B 39, 4169-4177 (2	Sankari, A. Kivimäki, H. Aksela, S. Aksela ectron Satellite Lines in the Photon Energy Region Below 006)	
	Kr	Energy Levels, Wavelengths	Exp
209.	I. D. Petrov, V. L. Sukhoru Autoionizing Even $2p_{1/2}^5$ of Many-Electron Theor J. Phys. B 39, 3159-3176 (2	kov, T. Peters, A. Zehnder, H. J. Wörner, F. Merkt, H. Hotop $n\ell'[\mathbf{K'}]_{0,1,2}$ ( $\ell'=1,3$ ) Rydberg Series of Ne: A Comparison by and Experiment (006)	
	Ne	Energy Levels, Wavelengths	Exp
210.	Y. Liu, R. Hutton, Y. Zou, MCDF Calculations for J. Phys. B 39, 3147-3158 (2	M. Andersson, T. Brage the Lowest Excited States in the Zn-like Sequence 006)	
	Zn Z= 30-47	Energy Levels, Wavelengths	$\mathrm{Th}$
211.	C. Z. Dong, D. H. Zhang, T Relativity, Electron Cor Highly Charged Li-like I J. Phys. B 39, 3121-3129 (2	Th. Stöhlker, S. Fritzsche, B. Fricke <b>rrelation and QED Effects in the <math>1s2s^2</math></b> ${}^2S_{1/2}$ <b>State of</b> <b>lons</b> 006)	
	Li Z= 15-92 $Ar^{15+}$ $Fe^{23+}$ $Kr^{33+}$ $Au^{76+}$ $Hg^{77+}$ $Bi^{80+}$ $U^{89+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	$Th \\ Th \\$
212.	I. Murakami, T. Kato, D. K Large-Scale Calculation Fe J. Phys. B 39, 2917-2937 (2	Tato, U. I. Safronova, T. E. Cowan, Yu. Ralchenko of Dielectronic Recombination Parameters for Mg-like 006)	
	$\mathbf{Fe}^{14+}$	Energy Levels, Wavelengths	Th
213.	M. Andersson, T. Brage, R. Systematic Studies of H Electrons J. Phys. B 39, 2815-2826 (2	Hutton, I. Kink, L. Engström <b>ighly Excited Rydberg States in Ions with Two Valance</b> 006)	
	${f O}^{4+} {f S}^{4+} {f Cl}^{5+} {f Ar}^{6+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T E/T E/T E/T
214.	M. J. Vilkas, Y. Ishikawa, E Relativistic Multireferer Ne-, Na-, Mg-, Al-, Si- a J. Phys. B 39, 2195-2216 (2	2. Träbert nce Many-Body Perturbation Theory Calculations on F-, and P-like Xenon Ions 0006)	

	$Xe^{39+-45+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
215.	I. Savukov, A. A. Markhotol Ab Initio Calculations w Beryllium-like Neon J. Phys. B 39, 2115-2125 (20	( ith CI+MBPT of Large Number of Energy Levels for (006)	
	$\mathbf{Ne}^{6+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
216.	S. Song, F. Peng, G. Jiang <b>Properties of the K</b> $\alpha$ and J. Phys. B 39, 2087-2093 (20	l K $\beta$ X-ray Transitions in Cu XX through Cu XXVIII 006)	
	$Cu^{19+-27+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
217.	P. Jönsson, M. Andersson, H. Oscillator Strengths and Dirac-Hartree-Fock Calc J. Phys. B 39, 1813-1824 (20	I. Sabel, T. Brage <b>Hypertine Structures in Ga II from Multiconfiguration</b> ulations 006)	
	${f Ga^+}$	Energy Levels, Wavelengths	Th
218.	M. Schäfer, M. Andrist, H. S A 240-380 GHz Millimet of High Rydberg States J. Phys. B 39, 831-845 (2006	Schmutz, F. Lewen, G. Winnewisser, F. Merkt re Wave Source for Very High Resolution Spectroscopy 6)	
	<sup>84</sup> Kr Kr	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
219.	U. I. Safronova, T. E. Cowar Excitation Energies, Hyp 4s <sup>2</sup> nl States in Neutral O J. Phys. B 39, 749-764 (2006	n, M. S. Safronova Derfine Constants, E1 Transition Rates and Lifetimes of Gallium S)	
	$^{69}$ Ga	Energy Levels, Wavelengths	$\mathrm{Th}$
	<sup>71</sup> Ga	Energy Levels, Wavelengths	Th
	Ga	Energy Levels, Wavelengths	Th
220.	W. Wang, X. L. Cheng, X. I Calculation of Wavelengt J. Phys. B 39, 519-527 (2006	D. Yang, X. M. Tan ths and Oscillator Strengths in High-Z Mg-like Ions 5)	
	Mg Z= 60-62	Energy Levels, Wavelengths	Th
221.	A. B. Borisov, X. Song, P Poopalasingam, J. Zhao, K. Single-Pulse Characterist sition Array at Lambda 5 J. Phys. B 39, L313-L321 (2)	. Zhang, J. C. McCorkindale, S. F. Khan, R. DeJonghe, S. Boyer, C. K. Rhodes tics of the Xe(L) Amplifier on the Xe <sup>35+</sup> (3d $\rightarrow$ 2p) Tran- $\approx$ 2.86 Å 006)	
	$\mathbf{Xe}^{35+}$	Energy Levels, Wavelengths	Exp
222.	LR. Wang, JT. Hsiao, K <b>Doubly Excited States o</b> J. Phys. B 39, L217-L224 (2	N. Huang f <b>the Be Atom in the MCRRPA</b> 006)	
	Be	Energy Levels, Wavelengths	$\mathrm{Th}$

223. J. P. Santos, G. C. Rodrigues, J. P. Marques, F. Parente, J. P. Desclaux, P. Indelicato Relativistic Correlation Correction to the Binding Energies of the Ground Configuration of Beryllium-like, Neon-like, Magnesium-like and Argon-like Ions Eur. Phys. J. D 37, 201-207 (2006)

	Be $Z= 4-95$ Ne $Z= 10-105$ Mg $Z= 12-95$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th
	Ar Z= 18-95	Energy Levels, Wavelengths	Th
	Be	Energy Levels, Wavelengths	Th
	$\mathbf{Rh}^{40+}$	Energy Levels, Wavelengths	Th
	$\mathbf{At}^{80+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
224.	M. Imai, M. Sataka, K. Kaw High Resolution Zero De bon Foil Braz. J. Phys. 36-2B, 541-5	vatsura, K. Takahiro, K. Komaki, H. Shibata egree Electron Spectroscopy of Argon Ions through Car- 545 (2006)	
	$Ar^{13+-14+}$	Energy Levels, Wavelengths	Exp
225.	J. Fuhr, W. L. Wiese A Critical Compilation of Ionized Iron J. Phys. Chem. Ref. Data 3	of Atomic Transition Probabilities for Neutral and Singly 35-4, 1669-1809 (2006)	
	$Fe^{0+-+}$	Energy Levels, Wavelengths	Exp
226.	U. Kentsch, G. Zschornack, L X-ray Transitions in Temperature Electron E X-Ray Spectrom. 35-1, 71-7	F. Grossmann, V. P. Ovsyannikov, F. Ullmann, S. Fritzsche F-like to Na-like Xenon Ions Determined at a Room Beam Ion Trap 78 (2006)	
	$Xe^{43+-45+}$	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
227.	J. Huang, G. Jiang, Q. Zha Ground-State Ionization quences with Z=37-82 Chin. Phys. Lett. 23, 69-72	0 1 Potentials for Lithium through Neon Isoelectronic Se- 2 (2006)	
	Li Z= 37-82	Energy Levels Wavelengths	Th
	Ne $Z = 37-82$	Energy Levels, Wavelengths	Th
	F Z = 37-82	Energy Levels, Wavelengths	Th
	O Z= 37-82	Energy Levels, Wavelengths	Th
	N Z= 37-82	Energy Levels, Wavelengths	Th
	C Z = 37-82	Energy Levels, Wavelengths	Th
	B Z= 37-82	Energy Levels, Wavelengths	Th
	Be Z= 37-82	Energy Levels, Wavelengths	$\mathrm{Th}$
228.	Z. Xiong, N. C. Bacalis Analytic Variationally O Orbitals in Accurate At Chin. Phys. 15, 992-997 (20	Optimized Internally Orthogonalized Modified Laguerre omic Configuration Interaction Calculation 006)	
	He Z= 2-10	Energy Levels, Wavelengths	Th
229.	O. Scharf, G. Gaigalas Large Scale Multi-Config ture of the Ground Stat	guration Hartree-Fock Calculation of the Hyperfine Struc- ie of Vanadium	

Cent. Eur. J. Phys. 4-1, 42-57 (2006)

	${f V}^{51}{f V}{f V}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	$_{\mathrm{Th}}$
230.	P. Quinet, É. Biémont, P. P. <b>Relativistic Atomic Data</b> <b>Ions (Yb</b> <sup>40+</sup> <b>to U</b> <sup>62+</sup> ) Lawrence Livermore Lab., U	almeri, E. Träbert a <b>for EUV and X-ray Lines in the Highly Charged Zn-like</b> Univ. California, Technical Report, (2006)	
	Zn Z= 70-92	Energy Levels, Wavelengths	$\mathrm{Th}$
231.	F. P. Keenan, K. M. Agga Brosius, J. M. Davila, R. J. <b>Fe XI Emission Lines in</b> <b>Spectrum Obtained by</b> <b>Spectrograph</b> Astrophys. J. 624, 428-435 (	rwal, R. S. I. Ryans, R. O. Milligan, D. S. Bloomfield, J. W. Thomas A <b>High-Resolution Extreme-Ultraviolet Active Region</b> the Solar Extreme Ultraviolet Research Telescope and (2005)	
	$\mathbf{Fe}^{10+}$	Energy Levels, Wavelengths	Exp
232.	J. L. Friar, G. L. Payne <b>The Nuclear Physics of</b> Phys. Lett. B 618, 68-76 (2007)	Hyperfine Structure in Hydrogenic Atoms 005)	
	Н	Energy Levels, Wavelengths	Th
	${}^{3}\mathrm{He}$	Energy Levels, Wavelengths	$\mathrm{Th}$
	He	Energy Levels, Wavelengths	$\mathrm{Th}$
	D	Energy Levels, Wavelengths	$\mathrm{Th}$
	Т	Energy Levels, Wavelengths	Th
233.	S. Parenti, JC. Vial, P. Lee <b>Prominence Atlas in the</b> <b>and Ions Identifications</b> Astron. Astrophys. 443-2, 6	maire 2 SUMER Range 800-1250 Å II. Line Profile Properties 79-684 (2005)	
	Н	Energy Levels, Wavelengths	Exp
	$\mathbf{He}^{0+-+}$	Energy Levels, Wavelengths	Exp
	$C^{0+-2+}$	Energy Levels, Wavelengths	Exp
	N	Energy Levels, Wavelengths	Exp
	$N^{2+}$	Energy Levels, Wavelengths	Exp
	$0^{6+}$	Energy Levels, Wavelengths	Exp
	$100^{-1}$	Energy Levels, wavelengths	Exp
	Si <sup>+</sup>	Energy Levels, Wavelengths	Exp
	$\mathbf{Si}^{4+}$	Energy Levels, Wavelengths	Exp
	Si <sup>6+</sup> <sup>7+</sup>	Energy Levels, Wavelengths	Exp
	$S^{0+-4+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{S}^{9+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{Ar}^{11+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{Ca}^{9+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{Ca}^{12+}$	Energy Levels, Wavelengths	Exp
	$Fe^{+-2+}$	Energy Levels, Wavelengths	Exp

234. J.-M. Bizau, J.-P. Champeaux, D. Cubaynes, F. J. Wuilleumier, F. Folkmann, T. S. Jacobsen, F. Penent, C. Blancard, H. Kjeldsen
Absolute Cross Sections for L-Shell Photoionization of the Ions N<sup>2+</sup>, N<sup>3+</sup>, O<sup>3+</sup>, O<sup>4+</sup>, F<sup>3+</sup>, F<sup>4+</sup> and Ne<sup>4+</sup>
Astron. Astrophys. 439-1, 387-399 (2005)

1011. Astrophys. 455-1, 567-555 (2005)

$N^{2+-3+}$	Energy Levels, Wavelengths	Exp
$O^{3+-4+}$	Energy Levels, Wavelengths	Exp
$F^{3+-4+}$	Energy Levels, Wavelengths	Exp
${f Ne}^{4+}$	Energy Levels, Wavelengths	Exp

235. S. G. Karshenboim

Precision Physics of Simple Atoms: QED Tests, Nuclear Structure and Fundamental Constants

Phys. Rep. 422-1-2, 1-63 (2005)

Н	Energy Levels, Wavelengths	E/T
${}^{3}\mathrm{He}^{+}$	Energy Levels, Wavelengths	E/T
${}^{4}\mathrm{He}^{+}$	Energy Levels, Wavelengths	E/T
$\mathrm{He^{+}}$	Energy Levels, Wavelengths	E/T
${}^{10}{ m Be}{}^{3+}$	Energy Levels, Wavelengths	E/T
$\mathbf{Be}^{3+}$	Energy Levels, Wavelengths	E/T
$^{12}C^{5+}$	Energy Levels, Wavelengths	E/T
$\mathbf{C}^{5+}$	Energy Levels, Wavelengths	E/T
$^{16}\mathbf{O}^{7+}$	Energy Levels, Wavelengths	E/T
$^{18}$ O <sup>7+</sup>	Energy Levels, Wavelengths	E/T
$\mathbf{O}^{7+}$	Energy Levels, Wavelengths	E/T
D	Energy Levels, Wavelengths	E/T
Т	Energy Levels, Wavelengths	E/T

236. T. W. Hänsch, J. Alnis, P. Fendel, M. Fischer, C. Gohle, M. Herrmann, R. Holzwarth, N. Kolachevsky, Th. Udem, M. Zimmermann Precision Spectroscopy of Hydrogen and Femtosecond Laser Frequency Combs Philos. Trans. R. Soc. London, Ser. A 363, 2155-2163 (2005)

${}^{1}\mathbf{H}$	Energy Levels, Wavelengths	Exp
Н	Energy Levels, Wavelengths	Exp

237. R. J. Blackwell-Whitehead, H. L. Xu, J. C. Pickering, G. Nave, H. Lundberg Experimental Oscillator Strengths for the Spectrum of Neutral Manganese Mon. Not. R. Astron. Soc. 361, 1281-1286 (2005)

$\mathbf{Mn}$	Energy Levels, Wavelengths	Exp
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238. S. Witte, R. Th. Zinkstok, W. Ubachs, W. Hogervorst, K. S. E. Eikema Deep-Ultraviolet Quantum Interference Metrology with Ultrashort Laser Pulses Science 307-5708, 400-403 (2005)

$^{80}$ Kr	Energy Levels, Wavelengths	Exp
$^{82}$ Kr	Energy Levels, Wavelengths	Exp
<sup>83</sup> Kr	Energy Levels, Wavelengths	Exp
$^{84}$ Kr	Energy Levels, Wavelengths	Exp
$^{86}$ Kr	Energy Levels, Wavelengths	Exp
Kr	Energy Levels, Wavelengths	Exp

239. H. Merabet, S. Kondagari, R. Bruch, S. Fülling, S. Hahto, K.-L. Leung, J. Reijonen, A. L. Godunov, V. A. Schipakov
EUV Emission from Xenon in the 10-80 nm Wavelength Range Using a Compact ECR Ion Source
Nucl. Instrum. Methods Phys. Res. B 241, 23-29 (2005)

$Xe^{2+-10+}$	Energy Levels, Wavelengths	E/T
$Xe^{2} - 10$	Energy Levels, Wavelengths	E/

240.	P. Bogdanovich, V. Jonaush Solving Quasi-Relativist Finite Size of a Nucleus Nucl. Instrum. Methods Ph	xas, O. Rancova ic Equations for Hydrogen-like Ions with Account of the nys. Res. B 235, 145-148 (2005)	
	$rac{\mathbf{Ne}^{9+}}{\mathbf{Nd}^{59+}}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	$_{\mathrm{Th}}$
241.	J. R. Crespo López-Urrutia A. J. González-Martínez, A Trinczek, I. Tupitsin, J. Ull <b>High Precision Measure</b> <b>at the Heidelberg EBIT</b> Nucl. Instrum. Methods Ph	A. Artemyev, J. Braun, G. Brenner, H. Bruhns, I. N. Draganič, Lapierre, V. Mironov, J. Scofield, R. Soria Orts, H. Tawara, M. rich ments of Forbidden Transitions in Highly Charged Ions hys. Res. B 235, 85-91 (2005)	
	$Ar^{13+-17+}$	Energy Levels, Wavelengths	Exp
242.	T. J. M. Zouros, E. P. Benis T. Morishita <b>Investigation of Triply E</b> by Zero-Degree Auger H Nucl. Instrum. Methods Ph	a, M. Zamkov, CD. Lin, T. G. Lee, P. Richard, T. W. Gorczyca, Excited States of Li-like Ions in Fast Ion-Atom Collisions Projectile Electron Spectroscopy ays. Res. B 233, 161-171 (2005)	
	Li Z= 5-9	Energy Levels, Wavelengths	Exp
243.	E. Landi, K. J. H. Phillips <b>Spectral Atlas of X-ray</b> Astrophys. J., Suppl. Ser.	Lines Emitted During Solar Flares Based on CHIANTI 160, 286-311 (2005)	
	$O^{6+7+}$ $Ne^{8+}$ $Na^{9+}$ $Mg^{9+11+}$ $Al^{10+11+}$ $Fe^{16+23+}$ $Fe^{17+23+}$ $Ni^{18+19+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp Exp Exp Exp Exp Exp
244.	J. García, C. Mendoza, M. <b>K-Shell Photoabsorption</b> Astrophys. J., Suppl. Ser.	A. Bautista, T. W. Gorczyca, T. R. Kallman, P. Palmeri n of Oxygen Ions 158-1, 68-79 (2005)	
	${f O}^{0+6+} {f O}^{+4+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th
245.	M. R. Went, M. Vos Electron-Induced KLL A J. Electron Spectrosc. Rela	Auger Electron Spectroscopy of Fe, Cu and Ge t. Phenom. 148, 107-114 (2005)	
	Fe Cu Ge	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp
246.	A. S. Schlachter, S. W. J. Sc Lubell, A. M. Covington, R	ully, R. A. Phaneuf, E. D. Emmons, A. Aguilar, D. Leitner, M. S. Puettner, A. Mueller, M. Halka, J. C. Levin, B. M. McLaughlin	Ţ

K-Shell Photoionization of C<sup>2+</sup> Ions: Experiment and Theory J. Electron Spectrosc. Relat. Phenom. 144-147, 53-54 (2005)

	$\mathbf{C}^{2+}$	Energy Levels, Wavelengths	Exp
247.	K. C. Prince, L. Avaldi, I Photoabsorption and Excitations J. Electron Spectrosc. Re	R. Sankari, R. Richter, M. de Simone, M. Coreno Resonant Photoemission in the Region of Ne 1s Double elat. Phenom. 144-147, 43-46 (2005)	
	Ne	Energy Levels, Wavelengths	Exp
248.	I. D. Petrov, Ph. V. Den KH. Schartner, A. Ehres <b>Strongly Perturbed R</b> J. Electron Spectrosc. Re	nekhin, B. M. Lagutin, V. L. Sukhorukov, S. Kammer, S. Mickat, smann, S. Klumpp, L. Werner, H. Schmoranzer <b>ydberg Series Originating from Kr II 4p<sup>4</sup>5s Ionic States</b> elat. Phenom. 144-147, 35-38 (2005)	
	$\mathrm{Kr}^+$	Energy Levels, Wavelengths	Exp
249.	N. Berrah, R. C. Bilodeau Double Photodetachm J. Electron Spectrosc. Re	u, J. D. Bozek, G. Turri, G. D. Ackerman nent in He <sup>-</sup> : Feshbach and Triply Excited Resonances elat. Phenom. 144-147, 19-21 (2005)	
	$\mathrm{He}^-$	Energy Levels, Wavelengths	Exp
250.	S. Pruss-Hunzinger, F. St <b>Relativistic Ionization</b> Nuovo Cimento B 120-5,	cary, M. Mattes, M. Sorg <b>Energies of the Helium-like Ions</b> 467-506 (2005)	
	He Z= 2-100	Energy Levels, Wavelengths	$\mathrm{Th}$
251.	P. Beiersdorfer <b>Highly Charged Ion R</b> Phys. Scr. T120, 40-46 (2	tesearch at the Livermore Electron Beam Ion Traps $2005)$	
	$\mathbf{Ar}^{8+}$	Energy Levels, Wavelengths	Exp
252.	M. G. von Hellermann, Marchuk, M. O'Mullane, <b>Complex Spectra in F</b> Phys. Scr. T120, 19-29 (2	G. Bertschinger, W. Biel, C. Giroud, R. Jaspers, C. Jupen, O. H. P. Summers, A. Whiteford, KD. Zastrow Jusion Plasmas 2005)	
	$\begin{array}{c} {\bf Be^+} \\ {\bf C^+} \\ {\bf C^{2+}} \\ {\bf C^{5+}} \\ {\bf N^6+} \\ {\bf Ne^{3+-5+}} \\ {\bf Ar^{5+}} \\ {\bf Ar^{15+}} \\ {\bf Ar^{16+}} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp Exp Exp Exp Exp Exp
253.	V. A. Yerokhin, A. N. Ar Screened Self-Energy ( Opt. Spectrosc. 99-1, 12-	temyev, V. M. Shabaev, G. Plunien, G. Soff Correction to the 2p <sub>3/2</sub> -2s Transition Energy in Li-like Ions 17 (2005)	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th

254.	U. D. Jentschura, S. Kotoch Precise Calculation of Tr on a Least-Squares Analy Phys. Rev. Lett. 95, 163003	igova, EO. Le Bigot, P. J. Mohr, B. N. Taylor ansition Frequencies of Hydrogen and Deuterium Based ysis (2005)	
	H D	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th
255.	M. Gallardo, M. Raineri, M. Almandos New Study on the Xe V. J. Quant. Spectrosc. Radiat	I. Giuliani, C. Lagorio, S. Padilla, R. Sarmiento, J. G. Reyna III Spectrum 3. Transfer 95, 365-372 (2005)	
	${f Xe^{7+}}$	Energy Levels, Wavelengths	$\mathrm{E/T}$
256.	A. S. Alnaser, A. L. Landers Electron Correlation in t tronic Sequence Phys. Rev. Lett. 94, 023201	s, J. A. Tanis <b>he Formation of Hollow States Along the Li-like Isoelec-</b> (2005)	
	Li Z= 4-6 F <sup>6+</sup>	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
257.	J. Y. Zhong, J. Zhang, J. L. Energy Levels, Transitic Possible X-ray Line Emis At. Data Nucl. Data Tables	Zeng, G. Zhao, M. F. Gu on Probabilities, and Electron Impact Excitations for ssions of Ni-like Tantalum Ions 89, 101-138 (2005)	
	${f Ta}^{45+}$	Energy Levels, Wavelengths	Th
258.	K. W. Kukla, A. E. Livingst S. Cheng Extreme-Ultraviolet Way Krypton Can. J. Phys. 83-11, 1127-1	on, C. M. Vogel Vogt, H. G. Berry, R. W. Dunford, L. J. Curtis, velength and Lifetime Measurements in Highly Ionized 139 (2005)	
	$Kr^{31+-33+}$	Energy Levels, Wavelengths	Exp
259.	J. R. Crespo López-Urrutia, Martínez, A. Lapierre, V. M rich, I. I. Tupitsyn, V. M. Sl <b>High-Precision Measuren</b> <b>delberg Electron Beam I</b> Can. J. Phys. 83-4, 387-393	J. Braun, G. Brenner, H. Bruhns, I. N. Draganič, A. J. González ironov, C. Osborne, G. Sikler, R. Soria Orts, H. Tawara, J. Ull- nabaev ments in Few-Electron Highly Charged Ions at the Hei- on Trap (EBIT) (2005)	
	$Ar^{13+-14+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{Ar}^{16+}$	Energy Levels, Wavelengths	Exp
260.	<ul> <li>B. Blagojević, EO. Le Bigo</li> <li>Pomeroy, J. H. Burnett, J. I</li> <li>A High Efficiency Ultra</li> <li>Extreme Ultraviolet Way</li> <li>Rev. Sci. Instrum. 76, 0831</li> </ul>	t, K. Fahy, A. Aguilar, K. Makonyi, E. Takács, J. N. Tan, J. M. D. Gillaspy, J. R. Roberts high Vacuum Compatible Flat Field Spectrometer for velengths 02 (2005)	
	$Ne^{3+-7+}$	Energy Levels, Wavelengths	Exp
	$Ar^{8+-10+}$	Energy Levels, Wavelengths	Exp E
	$Xe^{12+-13+}$	Energy Levels, wavelengths Energy Levels, Wavelengths	Exp Exp
	$\mathbf{X}\mathbf{e}^{15+}$	Energy Levels, Wavelengths	Exp

192

261.	<ul> <li>J. Braun, H. Bruhns, M. Trinczek, J. R. Crespo López-Urrutia, J. Ullrich Novel Technique for High-Precision Bragg-Angle Determination in Crystal X- ray Spectroscopy Rev. Sci. Instrum. 76-7, 073105 (2005)</li> </ul>		
	$\mathbf{Ar}^{16+}$	Energy Levels, Wavelengths	Exp
262.	. V. A. Yerokhin, A. N. Artemyev, V. M. Shabaev, G. Plunien All-Order Results for the One-Loop QED Correction to the Hyperfine Structure in Light H-like Atoms Phys. Rev. A 72, 052510 (2005)		
	H Z= 1-30 $^{3}He^{+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	$_{\mathrm{Th}}^{\mathrm{Th}}$
263.	P. Beiersdorfer, M. Bitter, M. Charge-Exchange-Produ Plasma with Neutral-Bea Phys. Rev. A 72, 032725 (20	I. Marion, R. E. Olson ced K-Shell X-ray Emission from Ar <sup>16+</sup> in a Tokamak am Injection 005)	
	$Ar^{15+-16+}$	Energy Levels, Wavelengths	Exp
264.	264. M. J. Vilkas, Y. Ishikawa Relativistic Multireference Many-Body Perturbation Calculations on Multi-Valence- Electron Systems: Benchmarks on Zn-like Ions Phys. Rev. A 72, 032512 (2005)		
	Zn Z= 56-57 Zn Z= 60-70 step 2 Zn Z= 73-74 Zn Z= 82-83 X $e^{24+}$ Os <sup>46+</sup> A $u^{49+}$ Th <sup>60+</sup> U <sup>62+</sup>	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th Th Th Th Th
265.	J. L. Friar, G. L. Payne <b>Nuclear Corrections to H</b> Phys. Rev. C 72, 014002 (20	<b>Hyperfine Structure in Light Hydrogenic Atoms</b> 005)	
	$egin{array}{c} \mathbf{H} & \mathbf{H} \\ ^{3}\mathbf{H}\mathbf{e}^{+} & \mathbf{H}\mathbf{e}^{+} & \mathbf{D} & \mathbf{T} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th Th
266.	E. D. Emmons, A. Aguilar, M. A. S. Schlachter, I. Álvarez, <b>Photoionization and Elec</b> Phys. Rev. A 71, 042704 (20	M. F. Gharaibeh, S. W. J. Scully, R. Phaneuf, A. L. D. Kilcoyne, C. Cisneros, G. Hinojosa etron-Impact Ionization of $Xe^{3+}$ 005)	
	$\mathbf{X}\mathbf{e}^{3+}$	Energy Levels, Wavelengths	Exp
267.	S. B. Hansen, K. B. Fournie Y. Fukuda, Y. Akahane, M. Measurement of 21-nl' X High-Intensity Femtosec	r, A. Ya. Faenov, A. I. Magunov, T. A. Pikuz, I. Yu. Skobelev, Aoyama, N. Inoue, H. Ueda, K. Yamakawa F-ray Transitions from $\approx 1 \ \mu m$ Kr Clusters Irradiated by ond Laser Pulses	

Phys. Rev. E 71, 016408 (2005)

	$Kr^{23+-27+}$	Energy Levels, Wavelengths	Exp
268.	K. M. Aggarwal, F. P. Keens Radiative Rates, Collisio sitions in Mo XXXIV Phys. Scr. 71, 251-260 (2005	an n Strengths and Effective Collision Strengths for Tran-	
	$\mathrm{Mo}^{33+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
269.	M. Biaye, A. Konté, A. S. N <b>The Singlet Doubly Exci</b> Phys. Scr. 71, 39-42 (2005)	dao, N. A. B. Faye, A. Wagué ted (nl) <sup>2</sup> States of Helium-like Systems	
	He Z= 2-12	Energy Levels, Wavelengths	Th
270.	YX. Zhu, LM. He, W. Ca <b>The Magnetic Fine Strue</b> Acta Phys. Sin. 54-11, 5082	o, ZM. Ge cture Calculation of Helium 10G–10M Rydberg States -5088 (2005)	
	Не	Energy Levels, Wavelengths	$\mathrm{Th}$
271.	LM. He, W. Cao, XQ. Ch Calculation of Helium <sup>1</sup> I Acta Phys. Sin. 54-11, 5077	ten, YX. Zhu D $^{3}$ D Term Intervals for 1snd (n = 4–11) States -5081 (2005)	
	Не	Energy Levels, Wavelengths	Th
272.	ZD. Mu, QY. Wei Theoretical Calculation o like Cu XVIII Acta Phys. Sin. 54-6, 2614-2	f Wavelengths and Transition Probabilities for Magnesium- 2619 (2005)	
	$\mathbf{Cu}^{17+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
273.	C. Chen, ZW. Wang Energies of 1s <sup>2</sup> ng and 1s <sup>2</sup> Sequence Commun. Theor. Phys. 43-5	<sup>2</sup> nh (n = 5, 6, 7, and 8) States for Lithium Isoelectronic 5, 886-890 (2005)	
	Li Z= 3-8	Energy Levels, Wavelengths	$\mathrm{Th}$
274.	C. Sur, R. K. Chaudhuri, B. Comparative Studies Usic ods: Nuclear Quadrupole ties of <sup>27</sup> Al J. Phys. B 38, 4185-4194 (20	P. Das, D. Mukherjee ng Coupled-Cluster and Unitary Coupled-Cluster Meth- e Moment, Hyperfine Constants and Transition Proper- 005)	
	<sup>27</sup> Al Al	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th
275.	L. Pan, D. R. Beck, S. M. O <b>Removal or Excitation of</b> J. Phys. B 38, 3721-3738 (20	'Malley f <b>a 1s Electron in Kr II and Kr III</b> 005)	
	$Kr^{+-2+}$	Energy Levels, Wavelengths	$\mathrm{Th}$

276.	<ul> <li>M. Zhang, B. C. Gou, L. L. Cui</li> <li>Energies, Auger Width and Branching Ratios of the Core-Excited Triplet 1s2p<sup>3</sup></li> <li><sup>3</sup>P° and <sup>3</sup>D° Resonances for a Beryllium-like System</li> <li>J. Phys. B 38, 3567-3579 (2005)</li> </ul>		
	Be Z= 4-10	Energy Levels, Wavelengths	$\mathrm{Th}$
277.	Ph. V. Demekhin, I. D. Pet A. Ehresmann, KH. Schar Interaction Between Rev Threshold in Kr II J. Phys. B 38, 3129-3145 (2)	rov, B. M. Lagutin, V. L. Sukhorukov, F. Vollweiler, S. Klumpp, tner, H. Schmoranzer sonances through Autoionization Continua Near the 4s- 2005)	
	Kr	Energy Levels, Wavelengths	E/T
278.	K. Okada, M. Kosugi, A. Fu H. Suzuki, K. Ohno Variation in Resonant A Threshold J. Phys. B 38, 421-431 (200	ujii, S. Nagaoka, T. Ibuki, S. Samori, Y. Tamenori, H. Ohashi, I. Auger Yields into the ${}^{1}G_{4}$ ·nl States of Kr Across the L <sub>3</sub>	
	${ m Kr^+}$	Energy Levels, Wavelengths	Exp
279.	A. Aguilar, E. D. Emmons, T Canton, B. Rude, A. S. Sch R. A. Phaneuf Photoionization of Ions Theory for F <sup>2+</sup> and Ne <sup>3</sup> J. Phys. B 38, 343-361 (200	M. F. Gharaibeh, A. M. Covington, J. D. Bozek, G. Ackerman, S. lachter, G. Hinojosa, I. Álvarez, C. Cisneros, B. M. McLaughlin, of the Nitrogen Isoelectronic Sequence: Experiment and + 5)	
	${f F}^{2+} {f Ne}^{3+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
280.	E. J. Salumbides, J. P. Spre <b>High Precision Frequence</b> J. Phys. B 38, L383-L387 (2010)	engers, E. Reinhold, W. Ubachs cy Calibration of N I Lines in the XUV Domain 2005)	
	$^{14}$ N	Energy Levels, Wavelengths	Exp
	$^{15}N$ N	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
281.	V. Jonauskas, F. P. Keenan J. Rose, G. J. Ferland, P. H <b>Relativistic Analogues o</b> J. Phys. B 38, L79-L85 (200	a, R. Kisielius, P. A. M. van Hoof, M. E. Foord, R. F. Heeter, S. I. Norrington of Nonrelativistic Integrals in R-Matrix Calculations 05)	1,
	$\mathbf{C}^{2+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
	${f Fe}^{22+} {f W}^{70+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th
282.	T. Peters, T. Halfmann, U. Experimental and Theor onances of Rare Gas At J. Phys. B 38, S51-S64 (200	Even, A. Wünnenberg, I. D. Petrov, V. L. Sukhorukov, H. Hotop retical Investigation of Even mp <sup>5</sup> <sub>1/2</sub> np' Autoionizing Res- oms 05)	
	$\mathbf{Ne}$	Energy Levels, Wavelengths	Exp
	Ar	Energy Levels, Wavelengths	Exp
	кг Хе	Energy Levels, wavelengths Energy Levels, Wavelengths	Exp Exp

 283. M. Hanif, M. Aslam, M. Riaz, S. A. Bhatti, M. A. Baig Laser Optogalvanic Measurements and Line-Shape Analysis of 5p<sup>5</sup>7p and 5p<sup>5</sup>4-5f Autoionizing Resonances in Xenon J. Phys. B 38, S65-S75 (2005)
 Xe Energy Levels, Wavelengths Exp

284. D. Kilbane, E. T. Kennedy, J.-P. Mosnier, P. van Kampen, J. T. Costello
On the 3p-Subshell Photoabsorption Spectra of Iron-Group Ions: The Case of Mn<sup>2+</sup>
J. Phys. B 38, L1-L8 (2005)

 $\mathbf{Mn}^{2+}$ 

## Energy Levels, Wavelengths

Exp

285. J. E. Sansonetti, W. C. Martin

Handbook of Basic Atomic Spectroscopic Data

J. Phys. Chem. Ref. Data 34-4, 1559-2259  $\left(2005\right)$ 

Н	Energy Levels, Wavelengths	E/T
$He^{0+-+}$	Energy Levels, Wavelengths	$\dot{E/T}$
Li-Ge	Energy Levels, Wavelengths	$\dot{E/T}$
Li-Es	Energy Levels, Wavelengths	$\dot{\mathrm{E}/\mathrm{T}}$
$\mathbf{Li} extsf{-}\mathbf{Ar}^+$	Energy Levels, Wavelengths	$\dot{E/T}$
$\mathbf{Li} extsf{-Bi}^+$	Energy Levels, Wavelengths	$\dot{E/T}$
$\mathbf{K}^+$	Energy Levels, Wavelengths	$\dot{\mathrm{E}/\mathrm{T}}$
$\mathbf{Ca-Zr^+}$	Energy Levels, Wavelengths	$\dot{E/T}$
As	Energy Levels, Wavelengths	$\dot{E/T}$
Se-Mo	Energy Levels, Wavelengths	$\dot{E/T}$
$Nb-Tc^+$	Energy Levels, Wavelengths	$\dot{E/T}$
Tc	Energy Levels, Wavelengths	$\dot{E/T}$
Ru-Sb	Energy Levels, Wavelengths	$\dot{E/T}$
$\mathbf{Ru}^+$	Energy Levels, Wavelengths	$\dot{E/T}$
$\mathbf{Rh} extsf{-}\mathbf{Pd}^+$	Energy Levels, Wavelengths	$\dot{E/T}$
$Ag-Sb^+$	Energy Levels, Wavelengths	E/T
Te	Energy Levels, Wavelengths	E/T
${f Te}^+$	Energy Levels, Wavelengths	E/T
I-Po	Energy Levels, Wavelengths	E/T
$\mathbf{I} extsf{-}\mathbf{Ba}^+$	Energy Levels, Wavelengths	E/T
$\mathbf{La}^+$	Energy Levels, Wavelengths	E/T
$Ce^+$	Energy Levels, Wavelengths	E/T
$\mathbf{Pr} extsf{-}\mathbf{Sm}^+$	Energy Levels, Wavelengths	E/T
$\mathbf{Eu}^+$	Energy Levels, Wavelengths	E/T
$\mathbf{Gd}\text{-}\mathbf{Ho}^+$	Energy Levels, Wavelengths	E/T
$\mathbf{Er}^+$	Energy Levels, Wavelengths	E/T
$\mathrm{Tm}^+$	Energy Levels, Wavelengths	E/T
$\mathbf{Yb}^+$	Energy Levels, Wavelengths	E/T
$Lu-Hf^+$	Energy Levels, Wavelengths	E/T
$\mathbf{W}^+$	Energy Levels, Wavelengths	E/T
$\mathbf{Pt} extsf{-}\mathbf{Bi}^+$	Energy Levels, Wavelengths	E/T
Rn-Ra	Energy Levels, Wavelengths	E/T
$\operatorname{Ra-Es^+}$	Energy Levels, Wavelengths	E/T
$\mathbf{Ra}^+$	Energy Levels, Wavelengths	E/T
Ac	Energy Levels, Wavelengths	E/T
$\mathbf{Ac}^+$	Energy Levels, Wavelengths	E/T
$Th^{0+-+}$	Energy Levels, Wavelengths	E/T
Pa	Energy Levels, Wavelengths	E/T
U-Cm	Energy Levels, Wavelengths	E/T

	$egin{array}{c} \mathbf{U}^+ & & \ \mathbf{Pu}^+ & & \ \mathbf{Bk} & & \ \mathbf{Cf} & & \ \mathbf{Cf}^+ & & \ \mathbf{Es} & & \ \mathbf{Es}^+ & & \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T E/T E/T E/T E/T E/T
286.	C. Blondel, W. Chaibi, C. I <b>The Electron Affinities</b> <b>Microscope</b> Eur. Phys. J. D 33, 335-342	Delsart, C. Drag, F. Goldfarb, S. Kröger of O, Si, and S Revisited with the Photodetachment 2 (2005)	
	O <sup>-</sup> Si <sup>-</sup> S <sup>-</sup>	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp
287.	JL. Zeng, G. Zhao, JM. X X-ray Emission Spectra Chin. Phys. Lett. 22, 1972-	Yuan of Ni-like Gold Ions Under Coronal Plasma Condition 1975 (2005)	
	$\mathbf{Au}^{51+}$	Energy Levels, Wavelengths	Th
288.	R. Soria Orts Isotopic Effect in B-like Thesis of University of Fran	and Be-like Argon Ions kfurt , (2005)	
	$f Ar^{13+} \ Ar^{14+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	$\begin{array}{c} Exp\\ Exp \end{array}$
289.	T. Pütterich Investigations on Spectro Thesis of Augsburg Univ. ,	pscopic Diagnostic of High-Z Elements in Fusion Plasmas $(2005)$	
	${f Hf^{40+-46+}} \\ {f Ta^{41+-46+}} \\ {f W^{39+-45+}} \\ {f Re^{43+-48+}} \\ {f Au^{47+-52+}} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T E/T E/T E/T E/T
290.	U. Feldman, E. Landi, W. C Newly Identified Forbido of Very Low Abundance Astrophys. J. 607, 1039-104	Curdt Ien Transitions Within the Ground Configuration of Ions P, Cl, K, and Co 5 (2004)	
	$\begin{array}{l} {\bf P}^{7+} \\ {\bf P}^{8+} \\ {\bf C}{\bf l}^{9+-11+} \\ {\bf C}{\bf l}^{10+} \\ {\bf K}^{11+-13+} \\ {\bf K}^{12+} \\ {\bf C}{\bf r}^{9+} \\ {\bf C}{\bf r}^{10+} \\ {\bf Mn}^{10+} \\ {\bf Mn}^{11+} \\ {\bf Co}^{11+} \\ {\bf Co}^{12+} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp Exp Exp Exp Exp Exp Exp
		Energy Horons, Haronouguno	тур

291.	R. H. Rubin, G. J ${}^{12}C/{}^{13}C$ Ratio in Astrophys. J. 605,	. Ferland, E. E. Chollet, R. Horstmeyer <b>n Planetary Nebulae from the IUE Archives</b> , 784-792 (2004)	
	${}^{13}{ m C}^{2+}{ m C}^{2+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	$\begin{array}{c} Exp\\ Exp \end{array}$
292.	E. Silver, H. Schno J. Beeman, E. E. I Using a Microca Uranium on Co Nucl. Instrum. Me	opper, G. Austin, R. Ingram, G. Guth, S. Murray, N. Madden, D. Landis, Haller, Th. Stöhlker alorimeter to Measure the Lamb Shift in Hydrogenic Gold and oled, Decelerated Ion Beams ethods Phys. Res. A 520, 60-62 (2004)	
	$\mathbf{A}\mathbf{u}^{78+}$	Energy Levels, Wavelengths	Exp
293.	W. Curdt, E. Land <b>The SUMER S</b> Astron. Astrophys	di, U. Feldman pectral Atlas of Solar Coronal Features s. 427-3, 1045-1054 (2004)	
	$\mathbf{N}^{4+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{O}^{5+}$	Energy Levels, Wavelengths	Exp
	$Ne^{5+-7+}$	Energy Levels, Wavelengths	Exp
	$Na^{6+9+}$	Energy Levels, Wavelengths	Exp
	$Mg^{5+-10+}$	Energy Levels, Wavelengths	Exp
	$Al^{6+-10+}$	Energy Levels, Wavelengths	Exp
	$Si^{5+-12+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{P}^{8+}$	Energy Levels, Wavelengths	Exp
	$S^{5+-12+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{Cl}^{6+}$	Energy Levels, Wavelengths	Exp
	$Cl^{10+-11+}$	Energy Levels, Wavelengths	Exp
	$Ar^{6+-8+}$	Energy Levels, Wavelengths	Exp
	$Ar^{10+-12+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{K}^{8+}$	Energy Levels, Wavelengths	Exp
	$K^{10+-12+}$	Energy Levels, Wavelengths	Exp
	$Ca^{6+-9+}$	Energy Levels, Wavelengths	Exp
	$Ca^{11+-14+}$	Energy Levels, Wavelengths	Exp
	$Ti^{14+-15+}$	Energy Levels, Wavelengths	Exp
	$Cr^{9+-10+}$	Energy Levels, Wavelengths	Exp
	$Cr^{15+-17+}$	Energy Levels, Wavelengths	Exp
	$\mathbf{Cr}^{19+}$	Energy Levels, Wavelengths	Exp
	$Mn^{16+-17+}$	Energy Levels, Wavelengths	Exp
	$Mn^{19+-20+}$	Energy Levels, Wavelengths	Exp
	$Fe^{6+7+}$	Energy Levels, Wavelengths	Exp

294. K. Werner, T. Rauch, E. Reiff, J. W. Kruk, R. Napiwotzki Identification of Neon in FUSE and VLT Spectra of Extremely Hot Hydrogen-Deficient (Pre-) White Dwarfs Astron. Astrophys. 427, 685-695 (2004)

Energy Levels, Wavelengths

 $Ne^{6+}$ 

 $Fe^{16+-22+}$  $Co^{11+-12+}$ 

 $Ni^{13+-14+}$ 

 $\mathbf{Co}^{18+}$ 

 $Ni^{18+}$ 

 $Ni^{20+}$ 

 $Ni^{22+}$ 

Energy Levels, Wavelengths

Exp

Exp

Exp

Exp

 $\operatorname{Exp}$ 

 $\operatorname{Exp}$ 

Exp

 $\operatorname{Exp}$ 

295. F. Castelli, S. Hubrig

A Spectroscopic Atlas of the HgMn Star HD 175640 (B9 V)  $\lambda\lambda$  3040-10000 Å Astron. Astrophys. 425, 263-270 (2004)

	$egin{array}{c} \mathbf{C} & & \ \mathbf{Ti}^+ & \ \mathbf{Cr}^+ & & \ \mathbf{Mn}^+ & & \ \mathbf{Ga}^+ & & \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp Exp Exp
	$egin{array}{l} \mathbf{Ba^+} \\ \mathbf{Pt^+} \\ \mathbf{Hg^{0++}} \end{array}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp
296.	P. Petitjean, B. Aracil <b>The Ratio of the C IV</b> <b>Absorption Lines</b> Astron. Astrophys. 422, 5	$\lambda\lambda \bf 1548, 1550$ Rest-Wavelengths from High-Redshift QSO $23\text{-}526~(2004)$	
	$\mathbf{C}^{3+}$	Energy Levels, Wavelengths	Exp
297.	C. Mendoza, T. R. Kallma <b>Decay Properties of K</b> - Astron. Astrophys. 414-1,	an, M. A. Bautista, P. Palmeri -Vacancy States in Fe X-Fe XVII 377-388 (2004)	
	$Fe^{9+-16+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
298.	G. Pandey, D. L. Lambert <b>The R Coronae Borea</b> <b>Lines</b> Mon. Not. R. Astron. Soc	, N. K. Rao, B. Gustafsson, N. Ryde, D. Yong lis Stars: Carbon Abundances from Forbidden Carbon c. 353-1, 143-152 (2004)	
	С	Energy Levels, Wavelengths	Exp
299.	S. Heinäsmäki, H. Aksela, Lifetime and Auger De J. Electron Spectrosc. Rel	J. Nikkinen, E. Kukk, A. Kivimäki, S. Aksela, S. Fritzsche ecay of Strongly Correlated 4p Hole States of Xenon at. Phenom. 137-40, 281-285 (2004)	
	Xe	Energy Levels, Wavelengths	$\mathrm{E}/\mathrm{T}$
300.	I. B. Khriplovich, A. I. Mi Corrections to Deuteri JETP 98-2, 181-185 (2004	lstein <b>um Hyperfine Structure due to Deuteron Excitations</b> )	
	H D	Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th
301.	V. A. Zilitis Determination of the D the Method of Interpo Opt. Spectrosc. 97-6, 849-	0 and F° Rydberg Energy Levels of Rubidium-like Ions by lation of Relativistic Quantum Defects -853 (2004)	
	$f{Rb} \ Z=37-39 \ f{Rb} \ Z=37-87 \ f{Nb}^{4+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T E/T E/T
302.	A. V. Andreev On the Theory of Hype	erfine Structure of Atomic Levels	

Opt. Spectrosc. 96-5, 645-649 (2004)

Th

Exp

303. V. A. Zilitis

Determination of the S and  $P^{\circ}$  Rydberg Energy Levels of Rubidium-like Ions by the Method of Interpolation of Relativistic Quantum Defects Opt. Spectrosc. 96-4, 482-485 (2004)

Rb Z= 37-87	Energy Levels, Wavelengths	E/T
Rb	Energy Levels, Wavelengths	E/T
$\mathbf{Sr}^+$	Energy Levels, Wavelengths	E/T
$\mathbf{Y}^{2+}$	Energy Levels, Wavelengths	É/T
$\mathbf{Nb}^{4+}$	Energy Levels, Wavelengths	É/T

304. I. I. Tupitsyn, A. V. Loginov

Calculation of the Magnetic Dipole Constant of the Hyperfine Structure of the  ${}^{6}S_{5/2}$  (3d<sup>5</sup>4s<sup>2</sup>) Term in the Atomic Spectrum of Manganese Opt. Spectrosc. 96-3, 324-327 (2004)

Mn

## Energy Levels, Wavelengths

305. L.-B. Wang, P. Mueller, K. Bailey, G. W. F. Drake, J. P. Greene, D. Henderson, R. J. Holt, R. V. F. Janssens, C. L. Jiang, Z.-T. Lu, T. P. O'Connor, R. C. Pardo, K. E. Rehm, J. P. Schiffer, X. D. Tang Laser Spectroscopic Determination of the <sup>6</sup>He Nuclear Charge Radius

Phys. Rev. Lett. 93, 142501 (2004)

Т	[]
J	$\mathbf{e}$

## Energy Levels, Wavelengths

306. G. C. Rodrigues, P. Indelicato, J. P. Santos, P. Patté, F. Parente

## Systematic Calculation of Total Atomic Energies of Ground State Configurations At. Data Nucl. Data Tables 86, 117-233 (2004)

Li Z= 3-109	Energy Levels, Wavelengths	Th
U Z= 92-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Pa Z= 91-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Th Z= 90-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Ac Z= 89-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Ra Z= 88-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Fr Z= 87-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Rn Z= 86-109	Energy Levels, Wavelengths	$\mathrm{Th}$
At Z= 85-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Po Z= 84-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Bi Z= 83-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Pb Z= 82-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Tl Z= 81-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Hg Z= 80-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Au Z= 79-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Pt Z= 78-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Ir Z= 77-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Os Z= 76-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Re Z= 75-109	Energy Levels, Wavelengths	$\mathrm{Th}$
W Z= 74-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Ta Z= 73-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Hf Z= 72-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Lu Z= 71-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Yb Z= 70-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Tm Z= 69-109	Energy Levels, Wavelengths	$\mathrm{Th}$

Er Z= 68-109	Energy Levels, Wavelengths	Th
Ho Z= 67-109	Energy Levels, Wavelengths	Th
Dy Z= 66-109	Energy Levels, Wavelengths	Th
Tb Z= 65-109	Energy Levels, Wavelengths	Th
Gd Z= 64-109	Energy Levels, Wavelengths	Th
Eu Z= 63-109	Energy Levels, Wavelengths	Th
Sm Z= 62-109	Energy Levels, Wavelengths	Th
Pm Z= 61-109	Energy Levels, Wavelengths	Th
Nd Z= 60-109	Energy Levels, Wavelengths	Th
Pr Z= 59-109	Energy Levels, Wavelengths	Th
Ce Z= 58-109	Energy Levels, Wavelengths	Th
La Z= 57-109	Energy Levels, Wavelengths	Th
Ba Z= 56-109	Energy Levels, Wavelengths	Th
Cs Z= 55-109	Energy Levels, Wavelengths	Th
Xe Z= 54-109	Energy Levels, Wavelengths	Th
I Z= 53-109	Energy Levels, Wavelengths	Th
Te $Z = 52-109$	Energy Levels, Wavelengths	Th
Sb Z= 51-109	Energy Levels, Wavelengths	Th
Sn Z= 50-109	Energy Levels, Wavelengths	Th
In Z= 49-109	Energy Levels, Wavelengths	Th
Cd Z= 48-109	Energy Levels, Wavelengths	Th
Ag Z= 47-109	Energy Levels, Wavelengths	Th
Pd Z= 46-109	Energy Levels, Wavelengths	Th
Rh Z= 45-109	Energy Levels, Wavelengths	Th
Ru Z= 44-109	Energy Levels, Wavelengths	Th
Tc $Z = 43-109$	Energy Levels, Wavelengths	Th
Mo $Z = 42-109$	Energy Levels, Wavelengths	Th
Nb $Z = 41-109$	Energy Levels, Wavelengths	Th
Zr Z = 40-109	Energy Levels, Wavelengths	Th
Y Z = 39-109	Energy Levels, Wavelengths	Th
Sr Z = 38-109	Energy Levels, Wavelengths	Th
RD Z = 37-109	Energy Levels, Wavelengths	
Kr Z = 36-109	Energy Levels, Wavelengths	
Br $Z = 35-109$ So $Z = 24,100$	Energy Levels, Wavelengths	1 n Th
Se $Z = 34-109$	Energy Levels, Wavelengths	1 n Th
As $Z = 33-109$ Co Z = 22,100	Energy Levels, Wavelengths	
Ge $Z = 32-109$ Co $Z = 31,100$	Energy Levels, Wavelengths	III Th
Ga L = 31-109 7n 7 = 30 100	Energy Levels, Wavelengths	III Th
211 Z = 30-109 Cu Z = 20-100	Energy Levels, Wavelengths	Th
$N_{1} Z = 23-103$	Energy Levels, Wavelengths	Th
$C_0 Z = 27.109$	Energy Levels, Wavelengths	Th
Fe Z = 26-109	Energy Levels, Wavelengths	Th
Mn Z = 25-109	Energy Levels Wavelengths	Th
Cr Z = 24-109	Energy Levels, Wavelengths	Th
V Z = 23-109	Energy Levels, Wavelengths	Th
Ti Z = 22-109	Energy Levels, Wavelengths	Th
Sc Z = 21-109	Energy Levels, Wavelengths	Th
Ca Z = 20-109	Energy Levels, Wavelengths	Th
K Z= 19-109	Energy Levels, Wavelengths	Th
Ar Z= 18-109	Energy Levels, Wavelengths	Th
Cl Z= 17-109	Energy Levels, Wavelengths	Th
S Z= 16-109	Energy Levels, Wavelengths	Th
P Z= 15-109	Energy Levels, Wavelengths	Th
Si Z= 14-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Al Z= 13-109	Energy Levels, Wavelengths	$\mathrm{Th}$
Mg Z= 12-109	Energy Levels, Wavelengths	$\mathrm{Th}$

	Na Z= 11-109 Ne Z= 10-109 F Z= 9-109	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th
	O Z= 8-109	Energy Levels, Wavelengths	$\mathrm{Th}$
	N Z= 7-109	Energy Levels, Wavelengths	Th
	C Z = 6-109	Energy Levels, Wavelengths	Th
	B Z = 5-109	Energy Levels, Wavelengths	Th
	Be $Z = 4-109$	Energy Levels, Wavelengths	Th
307.	M. J. Conneely, L. Lipsk Energy Levels and Cl Ne <sup>7+</sup> At Data Nucl Data Ta	y assifications of Triply Excited States of $N^{4+}$ , $O^{5+}$ , $F^{6+}$ , and bles 86, 35-116 (2004)	
	Li Z— 7-10	Energy Levels Wavelengths	$\mathbf{T}\mathbf{h}$
	DI Z = 7-10	Energy Levels, wavelengths	111
308.	P. Neill, C. Harris, A. S. <b>The Study of X-ray</b> <b>National Laboratory</b> Can. J. Phys. 82, 931-94	Safronova, S. Hamasha, S. Hansen, U. I. Safronova, P. Beiersdorfer M-Shell Spectra of W Ions from the Lawrence Livermore Electron Beam Ion Trap 42 (2004)	
	$W^{40+-50+}$	Energy Levels, Wavelengths	Exp
309.	F. S. Porter, G. V. Brow Chen, S. Terracol, S. M. <b>The Astro-E2 X-ray</b> S Rev. Sci. Instrum. 75-10	vn, K. R. Boyce, R. L. Kelley, C. A. Kilbourne, P. Beiersdorfer, H. Kahn, A. E. Szymkowiak Spectrometer/EBIT Microcalorimeter X-ray Spectrometer 0, 3772-3774 (2004)	
	${f Ni}^{26+} {f Ni}^{27+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
310.	P. Beiersdorfer, G. V. Br High-Resolution Crys gion Rev. Sci. Instrum. 75-10	cown, R. Goddard, B. J. Wargelin stal Spectrometer for the 10–60 Å Extreme Ultraviolet Re- 0, 3720-3722 (2004)	
	${f Ar^{lpha+}}\ {f Fe}^{16+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp
311.	M. I. Eides, V. A. Shelyr <b>Three-Loop Reducibl</b> <b>perfine Splitting</b> Phys. Rev. A 70, 022500	ato e Radiative Photon Contributions to Lamb Shift and Hy- 5 (2004)	
	H Z= 1-108	Energy Levels, Wavelengths	$\mathrm{Th}$
312.	E. Lindroth, J. L. Sanz- Photodetachment of Radiat. Phys. Chem. 70	Vicario Few-Electron Negative Ions )-1-3, 387-405 (2004)	
	$\mathrm{H}^{-}$	Energy Levels, Wavelengths	Th
	$\mathrm{He}^-$	Energy Levels, Wavelengths	Th
	$Li^-$	Energy Levels, Wavelengths	$\mathrm{Th}$
	$\mathrm{Be}^-$	Energy Levels, Wavelengths	$\mathrm{Th}$
313.	S. Gheysen, G. Neyens, Calculated Hyperfine Magnetic Moments a	J. Odeurs Spectra for In-Source Laser Spectroscopy and Deduced nd Isomer Shifts of <sup>68</sup> Cu and <sup>70</sup> Cu Isomeric States	

Phys. Rev. C 69, 064310 (2004)

	<sup>65</sup> Cu <sup>68</sup> Cu <sup>70</sup> Cu Cu	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T E/T E/T E/T
314.	E. P. Benis, T. J. M. Zouros Elastic Resonant and No from $B^{4+}(1s)$ and $B^{3+}(1s)$ Phys. Rev. A 73, 029901 (20)	s, T. W. Gorczyca, A. D. González, P. Richard mresonant Differential Scattering of Quasifree Electrons s <sup>2</sup> ) Ions 004)	
	Li Z= 5-9 B <sup>2+</sup> B <sup>3+</sup>	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	E/T E/T E/T
315.	K. M. Aggarwal, F. P. Keen Electron Impact Excitate Phys. Scr. 69, 176-188 (2004	an ion of Mo XXXIV 4)	
	$\mathrm{Mo}^{33+}$	Energy Levels, Wavelengths	Th
316.	ZD. Mu, QY. Wei Calculation of Wavelengt for Ions from Mo XIV-F Acta Phys. Sin. 53-6, 1742-	hs and Oscillator Strengths of Transition 3d <sup>10</sup> 4s–3d <sup>9</sup> 4s4p Ru XVI 1748 (2004)	
	Cu Z= 42-44	Energy Levels, Wavelengths	Th
317.	ZM. Ge, ZW. Wang, YJ Theoretical Calculation of States 1s <sup>2</sup> 2s of Lithium-I Acta Phys. Sin. 53-1, 42-47	The function is the function of the function for the function of the function is the function of the function	
	Li Z= 21-30	Energy Levels, Wavelengths	$\mathrm{Th}$
318.	A. Natarajan, L. Natarajan $\mathbf{K}\beta$ X-ray Satellites of H J. Phys. B 37, 4789-4801 (20	ighly Ionized Iron 004)	
	$Fe^{19+-24+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
319.	T. van Zoest, H. Knopp, J. <b>Electron-Impact Ionizati</b> J. Phys. B 37, 4387-4395 (20	Jacobi, S. Schippers, R. A. Phaneuf, A. Müller on of Ti <sup>3+</sup> Ions 004)	
	${ m Ti}^{3+}$	Energy Levels, Wavelengths	Exp
320.	S. F. Dyubko, V. A. Efremo Microwave Spectroscopy hensive Quantum-Defect J. Phys. B 37, 1967-1978 (20	v, V. G. Gerasimov, K. B. MacAdam of Al I Atoms in $\ell = 0$ to 4 Rydberg States: Compre- c Analysis 004)	
	Al	Energy Levels, Wavelengths	Exp
321.	S. Schippers, A. Müller, R. A M. F. Gharaibeh, G. Hinojo <b>Threshold Truncation of</b> J. Phys. B 37, L209-L216 (2	A. Phaneuf, T. van Zoest, I. Álvarez, C. Cisneros, E. D. Emmons, sa, A. S. Schlachter, S. W. J. Scully <b>'a 'Giant' Dipole Resonance in Photoionization of Ti</b> <sup>3+</sup> 2004)	

	${f Ti}^{3+}$	Energy Levels, Wavelengths	Exp
322.	D. Nikolić, E. Lindroth Intermediate Hamiltonia States J. Phys. B 37, L285-L291 (2	an to Avoid Intruder State Problems for Doubly Excited	
	He	Energy Levels, Wavelengths	Th
323.	E. B. Saloman, C. J. Sanson Wavelengths, Energy Le of Neutral Neon J. Phys. Chem. Ref. Data 3	netti evel Classifications, and Energy Levels for the Spectrum 33-4, 1113-1158 (2004)	
	Ne	Energy Levels, Wavelengths	Exp
324.	R. Şchiopu, Z. Harman, W. Isotope Shifts of Dielect Eur. Phys. J. D 31, 21-25 (	Scheid, N. Grün ronic Resonances for Heavy Few-Electron Ions 2004)	
	H Z= 54-94 Li Z= 54-94 He Z= 54-94	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th
325.	GY. Liang, G. Zhao, JR. Identification of Three V tron Temperature and E Chin. Phys. Lett. 21-10, 20	Shi, JL. Zeng, X. Bian Weak Lines and Their Influences on Diagnostics of Elec- Density in Astrophysical Plasmas 63-2066 (2004)	
	${f Ne}^{8+} \ {f Ar}^{14+-15+} \ {f Fe}^{16+-18+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp
326.	M. Verschl, M. Mattes, M. S Relativistic Effects in Be Eur. Phys. J. A 20, 211-231	Sorg <b>pund Two-Particle Systems</b> I (2004)	
	${f Ge}^{30+} {f Xe}^{52+} {f Dy}^{64+} {f W}^{72+} {f Bi}^{81+}$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Th Th Th Th Th
327.	B. Gou, Y. Lu, F. Wang Electron Correlation Eff Int. J. Mod. Phys. B 18-17	Tects for Doubly-Excited States of Be-like Ar <sup>14+</sup> Ion -19, 2590-2594 (2004)	
	$\mathbf{Ar}^{14+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
328.	F. Kerber, M. R. Rosa, C. J Lercher Spectral Characterization alogues and Ageing Test UV and Gamma Bay Space	J. Sansonetti, J. Reader, G. Nave, P. Bristow, M. Fiorentino, G. on of HST Calibration Lamps: New Pt/Cr-Ne Line Cat-	

UV and Gamma Ray Space Telescope Systems, Proc. SPIE 5488, Editors: G. Hasinger and M. J. L. Turner, (2004)

С	Energy Levels, Wavelengths	Exp
Ν	Energy Levels, Wavelengths	Exp
$Ne^{0+-2+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Al}^+$	Energy Levels, Wavelengths	Exp
Cl	Energy Levels, Wavelengths	Exp
$Cr^{0+-+}$	Energy Levels, Wavelengths	Exp
$\mathbf{Cr}^+$	Energy Levels, Wavelengths	Exp
$Pt^{0+-+}$	Energy Levels, Wavelengths	Exp

329. J. D. Gillaspy, B. Blagojevic, A. Dalgarno, K. Fahey, V. Kharchenko, J. M. Laming, E.-O. Le Bigot, L. Lugosi, K. Makonyi, L. P. Ratliff, H. W. Schnopper, E. H. Silver, E. Takács, J. N. Tan, H. Tawara, K. Tokési
Visible, EUV, and X-ray Spectroscopy at the NIST EBIT Facility
Atomic Processes in Plasmas, 14th APS Topical Conference, AIP Conf. Proc. 730, AIP Press, (2004)

$\mathbf{X}\mathbf{e}^{9+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$
$\mathbf{X}\mathbf{e}^{31+}$	Energy Levels, Wavelengths	$\operatorname{Exp}$

330. W. R. Johnson, K. T. Cheng, M. H. Chen

Accurate Relativistic Calculations Including QED Contributions for Few-Electron Systems

Relativistic Electronic Structure Theory, Elsevier Science B.V., (2004)

Li Z= 10-92	Energy Levels, Wavelengths	Th
He	Energy Levels, Wavelengths	Th
Li	Energy Levels, Wavelengths	Th
$U^{79+81+}$	Energy Levels, Wavelengths	Th
$\mathbf{U}^{89+}$	Energy Levels, Wavelengths	Th

331. M. Matranga, M. Barbera, A. Maggio, G. Peres, S. Serio, E. Takács, E. Silver, J. Gillaspy, H. Schnopper, M. Laming, J. Beeman, E. Haller, N. Madden EBIT Diagnostics Using X-ray Spectra of Highly Ionized Ne Nucl. Instrum. Methods Phys. Res. B 205, 244-249 (2003)

	$Ne^{8+-9+}$	Energy Levels, Wavelengths	Exp
332.	P. Beiersdorfer, J. H. Scofiel X-ray-Line Diagnostic of Phys. Rev. Lett. 90, 235003	d, A. L. Osterheld Magnetic Field Strength for High-Temperature Plasmas 3 (2003)	
	$\mathbf{Ar}^{8+}$	Energy Levels, Wavelengths	Exp
333.	S. Mazouffre, E. Pawelec, N Doppler-Free Spectrosco ponents of Near-IR Xen	. Tran Bich, N. Sadeghi py Measurements of Isotope Shifts and Hyperfine Com- on Lines	

Plasma 2005, AIP Conference Proceedings 812, AIP Press, (2006)

$^{129}$ Xe <sup>0++</sup>	Energy Levels, Wavelengths	Exp
$^{131}$ <b>Xe</b> <sup>0++</sup>	Energy Levels, Wavelengths	Exp
$\mathbf{X}\mathbf{e}^{0+-+}$	Energy Levels, Wavelengths	Exp

334. J. E. Rice, K. B. Fournier, E. S. Marmar, J. L. Terry, U. I. Safronova
 X-Ray Spectroscopy of High n Transitions of He- and Ne-Like Ions in Alcator
 C-Mod Plasmas
 Nuclear Fusion Research: Understanding Plasma-Surface Interactions, Springer Series in

Nuclear Fusion Research: Understanding Plasma-Surface Interactions, Springer Series Chemical Physics, Springer-Verlag, (2005)

	$egin{array}{llllllllllllllllllllllllllllllllllll$	Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths Energy Levels, Wavelengths	Exp Exp Exp Exp
335.	A. Farrag, S. A. H. A <b>Theoretical Level</b> Modern Trends in Pl	Abou Steit, A. I. Refaie Structure and Decay Dynamics for the Be-like Ti Ion hysics Research, AIP Conference Proceedings 748, AIP Press, (2005)	
	${f Ti}^{18+}$	Energy Levels, Wavelengths	$\mathrm{Th}$
336.	P. Cancio, G. Giusfi Inguscio <b>Precision Spectros</b> Atomic Physics 19, A	redi, C. de Mauro, V. Krachmalnicoff, D. Mazzotti, P. de Natale, M. scopy of Helium AIP Conference Proceedings 770, AIP Press, (2005)	
	${}^{3}\mathrm{He}$	Energy Levels, Wavelengths	Exp
	${}^{4}\mathrm{He}$ He	Energy Levels, Wavelengths Energy Levels, Wavelengths	
337.	I. Lindgren, S. Salon Quasi-Degeneracy Electromagnetic Pro	nonson, B. Åsén, AM. Mårtensson-Pendrill <b>in Bound-State QED. Fine Structure of Heliumlike Ions</b> bes of Fundamental Physics, World Scientific, (2003)	
	${f Ne^{8+}}\ {f Ar^{16+}}$	Energy Levels, Wavelengths Energy Levels, Wavelengths	${ m Th}$ Th
338.	R. Butzbach, H. Daid I. Uschmann, M. Vol Spatially Resolved and Co-like Ions f Inst. Phys. Conf. Se	do, E. Förster, Y. Gu, G. Huang, Y. Kato, F. Koike, S. Sebban, H. Tang, llbrecht, S. Wang d High Resolution Spectroscopy of 4f-3d Emission Lines of Ni- from Yb, Hf, Ta, and W X-ray Laser Plasmas er. No. 159, IOP Publishing, Ltd., (1999)	
	Ni Z= 72-74	Energy Levels, Wavelengths	Exp
339.	R. G. Dall, K. G. H. Experimental dete Phys. Rev. Lett. 100	Baldwin, L. J. Byron, A. G. Truscott ermination of the helium $2 {}^{3}P_{1}-1 {}^{1}S_{0}$ transition rate 0-2, 023001 (2008)	
	Не	Trans. prob., Oscill. Strengths	Exp
340.	<ul><li>D. E. Kelleher, L. I.</li><li>Atomic transition</li><li>J. Phys. Chem. Ref.</li></ul>	Podobedova probabilities of sodium and magnesium. A critical compilation Data 37, 267-706 (2008)	
	$egin{array}{l} {f Na}^{0+7+} \ {f Na}^{0+9+} \ {f Mg}^{0+8+} \ {f Mg}^{0+10+} \end{array}$	Trans. prob., Oscill. Strengths Trans. prob., Oscill. Strengths Trans. prob., Oscill. Strengths Trans. prob., Oscill. Strengths	E/T E/T E/T E/T
341.	J. S. Sobeck, J. E. L Improved laborate mination of the ch Astrophys. J. 667, 12	awler, C. Sneden ory transition probabilities for neutral chromium and redeter- nromium abundance for the sun and three stars 267-1282 (2007)	,
	$\mathbf{Cr}$	Trans. prob., Oscill. Strengths	Exp

342.	K. M. Aggarwal, F. P. Kee Energy levels, radiative Astron. Astrophys. 475, 39	enan e rates and excitation rates for transitions in Ni XI 93-399 (2007)	
	$\mathbf{Ni}^{10+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
343.	R. Blackwell-Whitehead, M A revision of the solar p tory oscillator strength Astron. Astrophys. 472, L	4. Bergemann manganese abundance using new and remeasured labora- s 43-L46 (2007)	
	Mn	Trans. prob., Oscill. Strengths	Exp
344.	F. P. Keenan, D. B. Jess, I Fe XIII emission lines i ultraviolet research tele Mon. Not. R. Astron. Soc	K. M. Aggarwal, R. J. Thomas, J. W. Brosius, J. M. Davila in active region spectra obtained with the solar extreme- escope and spectrograph . 376, 205-214 (2007)	
	$\mathbf{Fe}^{12+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
345.	G. Dixit, B. K. Sahoo, P. C Accurate estimates of vanadium using the cou Astrophys. J., Suppl. Ser.	C. Deshmukh, R. K. Chaudhuri, S. Majumder circumstellar and interstellar lines of quadruply ionized upled cluster approach 172, 645-648 (2007)	
	$\mathbf{V}^{4+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
346.	S. S. Tayal Oscillator strengths and O II Astrophys. J., Suppl. Ser.	d electron collision rates for fine-structure transitions in 171, 331-348 (2007)	
	$\mathbf{O}^+$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
347.	A. Bacławski, J. Musielok <b>Testing recent calculati</b> <b>by arc emission measur</b> Eur. Phys. J. Spec. Top. 7	ions of astrophysical relevant infrared N I line strengths rements 144, 221-225 (2007)	
	Ν	Trans. prob., Oscill. Strengths	Exp
348.	G. Çelik, E. Akin, H. Ş. K Comparison of transition WBEPM theory for some Int. J. Quantum Chem. 10	iliç on probabilities calculated using different parameters on me p-d and d-p transitions in excited atomic nitrogen 07, 495-500 (2007)	
	Ν	Trans. prob., Oscill. Strengths	Th
349.	E. Träbert, P. Beiersdorfer Observation of hyperfir in isotopically pure nicl Phys. Rev. Lett. 98, 26300	, G. V. Brown ne mixing in measurements of a magnetic octupole decay kel-like <sup>129</sup> Xe and <sup>132</sup> Xe ions 01 (2007)	
	$\mathbf{X}\mathbf{e}^{26+}$	Trans. prob., Oscill. Strengths	Exp
350.	A. K. Bhatia, E. Landi Atomic data and spectr At. Data Nucl. Data Table	ral line intensities for Mg IX es 93, 742-778 (2007)	

	$\mathbf{Mg}^{8+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
351.	P. Quinet, É. Biémont, P. Pa <b>Relativistic atomic data</b> ions from $Yb^{40+}$ to $U^{62+}$ At. Data Nucl. Data Tables	almeri, E. Träbert for EUV and X-ray lines in the highly charged Zn-like 93, 711-729 (2007)	
	Zn Z= 70-92	Trans. prob., Oscill. Strengths	Th
352.	K. M. Aggarwal, V. Tayal, G Energy levels and radiativ At. Data Nucl. Data Tables	<ul> <li>F. Gupta, F. P. Keenan</li> <li>ve rates for transitions in Mg-like iron, cobalt and nickel</li> <li>93, 615-710 (2007)</li> </ul>	
	Mg Z= 26-28	Trans. prob., Oscill. Strengths	Th
353.	P. Palmeri, P. Quinet, É. Bié Wavelengths and transiti like ions $(70 \le Z \le 92)$ At. Data Nucl. Data Tables	émont, E. Träbert on probabilities for $n=4\rightarrow n'=4$ transitions in heavy Cu- 93, 537-547 (2007)	
	Cu Z= 70-92	Trans. prob., Oscill. Strengths	Th
354.	G. Liang, G. Zhao, J. Zeng Electron impact collision At. Data Nucl. Data Tables	strengths in Si IX, Si X, and Si XI 93, 375-536 (2007)	
	$Si^{8+-10+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
355.	P. Palmeri, P. Quinet, É. Bié Wavelengths and transiti At. Data Nucl. Data Tables	émont, E. Träbert on probabilities in heavy Ge-like ions (70 $\leq \mathbb{Z} \leq 92$ ) 93, 355-374 (2007)	
	Ge Z= 70-92	Trans. prob., Oscill. Strengths	Th
356.	A. K. Bhatia, E. Landi Atomic data and spectra At. Data Nucl. Data Tables	l line intensities for Si XI 93, 275-353 (2007)	
	$\mathbf{Si}^{10+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
357.	J. Zeng, G. Zhao, J. Yuan Electron impact collision Cu-, Ni-, and Co-like Au At. Data Nucl. Data Tables	a strengths and oscillator strengths for Ge-, Ga-, Zn-, ions 93, 199-273 (2007)	
	$\mathbf{Au}^{47+-52+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
358.	J. M. Bridges, W. L. Wiese Experimental study of we of Ne II Phys. Rev. A 76, 022513 (20	eak intersystem lines and related strong persistent lines	
	${f Ne^+}$	Trans. prob., Oscill. Strengths	Exp
359.	G. P. Gupta, A. Z. Msezane <b>Fine-structure energy lev</b> Phys. Scr. 76, 225-232 (2007	rels, oscillator strengths and lifetimes in Mn XIII $)$	

	$\mathbf{Mn}^{12+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
360.	K. Fahy, E. Sokell, G. O'Sull Extreme-ultraviolet spec electron-beam ion trap Phys. Rev. A 75, 032520 (20	livan, A. Aguilar, J. M. Pomeroy, J. N. Tan, J. D. Gillaspy troscopy of highly charged xenon ions created using an 007)	
	$Xe^{6+-9+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
361.	V. Tayal, G. P. Gupta <b>Fine-structure energy lev</b> Eur. Phys. J. D 44, 449-457	els, oscillator strengths and lifetimes in Mg-like chromium (2007)	
	$\mathbf{Cr}^{12+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
362.	G. Çelik, Ş. Ateş <b>The calculation of transi</b> Eur. Phys. J. D 44, 433-437	tion probabilities for atomic oxygen (2007)	
	0	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
363.	A. Baclawski, T. Wujec, J. Measurements of selecter recent calculations Eur. Phys. J. D 44, 427-431	Musielok ed N I multiplet strength ratios and comparison with (2007)	
	Ν	Trans. prob., Oscill. Strengths	Exp
364.	É. Biémont, M. Clar, V. Fiv Lifetime and transition p VII and Xe VIII Eur. Phys. J. D 44, 23-33 (2	et, HP. Garnir, P. Palmeri, P. Quinet, D. Rostohar robability determination in xenon ions: The cases of Xe 2007)	
	$Xe^{6+-7+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
365.	D. R. Beck <b>Relativistic configuration</b> J. Phys. B 40, 3505-3514 (20	n interaction Fe III $3d^6 J = 4 \rightarrow 3d^54p J = 3,4,5$ f-values	
	${f Fe}^{2+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
366.	<ul> <li>A. E. Kingston, A. Hibbert</li> <li>Transitions from the 3p<sup>6</sup></li> <li>J. Phys. B 40, 3389-3399 (20)</li> </ul>	<b>3d ground state of potassium-like vanadium</b> 007)	
	$\mathbf{V}^{4+}$	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
367.	<ul> <li>H. S. Nataraj, B. K. Sahoo,</li> <li>Theoretical studies of th</li> <li>and S XII</li> <li>J. Phys. B 40, 3153-3162 (20)</li> </ul>	B. P. Das, R. K. Chaudhuri, D. Mukherjee e atomic transitions in boron-like ions: Mg VIII, Si X 007)	
	B Z= 12-16 step 2	Trans. prob., Oscill. Strengths	$\mathrm{Th}$
368.	P. Oliver, A. Hibbert Breit-Pauli oscillator stre J. Phys. B 40, 2847-2870 (20	engths for transitions among fine-structure levels of Cl I $007)$	
$\mathbf{Cl}$ 

Th

 $\mathrm{Th}$  $\mathrm{Th}$  $\mathrm{Th}$ ThTh $\mathrm{Th}$  $\mathrm{Th}$  $\mathrm{Th}$  $\mathrm{Th}$ Th $\mathrm{Th}$ ThTh $\mathrm{Th}$ Th  $\mathrm{Th}$ Th

Th

Th

E/TE/T

## 369. S. S. Tayal Oscillator strengths of allowed and intercombination lines in Si II using non-

	J. Phys. B 40, 2551-2562 (2007)			
	$\mathbf{Si}^+$	Trans. prob., Oscill. Strengths		
370.	U. I. Safronova, A. S Relativistic many- tor strengths of $\Delta$ J. Phys. B 40, 955-9	S. Safronova, P. Beiersdorfer <b>-body calculations of electric-dipole lifetimes, rates and oscilla- in=0 transitions between <math>3\ell^{-1}4\ell'</math> states in Ni-like ions 174 (2007)</b>		
	Ni Z= 34-100 Ni Z= 36-42 Ni Z= 46-48 Ru <sup>16+</sup> Sn <sup>22+</sup> Xe <sup>26+</sup> Ba <sup>28+</sup> Eu <sup>35+</sup> Yb <sup>42+</sup> Ta <sup>45+</sup> W <sup>46+</sup> Os <sup>48+</sup> Au <sup>51+</sup> Pb <sup>54+</sup> Bi <sup>55+</sup> Th <sup>62+</sup>	Trans. prob., Oscill. Strengths Trans. prob., Oscill. Strengths		
371.	U <sup>64+</sup> N. C. Deb, A. Hibbe Electric dipole tra rations in Fe III J. Phys. B 40, F251	Trans. prob., Oscill. Strengths ert ansitions among the levels of the 3d <sup>6</sup> , 3d <sup>5</sup> 4s and 3d <sup>5</sup> 4p configu- -F258 (2007)		
	$\mathbf{Fe}^{2+}$	Trans. prob., Oscill. Strengths		
372.	Y. Ralchenko <b>Density depender</b> J. Phys. B 40, F175	rce of the forbidden lines in Ni-like tungsten -F180 (2007)		
	$\mathbf{W}^{46+}$	Trans. prob., Oscill. Strengths		
373.	W. L. Wiese, J. R. H Improved critical tral and singly ion J. Phys. Chem. Ref	<sup>5</sup> uhr compilations of selected atomic transition probabilities for neu- nized carbon and nitrogen . Data 36, 1737 (2007)		
	$\mathbf{C}^{0+-+}$ $\mathbf{N}^{0+-+}$	Trans. prob., Oscill. Strengths Trans. prob., Oscill. Strengths		
374	I Fan T-y Zhang	N-w Zheng D-y Ma T Wang		

374. J. Fan, T.-y. Zhang, N.-w. Zheng, D.-x. Ma, T. Wang Calculations for spin-allowed transitions between energy levels above the 3s3pstate in Si III

Chin. J. Chem. Phys. 20, 265-272 (2007)

	${f Si}^{2+}$	Trans. prob., Oscill. Strengths	3	$\mathrm{Th}$
375.	H. Xu, Z. Jiang, H. Lundb Lifetime measurements J. Opt. Soc. Am. B 23, 25	erg 5 <b>in neutral and singly ionize</b> 597-2600 (2006)	l vanadium	
	$V^{0+-+}$	Trans. prob., Oscill. Strength	5	Exp
	3.2 Atomic and	l Molecular Collision	IS	
	3.2.1 Photon Colli	sions		
376.	J. Schulz, M. Tchaplyguine maki, H. Aksela, S. Aksela <b>Shakedown in core pho</b> Phys. Rev. A 72, 010702 (	e, T. Rander, O. Bjoerneholm, S. , E. Kukk toelectron spectra from align 2005)	Svensson, R. Sankari, S. Heinas- ned laser-excited Na atoms.	
	$h\nu + Na$	Fluorescence	$2.1 \mathrm{~eV}$	Exp
377.	S. Jones, J. H. Macek, D. I <b>Three-Coulomb-wave P</b> in the region of the cro Phys. Rev. A 72, 012718 (	H. Madison Pluvinage model for Compton ss-section maximum. 2005)	double ionization of helium	
	$h\nu + He$	Photoionization	2-20  keV	$\mathrm{Th}$
378.	K. L. Ishikawa, K. Midorik Above-threshold double pulses. Phys. Rev. A 72, 013407 (	cawa e ionization of helium with a 2005)	ttosecond intense soft x-ray	
	$h\nu + He$	Photoionization	$91.45~{\rm eV}$	Exp
379.	P. Lambropoulos, L.A.A. M Signatures of direct dou Phys. Rev. A 72, 013410 (	Nikolopoulos, M. G. Makris <b>uble ionization under xuv ra</b> o 2005)	diation.	
	$h\nu + He$	Photoionization	45  eV	Th
380.	S. Ricz, J. Nikkinen, R. Sa Aksela Interference effects in the 2p -; ns/md resona Phys. Rev. A 72, 014701 (	nkari, T. Ricsoka, A. Kover, D. V the angular distribution of A nnces. 2005)	Varga, S. Fritzsche, H. Aksela, S. Ar 3p photoelectrons across	
	h u + Ar	Photoionization	$90-330 \mathrm{~eV}$	Exp
381.	A. S. Kheifets, I. Bray <b>Double photoionization</b> Phys. Rev. A 72, 022703 (	of He and $H_2$ at unequal en 2005)	ergy sharing.	
	$f{h} u + He \ h u + H_2 \ h u + D_2 \ h u + He \ h u + He \ h u + He \ h u + H_2 \ h u + D_2$	Photoexcitation Photoexcitation Photoexcitation Photoionization Photoionization Photoionization		Th Th Th Th Th Th

382.	. U. Kleiman, M. S. Pindzola, F. Robicheaux <b>Photoionization with excitation and double photoionization of the</b> $Li^+$ ground 1 <sup>1</sup> S state and metastable 2 <sup>1,3</sup> S states. Phys. Rev. A 72, 022707 (2005)				
	$egin{array}{l} {f h} u + {f Li}^+ \ {f h} u + {f Li}^+ \end{array}$	Photoexcitation Photoionization	200 eV 200 eV	Th Th	
383.	J. Colgan, M. S. Pindzola, <b>Double and triple photo</b> Phys. Rev. A 72, 022727 (2	F. Robicheaux <b>bionization of Li and Be.</b> 2005)			
	$egin{array}{l} { m h} u + { m Li} \ { m h} u + { m Be} \end{array}$	Photoionization Photoionization	200-400 eV 200-400 eV	Th Th	
384.	M. Isla, J. A. Alonso Fragmentation and Cou with intense laser pulse Phys. Rev. A 72, 023201 (2	lomb explosion of deuterium s. 2005)	clusters by the interaction		
	$h\nu + D_3^+$	Photodissociation		Th	
	$\mathbf{h} u + \mathbf{D}_{13}$ $\mathbf{h} u + \mathbf{H}_{13}$ <sup>+</sup>	Photodissociation		1 n Th	
385.	A. D. Bandrauk, HZ. Lu Laser-induced electron Phys. Rev. A 72, 023408 (2 $h\nu + H_2$	recollision in $H_2$ and electron 2005) Photoionization	correlation. 800 nm	Th	
386.	6. T. Laarmann, A.R.B. de Castro, P. Gurtler, W. Laasch, J. Schulz, H. Wabnitz, T. Moeller Photoionization of helium atoms irradiated with intense vacuum ultraviolet free- electron laser light. Part I. Experimental study of multiphoton and single-photon processes. Phys. Rev. A 72, 023409 (2005)				
	$h\nu + He$	Photoionization	$13 \mathrm{~eV}$	Exp	
387.	A.R.B. de Castro, T. Laarn Photoionization of heliu electron laser light. Pa photon processes. Phys. Rev. A 72, 023410 (2010)	nann, J. Schulz, H. Wabnitz, T. M m atoms irradiated with inter rt II. Theoretical modeling of 2005)	Moeller nse vacuum ultraviolet free- of multi-photon and single-		
	$h\nu + He$	Photoionization	13  eV	Th	
388.	D. Pinkham, R. R. Jones Intense laser ionization Phys. Rev. A 72, 023418 (2010)	of transiently aligned CO. 2005)			
	$egin{array}{l} { m h} u + { m CO} \ { m h} u + { m CO} \end{array}$	Photodissociation Photoionization	780 nm 780 nm	Exp Exp	
389.	J. M. Chen, K. T. Lu, J. M. Dissociation dynamics of 2p and Cl 2p core-level	L Lee, S. C. Ho, H. W. Chang of excited neutral fragments o excitations.	f gaseous $SiCl_4$ following Si		

Phys. Rev. A 72, 032706 (2005)

	$\mathbf{h}\nu + \mathbf{SiCl}_4$	Photoexcitation	100-225  eV	Exp
390.	J. Schulz, M. Tchaplyguine, S. Heinasmaki, R. Sankari, <b>Final state selection in</b> <b>troscopy with soft-x-ray</b> Phys. Rev. A 72, 032718 (2	T. Rander, H. Bergersen, A. Lindl S. Osmekhin, S. Aksela, H. Aksela the 4p photoemission of Rb photoionization. 005)	blad, G. Oehrwall, S. Svensson, by combining laser spec-	
	$h\nu + Rb$	Photoionization	$61 \mathrm{~eV}$	$\mathrm{Th}$
391.	HL. Zhou, S. T. Manson, A Photodetachment of the Phys. Rev. A 72, 032723 (2	A. Hibbert, L. Vo Ky, N. Feautrie e <b>outer shell of</b> $C^-$ <b>in the excit</b> 005)	r ted $^{2}D$ state.	
	$h\nu + C^-$	Photodetachment	0-11 eV	$\mathrm{Th}$
392.	M. Ya. Amusia, A. S. Balte Near-threshold behavior todetachment. Phys. Rev. A 72, 032727 (2	nkov, L. V. Chernysheva, Z. Felfli r of angular anisotropy paran 005)	, A. Z. Msezane neters in negative-ion pho-	
	$egin{array}{l} \mathbf{h} u + \mathbf{I}^- \ \mathbf{h} u + \mathbf{X}\mathbf{e} \end{array}$	Photodetachment Photoionization	0-30 eV 0-30 eV	$_{\mathrm{Th}}$
393.	X. X. Zhou, X. M. Tong, Z. Alignment dependence of in intense laser fields. Phys. Rev. A 72, 033412 (2)	X. Zhao, C. D. Lin <b>f high-order harmonic generat</b> 005)	ion from $N_2$ and $O_2$ molecules	
	$egin{array}{l} {f h}  u + {f N}_2 \ {f h}  u + {f O}_2 \ {f h}  u + {f N}_2 \ {f h}  u + {f N}_2 \ {f h}  u + {f N}_2 \end{array}$	Fluorescence Fluorescence Photoionization Photoionization	$\begin{array}{l} 2-4x10^{14} \ {\rm W}/cm^2 \\ 2-4x10^{14} \ {\rm W}/cm^2 \\ 2-4x10^{14} \ {\rm W}/cm^2 \\ 2-4x10^{14} \ {\rm W}/cm^2 \end{array}$	${f Th} {f Th} {f Th} {f Th} {f Th} {f Th}$
394.	V. Serov, A. Keller, O. Atal Intense laser dissociation Phys. Rev. A 72, 033413 (2	bek, H. Figger, D. Pavicic <b>n of</b> $D_2^+$ : From experiment to 005)	o theory.	
	$egin{array}{l} \mathbf{h} u + \mathbf{H}_2^+ \ \mathbf{h} u + \mathbf{D}_2^+ \end{array}$	Photodissociation Photodissociation	$\frac{10^{14}}{10^{14}} \frac{\text{W}/cm^2}{\text{W}/cm^2}$	${ m E/T} { m E/T}$
395.	J. Sandstroem, I. Alvarez, I Gulley, M. Halka, D. Hanste <b>Triple photodetachment</b> Phys. Rev. A 72, 034702 (2	D. Calabrese, C. Cisneros, A. M. $^{\circ}$ orp, F. S. Schlachter, J. S. Thomp from the $Cl^-$ ion. 005)	Covington, V. T. Davis, M. S. oson, D. J. Pegg	
	$egin{array}{l} { m h} u+{ m Cl}^-\ { m h} u+{ m Cl}^- \end{array}$	Photodetachment Photoionization	38-85 eV 38-85 eV	Exp Exp
396.	A. S. Alnaser, M. Zamkov, Litvinyuk <b>Resonant excitation dur</b> Phys. Rev. A 72, 041402 (2	X. M. Tong, C. M. Maharjan, P. ing strong-field dissociative ic 005)	Ranitovic, C. L. Cocke, I. V.	
	$egin{array}{l} \mathbf{h} u + \mathbf{O}_2 \ \mathbf{n}\mathbf{h} u + \mathbf{O}_2 \ \mathbf{h} u + \mathbf{O}_2 \ \mathbf{n}\mathbf{h} u + \mathbf{O}_2 \ \mathbf{n}\mathbf{h} u + \mathbf{O}_2 \end{array}$	Photodissociation Photodissociation Photoionization Photoionization	550-1800 nm 550-1800 nm 550-1800 nm 550-1800 nm	Exp Exp Exp Exp

397. C. M. Maharjan, A. S. Alnaser, X. M. Tong, B. Ulrich, P. Ranitovic, S. Ghimire, Z. Chang, I. V. Litvinyuk, C. L. Cocke Momentum imaging of doubly charged ions of Ne and Ar in the sequential ion-

ization region. Phys. Rev. A 72, 041403 (2005)

$h\nu + Ne$	Photoionization	800 nm	Exp
$h\nu + Ar$	Photoionization	800 nm	Exp
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{N}\mathbf{e}$	Photoionization	800 nm	Exp
$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{A}\mathbf{r}$	Photoionization	800 nm	Exp

398. X. J. Liu, G. Pruemper, E. Kukk, R. Sankari, M. Hoshino, C. Makochekanwa, M. Kitajima, H. Tanaka, H. Yoshida, Y. Tamenori, K. Ueda
Site-selective ion production of the core-excited CH<sub>3</sub>F molecule probed by Auger-electron-ion coincidence measurements. Phys. Rev. A 72, 042704 (2005)

$h\nu + CH_3F$	Photoexcitation	288.8-687.8  eV	$\operatorname{Exp}$
$h\nu + CH_3F$	Photoionization	288.8-687.8  eV	$\operatorname{Exp}$

399. J. Nikkinen, H. Aksela, S. Fritzsche, S. Heinasmaki, R. Sankari, E. Kukk, N. Berrah, S. Aksela

Photoionization and Auger decay of the 3d vacancy state of atomic strontium: Electron-electron correlations.

Phys. Rev. A 72, 042706 (2005)

$h\nu + Sr$	Photoionization	$190-210   \mathrm{eV}$	E/T
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 400. X. Feng, A. A. Wills, E. Sokell, T. W. Gorczyca, M. Wiedenhoeft, N. Berrah Investigation of photoelectron recapture in Ar using two-dimensional photoelec- tron spectroscopy. Phys. Rev. A 72, 042712 (2005)

$h\nu + Ar$	Photoionization	$250-253 {\rm ~eV}$	E/T
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401. C. Bouri, P. Selles, L. Malegat, J. M. Teuler, M. Kwato Njock, A. K. Kazansky
 Dynamics of the helium atom close to the full fragmentation threshold: Ionization excitation.

Phys. Rev. A 72, 042716 (2005)

$h\nu + He$	Photodissociation	79.1  eV	Th
$h\nu + He$	Photoexcitation	79.1  eV	$\mathrm{Th}$

402. N. Saito, X.-J. Liu, Y. Morishita, G. Pruemper, M. Machida, M. Oura, H. Yamaoka, Y. Tamenori, I. Koyano, I. H. Suzuki, K. Ueda
Vibrationally resolved molecular-frame angular distribution of O 1s photoelectrons from CO<sub>2</sub> molecules.
Phys. Rev. A 72, 042717 (2005)

$\mathbf{h} u + \mathbf{CO}_2$	Photoionization	540.5-546.5  eV	

403. M. K. Inal, A. Surzhykov, S. Fritzsche
Linear polarization of the 2p<sup>5</sup>3s-¿2p<sup>6</sup> lines following the inner-shell photoionization of sodiumlike ions.
Phys. Rev. A 72, 042720 (2005)

$\mathbf{h} u + \mathbf{F}\mathbf{e}^{15+}$	Photoionization	1-37  keV	Th
$\mathbf{h} u$ + $\mathbf{U}^{81+}$	Photoionization	1-37  keV	$\mathrm{Th}$

Exp

404.	<ul> <li>Y. Morishita, Y. Tamenori, K. Okada, T. Oyama, K. Yamamoto, K. Tabayashi, T. Ibuki, I. H. Suzuki</li> <li>Shake-off of loosely bound electrons in Auger decays of Kr 2p core hole states. Phys. Rev. A 72, 044702 (2005)</li> </ul>				
	$\mathbf{h} u$ + Kr	Photoionization	$1850~{\rm eV}$	Exp	
405.	M. Uhlmann, T. Kun Molecular alignme Phys. Rev. A 72, 045	hert, R. Schmidt <b>nt of fragmenting</b> $H_2^+$ and $H_5402$ (2005)	$_2$ in strong laser fields.		
	$\mathbf{h}\nu + \mathbf{H}_2$	Photodissociation	266  nm	$\mathrm{Th}$	
	$\mathbf{h}\nu + \mathbf{H}_2^+$	Photodissociation	266 nm	$\mathrm{Th}$	
	$\mathbf{n}\mathbf{h} u + \mathbf{H}_2$	Photodissociation	266  nm	$\mathrm{Th}$	
	$\mathbf{n}\mathbf{h} u$ + $\mathbf{H}_{2}^{+}$	Photodissociation	266 nm	$\mathrm{Th}$	
406.	R. C. Bilodeau, N. D J. G. Heredia, M. Per <b>High-charge-state</b> Phys. Rev. A 72, 050	9. Gibson, J. D. Bozek, C. W. Wa rri, N. Berrah formation following inner-she 0701 (2005)	alter, G. D. Ackerman, P. Anderss ell photodetachment from $S^-$ .	on,	
	$h\nu + S^-$	Photodetachment	150-240 eV	Exp	
	$h\nu + \tilde{s}^-$	Photoionization	150-240  eV	Exp	
407.	<ul> <li>7. Z. Chen, A. Z. Msezane</li> <li>Random-phase approximation with exchange for the inner-shell electron transitions.</li> <li>Phys. Rev. A 72, 050702 (2005)</li> </ul>				
	$\mathbf{h}\nu + \mathbf{I}$	Photoionization	50-200  eV	E/T	
	$h\nu + I^+$	Photoionization	50-200 eV	E/T	
408.	A. Y. Istomin, A. F. Parametrizations a double photoioniza Phys. Rev. A 72, 052	Starace, N. L. Manakov, A. V. M and dynamical analysis of an ation including nondipole effe 2708 (2005)	eremianin, A. S. Kheifets, I. Bray gle-integrated cross sections cts.	for	
	$h\nu + He$	Photoionization	$0.1-1 \mathrm{keV}$	E/T	
409.	A. K. Kazansky, N. M Nonstationary the atomic shells. Phys. Rev. A 72, 052	M. Kabachnik cory for short-pulse near-thr 2714 (2005)	eshold photoionization of in	ner	
	$h\nu + Ne$	Photoexcitation	near-threshold	$\mathrm{Th}$	
	$h\nu + Ne$	Photoionization	near-threshold	$\mathrm{Th}$	
410.	<ul> <li>D. Pavicic, T. W. Haensch, H. Figger</li> <li>Vibrationally resolved strong-field dissociation of D<sub>2</sub><sup>+</sup> in ion beams.</li> <li>Phys. Rev. A 72, 053413 (2005)</li> </ul>				
	$ \begin{aligned} \mathbf{h}\nu + \mathbf{H}_2^+ \\ \mathbf{h}\nu + \mathbf{D}_2^+ \end{aligned} $	Photodissociation Photodissociation	$\begin{array}{c} 785 \ \mathrm{nm} \\ 785 \ \mathrm{nm} \end{array}$	$\begin{array}{c} \text{Exp} \\ \text{Exp} \end{array}$	
411.	I. I. Tupitsyn, A. V. V Urrutia, A. Lapierre, Magnetic-dipole tr Phys. Rev. A 72, 062	Volotka, D. A. Glazov, V. M. Shal J. Ullrich cansition probabilities in B-lik 2503 (2005)	oaev, G. Plunien, J. R. Crespo Lop <b>&amp; and Be-like ions.</b>	0ez-	

	$\begin{array}{l} \mathbf{h}\nu + \mathbf{S}^{11+} \\ \mathbf{h}\nu + \mathbf{S}^{12+} \\ \mathbf{h}\nu + \mathbf{Cl}^{12+} \\ \mathbf{h}\nu + \mathbf{Cl}^{13+} \\ \mathbf{h}\nu + \mathbf{Ar}^{13+} \\ \mathbf{h}\nu + \mathbf{Ar}^{13+} \\ \mathbf{h}\nu + \mathbf{Ar}^{14+} \\ \mathbf{h}\nu + \mathbf{K}^{14+} \\ \mathbf{h}\nu + \mathbf{K}^{15+} \\ \mathbf{h}\nu + \mathbf{Ti}^{17+} \\ \mathbf{h}\nu + \mathbf{Ti}^{18+} \end{array}$	Photoexcitation Photoexcitation Photoexcitation Photoexcitation Photoexcitation Photoexcitation Photoexcitation Photoexcitation Photoexcitation Photoexcitation		$Th \\ Th \\$
412.	S. J. Smith, A. Chutjian, A. <b>Measurement of metas</b> Phys. Rev. A 72, 062504 (	J. A. Lozano table lifetimes for tra (2005)	nsitions in $Fe^{9+}$ , $Fe^{10+}$ and $Fe^{13+}$ .	
	$egin{array}{lll} {f h}  u + {f Fe}^{9+} \ {f h}  u + {f Fe}^{10+} \ {f h}  u + {f Fe}^{13+} \end{array}$	Photoexcitation Photoexcitation Photoexcitation		Exp Exp Exp
413.	H. W. van der Hart, B.J.S Benchmark multiphoto J. Phys. B 38, L207 (2005	5. Doherty, J. S. Parker, I on ionization rates for )	K. T. Taylor He at 390 nm.	
	$\mathbf{h} u$ + He $\mathbf{n}\mathbf{h} u$ + He	Photoionization Photoionization	390 nm 390 nm	Th Th
414.	K. Miculis, W. Meyer Phototransition of Na( uum. J. Phys. B 38, 2097 (2005)	$(3p_{3/2})$ into high Rydb	erg states and the ionization contin-	
	$egin{array}{l} { m h} u+{ m Na}\ { m h} u+{ m Na}^* \end{array}$	Photoionization Photoionization	8-10 eV 8-10 eV	Th Th
415.	A. M. Juarez, E. Sokell, P $\beta$ – parameter measurem = 0 threshold of para – J. Phys. B 38, 2109 (2005)	. Bolognesi, G. C. King, ments of state-selecte - H <sub>2</sub> .	D. Cubric, M. de Simone, M. Coreno d rotational transitions near the $\nu^+$	
	$\mathbf{h} u$ + $\mathbf{H}_2$	Photoionization	15.47-15.75  eV	Exp
416.	Y. H. Jiang, R. Puettner, Theoretical photoioniz rameters of doubly exc J. Phys. B 38, 2157 (2005)	G. Kaindl ation partial cross se ited helium. )	ctions and angular distribution pa-	
	$egin{array}{l} {f h} u+{f He}\ {f h} u+{f He}^* \end{array}$	Photoionization Photoionization	69-76 eV 69-76 eV	Th Th
417.	A. De Fanis, G. Pruemper S. Fritzsche, N. M. Kaback Investigation of valence toelectron recapture. J. Phys. B 38, 2229 (2005)	r, U. Hergenhahn, E. Ku hnik, K. Ueda e <b>inter-multiplet Auge</b> )	kk, T. Tanaka, M. Kitajima, H. Tanaka, r transitions in Ne following 1s pho-	
	$egin{array}{l} { m h} u+{ m Ne} \ { m h} u+{ m Ne} \end{array}$	Photoexcitation Photoionization	$\begin{array}{c} 870 \ \mathrm{eV} \\ 870 \ \mathrm{eV} \end{array}$	E/T $E/T$

418.	I. A. Ivanov, A. S. Kheifets On the use of the Krame calculations. J. Phys. B 38, 2245 (2005)	rs-Henneberger Hamiltonian	in multi-photon ionization	
	$\mathbf{h} u + \mathbf{H}$	Photoionization	6.5-22  eV	$\mathrm{Th}$
	$h\nu + He$	Photoionization	6.5-22  eV	$\mathrm{Th}$
	$\mathbf{n}\mathbf{h} u$ + H	Photoionization	6.5-22  eV	$\mathrm{Th}$
	$\mathbf{n}\mathbf{h}\mathbf{\nu} + \mathbf{H}\mathbf{e}$	Photoionization	6.5-22  eV	Th
419.	S. A. Sheinerman PCI effects in resonant p 1s threshold. J. Phys. B 38, 2279 (2005)	processes of photo double elec	ctron emission near the Ne	
	$h\nu + Ne$	Photoionization	870 eV	$\mathrm{Th}$
420.	Ch. Siedschlag, T. Pattard Single-photon ionization J. Phys. B 38, 2297 (2005)	of the hydrogen molecule.		
	$\mathbf{h}\nu + \mathbf{H}_2$	Photodissociation	30-10,000  eV	$\mathrm{Th}$
	$h\nu + H_2$	Photoionization	30-10,000  eV	$\mathrm{Th}$
421.	K. Chakrabarti A comparison of the trip of $H^-$ , He and $Li^+$ at low J. Phys. B 38, 2487 (2005) $h\nu + H^-$ $h\nu + He$	De differential cross sections a v energy. Photoionization Photoionization	for double photoionization	Th Th
	$h u + Li^+$	Photoionization		Th
422.	R. J. Pelaez, C. Perez, V. R. Experimental measureme lines. J. Phys. B 38, 2505 (2005)	Gonzalez, F. Rodriguez, J. A. A ents of shifts and asymmetries	paricio, S. Mar of He II $P_{\alpha}$ and $P_{\beta}$ spectral	
	$h\nu + He^+$	Fluorescence	1.75  eV	Exp
423.	A. D. Bandrauk, H. Lu Harmonic generation in J. Phys. B 38, 2529 (2005)	a 1D model of $H_2$ with single	e and double ionization.	
	$h\nu + H_{2}$	Photoexcitation	800 nm	Th
	$h\nu + H_2$	Photoionization	800 nm	Th
424.	V. T. Davis, A. Aguilar, A. S. Gulley, M. Halka, D. Han Pegg <b>Photo-double detachmen</b> J. Phys. B 38, 2579 (2005)	M. Covington, J. S. Thompson, storp, J. Sandstroem, B. M. McL at from the $F^-$ ion.	D. Calabrese, C. Cisneros, M. aughlin, G. F. Gribakin, D. J.	
	1		20 C2 V	E / E
	$h\nu + F$	Photodetachment	20-62 eV	E/T E/T
	$\mathbf{n}\mathbf{\nu} + \mathbf{r}$	r notolomzation	20-02 ev	$\mathbb{E}/1$

425. P. Q. Wang, A. M. Sayler, K. D. Carnes, J. F. Xia, M. A. Smith, B. D. Esry, I. Ben-Itzhak Highlighting the angular dependence of bond softening and bond hardening of  $H_2^+$  in an ultrashort intense laser pulse. J. Phys. B 38, L251 (2005)

$\mathbf{h}\nu + \mathbf{H}_2^+$	Photodissociation	$2x10^{14} { m W}/cm^2$	Exp
			r

426. X. M. Tong, C. D. Lin

Empirical formula for static field ionization rates of atoms and molecules by lasers in the barrier-suppression regime.

J. Phys. B 38, 2593 (2005)

$h\nu + H$	Photoionization	$10^{13} - 10^{15} \text{ W/}cm^2$	$\mathrm{Th}$
$h\nu + He$	Photoionization	$10^{13} - 10^{15} \text{ W/}cm^2$	Th
$h\nu + Ne$	Photoionization	$10^{13} - 10^{15} \text{ W/}cm^2$	Th
$h\nu + Ne^+$	Photoionization	$10^{13} - 10^{15} \text{ W/}cm^2$	$\mathrm{Th}$
$h\nu + Ar$	Photoionization	$10^{13} - 10^{15} \text{ W/}cm^2$	Th
$h\nu + Ar^+$	Photoionization	$10^{13} - 10^{15} \text{ W/}cm^2$	Th
$h\nu + Rb$	Photoionization	$10^{13} - 10^{15} \text{ W/}cm^2$	Th
$h\nu + H_2^+$	Photoionization	$10^{13} - 10^{15} \text{ W/}cm^2$	$\mathrm{Th}$

427. S. Mickat, K. H. Schartner, Sv. Kammer, R. Schill, L. Werner, S. Klumpp, A. Ehresmann, H. Schmoranzer, V. L. Sukhorukov

Absolute cross sections and branching ratios for the radiative decay of doubly excited helium determined by photon-induced fluorescence spectroscopy. J. Phys. B 38, 2613 (2005)

$h\nu + He$	Fluorescence	64  eV	Exp
$h\nu + He$	Photoexcitation	64  eV	Exp

428. G. Hinojosa, M. M. Sant'Anna, A. M. Covington, R. A. Phaneuf, I. R. Covington, I. Dominguez, A. S. Schlachter, I. Alvarez, C. Cisneros Photofragmentation of ionic carbon monoxide. J. Phys. B 38, 2701 (2005)

$h\nu + CO^+$	Photodissociation	20.5-34.5  eV	Exp
$h\nu + CO^+$	Photoionization	20.5-34.5  eV	Exp

429. V. D. Rodriguez, P. Macri, R. Gayet
H<sub>2</sub><sup>+</sup> ionization by ultra-short electromagnetic pulses investigated through a non-perturbative Coulomb-Volkov approach.
J. Phys. B 38, 2775 (2005)

$h\nu + H_2^+$	Photoionization	$1 { m GeV/u}$	$\mathrm{Th}$
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430. U. Hergenhahn, A. De Fanis, G. Pruemper, A. K. Kazansky, N. M. Kabachnik, K. Ueda
A study of photoelectron recapture due to post-collision interaction in Ne at the
1s photoionization threshold.
J. Phys. B 38, 2843 (2005)

$h\nu + Ne$	Photoionization	803-816  eV	Е	/'	Τ
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431. M. Glass-Maujean, R. Kneip, E. Flemming, H. Schmoranzer
Photodissociation of doubly excited states of molecular hydrogen studied by polarization measurement of Lyman – α fluorescence.
J. Phys. B 38, 2871 (2005)

$h\nu + H_2$	Photodissociation	27-38  eV	E/T
$\mathbf{h} u + \mathbf{H}_2$	Fluorescence	27-38  eV	E/T

432.	C. Baraldi, E. Casnati, A. T. Measurement of L x-ray by 59.54 keV photons. J. Phys. B 38, 2883 (2005)	Fartari, B. Singh emission from elements in 64	; Z ; 73 interval stimulated	
	$h\nu + Gd$	Photoionization	59 54 keV	Exp
	$h\nu + Gu$ $h\nu + Dy$	Photoionization	59.54 keV	Exp
	$h\nu + Er$	Photoionization	59.54 keV	Exp
	$h\nu + Yh$	Photoionization	59.54 keV	Exp
	$h\nu + Hf$	Photoionization	59.54 keV	Exp
	$h\nu + Ta$	Photoionization	59.54  keV	Exp
433.	L. Gaynor, N. Murphy, D. Kampen, E. T. Kennedy <b>EUV photoabsorption o</b> J. Phys. B 38, 2895 (2005)	Kilbane, A. Cummings, G. O'S f laser produced tellurium pl	ullivan, J. T. Costello, P. van asmas: Te I-Te IV.	
	$h\nu$ + Te	Photoexcitation	50-130 eV	E/T
	$h\nu + Te^+$	Photoexcitation	50-130 eV	E/T
	$h\nu + Te^{2+}$	Photoexcitation	50-130 eV	E/T
	$h\nu + Te^{3+}$	Photoexcitation	50-130 eV	E/T
435.	A theoretical and exper J. Phys. B 38, 2911 (2005) $h\nu + Al^+$ N. Saito, K. Ueda, A. De Czasch, L. Schmidt, A. Cas Molecular frame photoe from $CO_2$ molecules. J. Phys. B 38, L277 (2005)	imental study of the photoion Photoionization Fanis, K. Kubozuka, M. Machie simi, K. Wang, B. Zimmermann, lectron angular distribution fo	nization of Al II. 20-160 eV la, I. Koyano, R. Doerner, A. V. McKoy or oxygen 1s photoemission	$\mathrm{E/T}$
	$egin{array}{l} \mathbf{h} u + \mathbf{CO}_2 \ \mathbf{h} u + \mathbf{CO}_2 \end{array}$	Photodissociation Photoionization	540-580 eV 540-580 eV	${ m E/T} { m E/T}$
436.	S. Vdovic, R. Beuc, D. Aun Absorption spectrum of J. Phys. B 38, 3107 (2005)	niler, T. Ban, G. Pichler Na-K-He mixture: Experime	ent and theory.	
	$h\nu + He$	Total Absorption. Scattering	400-850 nm	E/T
	$h\nu + Na$	Total Absorption, Scattering	400-850 nm	E/T
	$h\nu + K$	Total Absorption, Scattering	400-850 nm	E/T
437.	Ph. V. Demekhin, I. D. Pet A. Ehresmann, K. H. Schar Interaction between res threshold in Kr II. J. Phys. B 38, 3129 (2005)	rov, B. M. Lagutin, V. L. Sukhorr tner, H. Schmoranzer sonances through autoionizat	ukov, F. Vollweiler, S. Klumpp, tion continua near the 4s-	
	$\mathbf{h}_{K} + \mathbf{K} \mathbf{r}^{\pm}$	Photooxitation	82 02 nm	F /T

$h\nu + Kr^+$	Photoexcitation	82-92 nm	E/T
$h\nu + Kr^+$	Photoionization	82-92 nm	E/T

438.	S. B. Whitfield, K. Caspar, Velasco, M. O. Krause Valence satellite photo 3d giant resonance. J. Phys. B 38, 3273 (2005)	y, T. Myers, M. Bjelland, R ionization of atomic sca	Wehlitz, J. Jimenez-Mier, P. Olalde- ndium in the region of the 3p -¿	
	$h\nu + Sc$	Photoionization	29-41 eV	$\mathrm{E}/\mathrm{T}$
439.	J. Jha, D. Mathur, M. Kris Enhancement of x-ray intense laser light. J. Phys. B 38, L291 (2005)	shnamurthy <b>yields from heteronucle</b> )	ear cluster plasmas irradiated by	
	$h\nu + Ar$	Fluorescence	806 nm	Exp
	$h\nu + Arn$	Fluorescence	806 nm	Exp
	$h u + Arn(H_2O)m$	Fluorescence	806 nm	Exp
440.	C. Guo Ellipticity effects on ne strong laser fields. J. Phys. B 38, L323 (2005)	onsequential double ion	ization of diatomic molecules in	
	$h\nu + N_2$	Photoionization	800 nm	Exp
	$h\nu + NO$	Photoionization	800  nm	Exp
	$\mathbf{h}\mathbf{\nu} + \mathbf{O}_2$	Photoionization	800 nm	Exp
	<ul> <li>H. Aksela, S. Aksela</li> <li>Ion production by casca tion.</li> <li>J. Phys. B 38, 3559 (2005)</li> </ul>	ade Auger transitions fo	blowing the Xe $4d^{-1}$ -; 6p excita-	
	$h\nu + Xe$	Photoionization	64-71  eV	E/T
442.	<ul> <li>Y. Hikosaka, P. Lablanquid</li> <li>Efficient production of in N<sub>2</sub>.</li> <li>J. Phys. B 38, 3597 (2005)</li> </ul>	e, E. Shigemasa metastable fragments av	round the 1s ionization threshold	
	$\mathbf{h} u$ + $\mathbf{N}_2$	Photodissociation	$406\text{-}412~\mathrm{eV}$	Exp
443.	F. Da Pieve, L. Avaldi, R. Kabachnik, G. Stefani <b>Study of electronic corr</b> J. Phys. B 38, 3619 (2005)	Camilloni, M. Coreno, G. relations in the Auger c	Turri, A. Ruocco, S. Fritzsche, N. M. ascade decay from Ne* $1s^{-1}3p$ .	
	$egin{array}{l} {f h} u+{f Ne}\ {f h} u+{f Ne}^* \end{array}$	Photoionization Photoionization	$\begin{array}{c} 867 \ \mathrm{eV} \\ 867 \ \mathrm{eV} \end{array}$	E/T $E/T$
444.	HC. Lu, HK. Chen, BJ Spectra in the vacuum dispersed in solid argor J. Phys. B 38, 3693 (2005)	M. Cheng, YP. Kuo, J. F. ultraviolet region of CC n at 10 K.	Ogilvie ) in gaseous and solid phases and	
	$h\nu + CO$	Photoexcitation	$60,000-96,000 \ cm^{-1}$	Exp
445.	L. Pan, D. R. Beck, S. M. Removal or excitation of J. Phys. B 38, 3721 (2005)	O'Malley of a 1s electron in Kr II	and Kr III.	

	$\mathbf{n}\nu + \mathbf{n}$	Photoexcitation		111
	$h\nu + Kr^{2+}$	Photoexcitation		Th
	$h\nu + Kr^+$	Photoionization		Th
	$h\nu + Kr^{2+}$	Photoionization		Th
446.	A. V. Golovin, J. Ada Inner-shell photoel Comparison betwee J. Phys. B 38, 3755 (2)	achi, S. Motoki, M. Takahashi, A ectron angular distributions en experiment and theory. 2005)	Yagishita from fixed-in-space OCS molect	ules:
	$h\nu + OCS$	Photoionization	200  eV	Exp
447.	J. Viefhaus, M. Braun Auger cascades ver toionization of the J. Phys. B 38, 3885 (2)	ne, S. Korica, A. Reinkoester, D. rsus direct double Auger: Re Kr 3d and Xe 4d, 3d inner a 2005)	Rolles, U. Becker elaxation processes following pl shells.	ho-
	$\mathbf{h} \mathbf{u} \perp \mathbf{K} \mathbf{r}$	Photoionization	03 7 783 oV	Fyn
	$h\nu + Kl$ $h\nu + Xe$	Photoionization	93.7-783 eV	Exp
440.	Antonucci, O. Boyko, Multicolour above- in angular distribu J. Phys. B 38, L357 (	C. Valentin, D. Douillet threshold ionization of heliu tions. 2005)	Im: Quantum interference effe	, L. ects
	$\mathbf{h}_{H} \perp \mathbf{H}_{0}$	Photoionization	810 nm	F/T
	$n\nu + He$ $nh\nu + He$	Photoionization	810 nm	E/T
449.	V. A. Pazdzersky, A. Angular photoelect	V. Koval tron spectra for atom ionizat	ion in an intense two-colour la	ser
449.	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (2) $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization Photoionization	ion in an intense two-colour la 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV	ser Th Th Th Th Th
<ul><li>449.</li><li>450.</li></ul>	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (: $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$ M. Madine, H. W. va: Competition betwee He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (:	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization Photoionization an der Hart een multi-photon emission of 2005)	ion in an intense two-colour la 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV f the 1s and the 2s electron free	ser Th Th Th Th Om
<ul><li>449.</li><li>450.</li></ul>	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (: $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$ M. Madine, H. W. va: Competition betwee He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (: $h\nu + He$	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization n der Hart <b>cen multi-photon emission o</b> 2005) Photoionization	ion in an intense two-colour la 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV	ser Th Th Th Th Th Th
<ul><li>449.</li><li>450.</li></ul>	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (: $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$ M. Madine, H. W. va: Competition betwee He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (: $h\nu + He$ $h\nu + He^*$	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization n der Hart <b>cen multi-photon emission o</b> 2005) Photoionization Photoionization Photoionization	ion in an intense two-colour la 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV	ser Th Th Th Th Th Th
<ul><li>449.</li><li>450.</li></ul>	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (2) $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$ M. Madine, H. W. val Competition between He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (2) $h\nu + He$ $h\nu + He^*$ $nh\nu + He$	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization n der Hart <b>cen multi-photon emission o</b> 2005) Photoionization Photoionization Photoionization Photoionization Photoionization Photoionization	ion in an intense two-colour la 1.93 eV 1.93 eV 1.94 eV 1.95 eV 1.95 eV 1.95 eV 1.95 eV 1.95 eV 1.95 eV 1.95 eV 1.2-49.50 eV 1.2-49.50 eV 1.2-49.50 eV	ser Th Th Th Th om Th Th
<ul><li>449.</li><li>450.</li></ul>	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (: $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$ M. Madine, H. W. va: Competition betwee He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (: $h\nu + He$ $h\nu + He^*$ $nh\nu + He$ $nh\nu + He$	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization n der Hart een multi-photon emission of 2005) Photoionization Photoionization Photoionization Photoionization Photoionization Photoionization Photoionization Photoionization	ion in an intense two-colour la 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV f the 1s and the 2s electron from 11.2-49.50 eV 11.2-49.50 eV 11.2-49.50 eV 11.2-49.50 eV	ser Th Th Th Th Th Th Th Th Th
<ul><li>449.</li><li>450.</li><li>451.</li></ul>	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (: $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$ M. Madine, H. W. va: Competition between He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (: $h\nu + He$ $h\nu + He^*$ $nh\nu + He^*$ $nh\nu + He$ $nh\nu + $	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization Photoionization n der Hart <b>cen multi-photon emission o</b> 2005) Photoionization Photoioniz	ion in an intense two-colour la 1.93  eV 1.93  eV 1.93  eV 1.93  eV 1.93  eV f the 1s and the 2s electron from 11.2-49.50  eV 11.2-49.50  eV 11.2-49.50  eV 11.2-49.50  eV 11.2-49.50  eV 11.2-49.50  eV 11.2-49.50  eV 11.2-49.50  eV	ser Th Th Th Th Th Th Th Th Th Th
<ul><li>449.</li><li>450.</li><li>451.</li></ul>	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (: $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$ M. Madine, H. W. va: Competition betwee He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (: $h\nu + He$ $h\nu + He^*$ $nh\nu + He^*$ $nh\nu + He$ $nh\nu + He$ $nh\nu + He$ $nh\nu + He$ $nh\nu + He$ $nh\nu + He$ $h\nu + He$ $h\nu + He$ $h\nu + He$ $h\nu + He$ $h\nu + He$	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization Photoionization n der Hart een multi-photon emission of 2005) Photoionization	ion in an intense two-colour la 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV f the 1s and the 2s electron from 11.2-49.50 eV 11.2-49.50 eV 11.2-49.50 eV 11.2-49.50 eV 2-30 eV	ser Th Th Th Th Th Th Th Th Th Th Th
<ul><li>449.</li><li>450.</li><li>451.</li></ul>	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (: $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$ M. Madine, H. W. va: Competition between He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (: $h\nu + He$ $h\nu + He^*$ $nh\nu + He^*$ $nh\nu + He^*$ $nh\nu + He$ $h\nu + He^*$ $nh\nu + He$ $h\nu + He^*$ $nh\nu + He$ $h\nu + He^*$ $nh\nu + He^*$ $h\nu + He^*$	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization Photoionization n der Hart een multi-photon emission of 2005) Photoionization	ion in an intense two-colour la 1.93  eV 1.93  eV 1.93  eV 1.93  eV 1.93  eV f the 1s and the 2s electron from 11.2-49.50  eV 11.2-49.50  eV 11.2-49.50  eV 11.2-49.50  eV 11.2-49.50  eV 2-30  eV 2-30  eV	ser Th Th Th Th Th Th Th Th Th Th Th Th
<ul><li>449.</li><li>450.</li><li>451.</li></ul>	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (2) $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$ M. Madine, H. W. val Competition betwee He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (2) $h\nu + He$ $h\nu + He^*$ $nh\nu + He^*$ $nh\nu + He^*$ $nh\nu + He$ $nh\nu + He^*$ $nh\nu + He$ $nh\nu + He^*$ $nh\nu + He$ $nh\nu + He^*$ $nh\nu + He$ $nh\nu + He^*$ $h\nu + He$ $nh\nu + He^*$ $h\nu + He$ $nh\nu + He^*$ $h\nu + He$ $nh\nu + He^*$ $h\nu + He$ $h\nu + He$	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization Photoionization n der Hart een multi-photon emission of 2005) Photoionization	ion in an intense two-colour la 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV f the 1s and the 2s electron from 11.2-49.50 eV 11.2-49.50 eV 11.2-49.50 eV 11.2-49.50 eV 2.30 eV 2-30 eV 2-30 eV 2-30 eV 2-30 eV	ser Th Th Th Th Th Th Th Th Th Th Th Th
<ul><li>449.</li><li>450.</li><li>451.</li></ul>	V. A. Pazdzersky, A. Angular photoelect field. J. Phys. B 38, 3945 (2) $h\nu + H$ $h\nu + Xe$ $nh\nu + H$ $nh\nu + Xe$ M. Madine, H. W. var Competition between He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (2) $h\nu + He$ $h\nu + He^*$ $nh\nu + He^*$ $nh\nu + He^*$ $nh\nu + He$ $nh\nu + He^*$ $nh\nu + He^*$ $nh\nu + He$ $nh\nu + He^*$ $h\nu + He^*$ $nh\nu + He^*$ $h\nu + He^*$ $h\mu + He$	V. Koval tron spectra for atom ionizat 2005) Photoionization Photoionization Photoionization Photoionization n der Hart <b>cen multi-photon emission o</b> 2005) Photoionization	ion in an intense two-colour la 1.93 eV 1.93 eV 1.93 eV 1.93 eV 1.93 eV f the 1s and the 2s electron from 11.2-49.50 eV 11.2-49.50 eV 11.2-49.50 eV 11.2-49.50 eV 2.30 eV 2-30 eV 2-30 eV 2-30 eV 2-30 eV 2-30 eV 2-30 eV	ser Th Th Th Th Th Th Th Th Th Th Th Th Th

452. K.-H. Schartner, R. H. Schill, D. Hasselkamp, S. Mickat, S. Kammer, L. Werner, S. Klumpp, A. Ehresmann, H. Schmoranzer, B. M. Lagutin, V. L. Sukhorukov
Partial wave analysis of interfering Kr 3d<sup>9</sup>5p resonant Raman Auger transitions based on measurements of alignment and orientation parameters within the natural line width.
J. Phys. B 38, 4155 (2005)

$h\nu + Kr$	Fluorescence	91-92.8  eV	Exp
$h\nu + Kr$	Photoexcitation	91-92.8  eV	Exp
$h\nu + Kr$	Photoionization	91-92.8 eV	Exp

453. M. A. Lysaght, D. Kilbane, A. Cummings, N. Murphy, P. Dunne, G. O'Sullivan, P. van Kampen, J. T. Costello, E. T. Kennedy **4d photoabsorption spectra of Sn II and Sn IV in the 30-65 eV region.** J. Phys. B 38, 4247 (2005)  $\mathbf{h}\nu + \mathbf{Sn}^+$  Total Absorption, Scattering 30-65 eV E/T  $\mathbf{h}\nu + \mathbf{Sn}^{3+}$  Total Absorption, Scattering 30-65 eV E/T

454. R. G. Polozkov, V. K. Ivanov, A. V. Solov'yov **Photoionization of the fullerene ion**  $C_{60}^+$ . J. Phys. B 38, 4341 (2005)

$\mathbf{h}\nu + \mathbf{C}_{60}^+$ Photo	bionization 7-50	eV Th
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455. I. I. Beterov, D. B. Tretyakov, I. I. Ryabtsev, N. N. Bezuglov, K. Miculis, A. Ekers, A. N. Klucharev

Collisional and thermal ionization of sodium Rydberg atoms III. Experiment and theory for nS and nD states with n = 8-20 in crossed atomic beams. J. Phys. B 38, 4349 (2005)

$h\nu + Na$	Photoionization	420-630 K	E/T
$\mathbf{h} u + \mathbf{N}\mathbf{a}^*$	Photoionization	420-630 K	E/T

456. H. Abgrall, E. Roueff

Theoretical calculations of excited rovibrational levels of HD. Term values and transition probabilities of VUV electronic bands.

Astron. Astrophys. 445, 361 (2006)

$\mathbf{h}\nu + \mathbf{H}_2$	Photoexcitation	$100,000 \ cm^{-1}$	Th
$h\nu + HD$	Photoexcitation	$100,000 \ cm^{-1}$	Th

 457. H. Nilsson, G. Ljung, H. Lundberg, K. E. Nielsen
 The FERRUM project: Improved experimental oscillator strengths in Cr II. Astron. Astrophys. 445, 1165 (2006)

$\mathbf{h} u + \mathbf{Cr}^+$	Photoexcitation	4850-2050 A	Exp
458. G. Del Zanna			

Benchmarking atomic data for astrophysics: Fe XXIV. Astron. Astrophys. 447, 761 (2006)

$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{23+}$	Photoexcitation	$0-1.4x10^7 \ cm^{-1}$	$\mathrm{Th}$
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459. M. Lundqvist, H. Nilsson, G. M. Wahlgren, H. Lundberg, H. L. Xu, Z.-K. Jang, D. S. Leckrone Improved oscillator strengths and wavelengths in Hf II, with applications to

stellar elemental abundances. Astron. Astrophys. 450, 407 (2006)

	$\mathbf{h}\nu + \mathbf{H}\mathbf{f}^+$	Photoexcitation	$3000 \ \mathring{A}$	Exp
460.	H. L. Xu, Z. W. Sun, Radiative lifetimes, solar palladium abu Astron. Astrophys. 45	Z. W. Dai, Z. K. Jiang, P. Paln branching fractions and os indance. 52, 357 (2006)	neri, P. Quinet, E. Biemont acillator strengths in Pd I and the	
	$\mathbf{h}\mathbf{\nu} + \mathbf{P}\mathbf{d}$	Photoexcitation	400 Å	$\mathrm{E}/\mathrm{T}$
461.	G. Correge, A. Hibber Oscillator strength: Astrophys. J., Part 1	rt <b>s of near-infrared lines of Fe</b> 636, 1166 (2005)	e II.	
	h u + Fe <sup>+</sup>	Photoexcitation	9000 $\AA$	$\mathrm{Th}$
462.	E. B. Jenkins, T. M. T. Measurements of t and 1370.132 Å. Astrophys. J., Part 1	Tripp <b>he f-values of the resonance</b> 637, 548 (2005)	e transitions of Ni II at 1317.217	
	$\mathbf{h} u$ + $\mathbf{N}\mathbf{i}^+$	Photoexcitation	$1317 \ \AA$	Exp
463.	N. Smith, P. Hartigan Infrared [Fe II] emi and the 1600 AD o Astrophys. J., Part 1	ssion from P Cygni's nebula utburst. 638, 1045 (2006)	a: Atomic data, mass, kinematics,	
	$h\nu + Fe^+$	Photoexcitation	$2.0~\mu$ m	$\mathrm{Th}$
464.	M. F. Gu, T. Holczer, Inner-shell absorpt approach. Astrophys. J., Part 1	E. Behar, S. M. Kahn ion lines of Fe VI-Fe XVI: A 641, 1227 (2006)	A many-body perturbation theory	
	$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{5+-15+}$	Photoexcitation	$16~\AA$	Th
465.	N. Amin, S. Mahmood Measurement of the levels of sodium. Eur. Phys. J. D 37, 2	d, M. Anwar-ul-Haq, M. Riaz, M ne photoionization cross-sec 3 (2006)	A. A. Baig ction of the 3p ${}^2P_{1/2,3/2}$ excited	
	$f h  u + N f a \ h  u + N f a^*$	Photoionization Photoionization	$355 \mathrm{~nm}$ $355 \mathrm{~nm}$	Th Th
466.	G. Stark, K. P. Huber Oscillator strength ${}^{14}N_2$ between 93.5 J. Chem. Phys. 123, 2	r, K. Yoshino, P. L. Smith, K. It and linewidth measuremen and 99.5 nm. 214303 (2005)	ts of dipole-allowed transitions in	
	$\mathbf{h} u$ + $\mathbf{N}_2$	Photoexcitation	$99.5\text{-}93.5~\mathrm{nm}$	$\mathrm{Th}$
467.	M. Ehara, H. Nakatsu T. Tanaka, C. Makoch Symmetry-depender periment and theor J. Chem. Phys. 124, 1	iji, M. Matsumoto, T. Hatamot nekanwa, M. Hoshino, H. Tanaka ent vibrational excitation in ry. 124311 (2006)	o, X. J. Liu, T. Lischke, G. Pruemper, a, J. R. Harries, Y. Tamenori, K. Ueda N 1s photoionization of N <sub>2</sub> : Ex-	

 $\mathbf{h}\nu + \mathbf{N}_2$  Photoionization 430 eV E/T

468.	V. Jonauskas, P. Bogdanovich, F. P. Keenan, R. Kisielius, M. E. Foord, R. F. Heeter, S. J. Rose, G. J. Ferland, P. H. Norrington Energy levels and transition probabilities for boron-like Fe XXII. Astron. Astrophys. 455, 1157 (2006)				
	$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{21+}$	Photoexcitation	$5.0 \ \mathrm{keV}$	$\mathrm{Th}$	
469.	BM. Cheng, HC. L Liang, Y. L. Yung Absorption cross se 140-220 nm and im Astrophys. J., Part 1	u, HK. Chen, M. Bahou, YP ections of $NH_3$ , $NH_2D$ , $NHD$ plications for planetary isot 647, 1535 (2006)	2. Lee, A. M. Mebel, L. C. Lee, MC. $D_2$ , and $ND_3$ in the spectral range opic fractionation.		
	$h\nu + NH_3$	Photoexcitation	140-220 nm	Exp	
	$h\nu + ND_3$	Photoexcitation	140-220 nm	Exp	
	$h\nu + NH_2D$	Photoexcitation	140-220 nm	Exp	
	$h\nu + NHD_2$	Photoexcitation	140-220 nm	Exp	
470.	M. Eidelsberg, Y. She Oscillator strengths ${}^{13}C^{16}O$ , and ${}^{13}C^{18}O$ Astrophys. J., Part 1	ffer, S. R. Federman, J. L. Lema s and predissociation rates for involving the E ${}^{1}\Pi$ , B ${}^{1}\Sigma^{+}$ , 647, 1543 (2006)	tire, J. H. Fillion, F. Rostas, J. Ruiz or Rydberg transitions in ${}^{12}C^{16}O$ , and W ${}^{1}\Pi$ states.		
	$h\nu + CO$	Photoexcitation	$1000 \ \mathring{A}$	Exp	
471.	J. B. Bluett, D. Lukic <b>Double photoioniza</b> Nucl. Instrum. Metho	, S. B. Whitfield, R. Wehlitz <b>tion near threshold.</b> ods Phys. Res. B 241, 114 (2005)	)		
	$h\nu + He$	Photoionization	$0-60  \mathrm{eV}$	Exp	
	$h\nu + Li$	Photoionization	0-60  eV	Exp	
	$h\nu + Be$	Photoionization	0-60  eV	Exp	
	$h\nu + Na$	Photoionization	0-60  eV	Exp	
	$h\nu + H_2$	Photoionization	$0-60  \mathrm{eV}$	Exp	
472.	S. B. Appaji Gowda, Dispersion correcti lum, mercury and I Nucl. Instrum. Metho	T. K. Umesh ons to the forward Rayleigh ead derived using photon in ods Phys. Res. B 243, 2 (2005)	n scattering amplitudes of tanta- teraction cross sections.		
	$h\nu + Ta$	Elastic Scattering	24-136 keV	$\mathrm{Th}$	
	$h\nu + Hg$	Elastic Scattering	24-136  keV	$\mathrm{Th}$	
	$h\nu + Pb$	Elastic Scattering	24-136  keV	Th	
473.	P. Singh, S. Kumar, J Differential cross-s 17.44 keV photons. Nucl. Instrum. Metho	. Goswamy, D. Mehta, N. Singh ection measurements for el ods Phys. Res. B 244, 295 (2005	astic and inelastic scattering of		
	$\mathbf{b}_{\mathbf{U}} + \mathbf{C}$	Flagtin Conttant	1751-07	<b>D</b>	
	$n\nu + C$	Elastic Scattering	17.5  KeV	Exp E	
	$\mathbf{n}\nu + \mathbf{A}\mathbf{I}$	Elastic Scattering	17.5  KeV	Exp E	
	$\mu\nu + 5\mu$	Elastic Scattering	17.5  keV	±хр 5	
	$n\nu + 5$	Elastic Scattering	17.0  KeV 17.5  IroV	схр Б	
	$\mathbf{n}\nu + 11$	Elastic Scattering	17.0 KeV	ъхр	

Elastic Scattering

Elastic Scattering

 $\mathbf{h}\nu + \mathbf{V} \\ \mathbf{h}\nu + \mathbf{Co}$ 

 $h\nu + Ni$ 

 $17.5~{\rm keV}$ 

 $17.5~{\rm keV}$ 

 $17.5~{\rm keV}$ 

 $\operatorname{Exp}$ 

 $\operatorname{Exp}$ 

 $\operatorname{Exp}$ 

$h\nu + Cu$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + Zn$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + As$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + Se$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + Rb$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + Sr$	Elastic Scattering	$17.5 \ \mathrm{keV}$	$\operatorname{Exp}$
$h\nu + Ru$	Elastic Scattering	$17.5 \ \mathrm{keV}$	$\operatorname{Exp}$
$h\nu + Ag$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + Cd$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + In$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + Sn$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + Sb$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + Ba$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + Nd$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp
$h\nu + Eu$	Elastic Scattering	17.5  keV	$\operatorname{Exp}$
$h\nu + Gd$	Elastic Scattering	17.5  keV	Exp
$h\nu + Dy$	Elastic Scattering	17.5  keV	Exp
$h\nu + Ho$	Elastic Scattering	17.5  keV	Exp
$h\nu + Tm$	Elastic Scattering	17.5  keV	Exp
$h\nu + Yb$	Elastic Scattering	17.5  keV	Exp
$h\nu + Lu$	Elastic Scattering	17.5  keV	Exp
$h\nu$ + Ta	Elastic Scattering	17.5  keV	Exp
$h\nu + W$	Elastic Scattering	17.5  keV	Exp
$h\nu + Ir$	Elastic Scattering	17.5  keV	Exp
$h\nu + Pt$	Elastic Scattering	17.5  keV	Exp
$h\nu + Au$	Elastic Scattering	17.5  keV	Exp
$h\nu + Hg$	Elastic Scattering	17.5  keV	Exp
$h\nu + Tl$	Elastic Scattering	17.5  keV	Exp
$h\nu + Pb$	Elastic Scattering	17.5  keV	Exp
$h\nu + Bi$	Elastic Scattering	17.5  keV	Exp
$h\nu + Th$	Elastic Scattering	$17.5 \ \mathrm{keV}$	Exp

## 474. G. Apaydin, E. Tirasoglu

Measurements of K shell X-ray production cross sections and fluorescence yields of elements in the atomic number range 65 ; Z ; 92 at 123.6 keV. Nucl. Instrum. Methods Phys. Res. B 246, 303 (2006)

$h\nu + Tb$	Photoionization	124  keV	Exp
$h\nu + Dy$	Photoionization	124  keV	Exp
$h\nu + Ho$	Photoionization	124  keV	Exp
$h\nu + Er$	Photoionization	124  keV	Exp
$h\nu + Tm$	Photoionization	124  keV	Exp
$h\nu + Yb$	Photoionization	124  keV	Exp
$h\nu + Lu$	Photoionization	124  keV	Exp
$h\nu + Hf$	Photoionization	124  keV	Exp
$h\nu + Ta$	Photoionization	124  keV	Exp
$h\nu + W$	Photoionization	124  keV	Exp
$h\nu + Re$	Photoionization	124  keV	Exp
$h\nu + Os$	Photoionization	124  keV	Exp
$h\nu + Ir$	Photoionization	124  keV	Exp
$h\nu + Pt$	Photoionization	124  keV	Exp
$h\nu + Au$	Photoionization	124  keV	Exp
$h\nu + Hg$	Photoionization	124  keV	Exp
$h\nu + Tl$	Photoionization	124  keV	Exp
$h\nu + Pb$	Photoionization	124  keV	Exp
$h\nu + Bi$	Photoionization	124  keV	Exp
$h\nu + Th$	Photoionization	124  keV	$\operatorname{Exp}$

	$h\nu + U$	Photoionization	124  keV	Exp
475.	A. Czasch, M. Scho J. Titze, C. Wimm L.Ph.H. Schmidt, H Bray, A. S. Kheifets <b>Partial photoioni</b> tation of helilum Phys. Rev. Lett. 95	beffler, M. Hattass, S. Schoessler, er, S. Kammer, M. Weckenbrock, I. Schmidt-Boecking, R. Doerner, J. s, K. Bartschat zation cross sections and angu up to the $N = 13$ threshold. 5, 243003 (2005)	T. Jahnke, Th. Weber, A. Staudte, S. Voss, R. E. Grisenti, O. Jagutzki, J. M. Rost, T. Schneider, CN. Liu, I.	
	$h\nu + He$	Photoexcitation	78 eV	Exp
	$h\nu + He$	Photoionization	$78  \mathrm{eV}$	Exp
476.	M. Gisselbrecht, M Reddish	. Lavollee, A. Huetz, P. Bologne	si, L. Avaldi, D. P. Seccombe, T. J.	
	Photodouble ioni Phys. Rev. Lett. 96	zation dynamics for fixed-in-s 6, 153002 (2006)	pace $H_2$ .	
	$\mathbf{h} u + \mathbf{H}_2$	Photodissociation	$76  \mathrm{eV}$	Exp
	$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	$76  \mathrm{eV}$	Exp
477.	X. Liu, D. E. Shema A simple model ${}^{1}\Pi_{u}{}^{+}(4), b{}^{1}\Pi_{u}{}^{+}(5),$ Astrophys. J. 645, 7	ansky for $N_2$ line oscillator strength , and $c_3 \ ^11\Pi_u^+(0) - X \ ^1\Sigma_g^+(0)$ k 1560 (2006)	s of the b' ${}^1\Sigma_u^+(1), c_4' {}^1\Sigma_u^+(0), b$ pands.	
	$\mathbf{h}\nu + \mathbf{N}_2$	Photoexcitation	$0.5\ cm^{-1}$	$\mathrm{Th}$
478.	J. Guan, F. Wang, <b>Time-dependent</b> <b>and excitation sp</b> J. Chem. Phys. 125	T. Ziegler, H. Cox density functional study of the ectrum of the oxygen molecul 5, 044314 (2006)	electornic potential energy curves e.	
	$\mathbf{h}\nu + \mathbf{O}_2$	Photoexcitation	0-20  eV	$\mathrm{Th}$
479.	A. K. Bhatia $Electron - He^+$ <b>P</b> <b>systems.</b> Phys. Rev. A 73, 0	P-wave elastic scattering and 12705 (2006)	photoabsorption in two-electron	
	$\mathbf{h} u + \mathbf{H}^{-}$	Photodetachment	0.9-51  eV; 1000-25,000  K	$\mathrm{Th}$
	$h\nu + He$	Photoionization	$0.9\text{-}51~\mathrm{eV};$ 1000-25,000 K	$\mathrm{Th}$
480.	B. J. Claessens, J. I Vredenbregt Measurement of	P. Ashmore, R. T. Sang, W. R. Ma	acGillivray, H.C.W. Beijerinck, E.J.D.	
	neon. Phys. Rev. A 73, 0	12706 (2006)		
	$\mathbf{h}\nu + \mathbf{Ne}$	Photoionization	351-364  nm	Exp
	$\mathbf{h}\nu + \mathbf{N}\mathbf{e}^*$	Photoionization	351-364 nm	Exp
481.	X. Feng, A. A. Will Atomic Auger de	s, E. Sokell, M. Wiedenhoeft, N. E cay in core-excited HBr by ang	errah gle-resolved two-dimensional pho-	

toelectron spectroscopy. Phys. Rev. A 73, 012716 (2006)

$h\nu + HBr$	Photodissociation	69-74  eV	Exp
$h\nu + HBr$	Photoexcitation	69-74  eV	Exp
$h\nu + HBr$	Photoionization	69-74  eV	Exp

482.	V. K. Dolmatov, S. T. Man Photoionization of atom Phys. Rev. A 73, 013201 (2	son s encapsulated in endohedral 006)	ions A@ $C_{60}^{\pm z}$ .	
	$egin{array}{l} {f h}  u + {f Ne} \ {f h}  u + {f NeC_{60}}^- \ {f h}  u + {f NeC_{60}}^2 \ {f h}  u + {f NeC_{60}}^{2+} \ {f h}  u + {f NeC_{60}}^{5+} \ {f h}  u + {f NeC_{60}}^{5+} \ {f h}  u + {f NeC_{60}}^{10+} \end{array}$	Photoionization Photoionization Photoionization Photoionization Photoionization	880-950 eV 880-950 eV 880-950 eV 880-950 eV 880-950 eV 880-950 eV	Th Th Th Th Th Th
483.	P. Kaminski, R. Wiehle, W. Wavelength dependence Phys. Rev. A 73, 013413 (2	Kamke, H. Helm, B. Witzel of double ionization of xenor 006)	n in a strong laser field.	
	$h\nu + Xe$	Photoionization	700-1600  nm	$\operatorname{Exp}$
484.	J. M. Bizau, C. Blancard, I J. L. Lemaire, J. Blieck, F. <b>Experimental and theore</b> Phys. Rev. A 73, 020707 (2	D. Cubaynes, F. Folkmann, D. Ki J. Wuilleumier etical studies of the photoioniz 006)	lbane, G. Faussurier, H. Luna, zation cross section of $Fe^{4+}$ .	
	h u + Fe <sup>4+</sup>	Photoionization	59-140  eV	$\operatorname{Exp}$
485.	A. S. Kheifets, I. Bray Angular correlation in the Phys. Rev. A 73, 020708 (2)	<b>he two-electron continuum.</b> 006)		
	$egin{array}{ll} {f h}  u + {f He} \ {f h}  u + {f Be} \ {f h}  u + {f Ne} \ {f h}  u + {f Ne} \ {f h}  u + {f H}_2 \end{array}$	Photoionization Photoionization Photoionization Photoionization	75 eV 75 eV 75 eV 75 eV	Th Th Th Th
486.	V. O. Nesterenko, PG. Rei <b>Two-photon excitation of</b> <b>ters.</b> Phys. Rev. A 73, 021201 (2	nhard, T. Halfmann, L. I. Pavlov of low-lying electronic quadru 006)	pole states in atomic clus-	
	$\mathbf{h} u$ + $\mathbf{N}\mathbf{a}_{11}^+$	Photoexcitation	$2x10^{10} - 2x10^{11} \text{ W/}cm^2$	Exp
487.	D. Strasser, T. Pfeifer, B. J. Coherent interaction of Phys. Rev. A 73, 021805 (2	. Hom, A. M. Mueller, J. Plenge, femtosecond extreme-uv light 006)	S. R. Leone t with He atoms.	
	$h\nu + He$	Photoionization	400 nm	Exp
488.	M. S. Safronova, B. Arora, G Frequency-dependent po infrared spectral regions Phys. Rev. A 73, 022505 (2	C. W. Clark l <b>arizabilities of alkali-metal at</b> 006)	oms from ultraviolet through	
	$egin{array}{ll} \mathbf{h} u + \mathbf{Li} \ \mathbf{h} u + \mathbf{Na} \ \mathbf{h} u + \mathbf{K} \ \mathbf{h} u + \mathbf{Kb} \ \mathbf{h} u + \mathbf{Rb} \ \mathbf{h} u + \mathbf{Cs} \end{array}$	Photoexcitation Photoexcitation Photoexcitation Photoexcitation Photoexcitation		Th Th Th Th Th

489.	. A. Yiannopoulou, N. Melikechi, S. Gangopadhyay, J. C. Meiners, C. H. Chang, E. E. Eyler <b>Determinations of EF</b> ${}^{1}\Sigma_{g}{}^{+}$ ; <b>- X</b> ${}^{1}\Sigma_{g}{}^{+}$ transition frequencies in $H_2$ , $D_2$ , and <b>HD</b> . Phys. Rev. A 73, 022506 (2006)				
	$h\nu + H_{a}$	Photoexcitation	202 nm	Exp	
	$h\nu + HD$	Photoexcitation	202 nm	Exp	
	$h\nu + D_{2}$	Photoexcitation	202 nm	Exp	
	$\mathbf{n}\nu + \mathbf{D}_2$	1 HOUDERCHARDON	202 1111	птр	
490.	E. P. Kanter, I. Ahmad, R. Young <b>Double K-shell photoion</b> Phys. Rev. A 73, 022708 (20	W. Dunford, D. S. Gemmell, B. ization of silver. 006)	Krassig, S. H. Southworth, L.		
	$\mathbf{h} u$ + Ag	Photoionization	50-90  keV	$\mathrm{E}/\mathrm{T}$	
491.	U. Hergenhahn, A. De Fanis Population of individual ization threshold and the Phys. Rev. A 73, 022709 (20	, G. Pruemper, A. K. Kazansky, T. Ne $1s^{-1}np$ Rydberg states me evolution of shake-up into s 2006)	N. M. Kabachnik, K. Ueda easured across the 1s ion- hake-down.		
	hu i Na	Dhatagueitation		Erm	
	$n\nu + Ne$	Photoexcitation		Exp E-m	
	$n\nu + Ne$	Photoionization		Exp	
492.	O. Zatsarinny, K. Bartschat Low-energy photodetach Phys. Rev. A 73, 022714 (20	<b>ment of</b> <i>O</i> <sup>-</sup> <b>.</b> 006)			
	$h\nu + O^-$	Photodetachment	1-7  eV	$\mathrm{Th}$	
493.	<ul> <li>J. M. Bizau, C. Blancard, D. Cubaynes, F. Folkmann, J. P. Champeaux, J. L. Lemaire, F. J. Wuilleumier</li> <li>Absolute photoionization cross sections along the Xe isonuclear sequence: Xe<sup>3+</sup> to Xe<sup>6+</sup>.</li> <li>Phys. Rev. A 73, 022718 (2006)</li> </ul>				
	$\mathbf{b}_{\mathbf{v}} + \mathbf{v}_{\mathbf{a}}^{3+}$	Dhataianization	160 aV	Erm	
	$\mathbf{h}\nu + \mathbf{A}\mathbf{e}^{+}$	Photoionization	160 eV	Exp Evr	
	$n\nu + \lambda e^{-\nu}$	Photoionization Distaination	100 eV	Exp E	
	$\mathbf{n}\nu + \mathbf{A}\mathbf{e}^{\circ}$	Photoionization	100 eV	Exp	
	$n\nu + Ae^{\nu}$	Photoionization	160 ev	Exp	
494.	K. Jankala, R. Sankari, J. So der, S. Svensson, S. Aksela, <b>Laser excitation combine</b> <b>sium.</b> Phys. Rev. A 73, 022720 (20	chulz, M. Huttula, A. Calo, S. Hei H. Aksela ed with 2p photoionization a 006)	nasmaki, S. Fritzsche, T. Ran- nd Auger decay of potas-		
	$\mathbf{h}_{U} \perp \mathbf{K}$	Photoevcitation	340-400 eV	E/T	
	$\mu\nu + K$	Photoionization	340-400 ev 340-400 eV	⊔/ 1 F /T	
	$\mathbf{n}\mathbf{\nu} + \mathbf{\kappa}$	1 HOTOIOHIZATIOH	040-400 ev	$\mathbf{L}/1$	
495.	C. Bouri, P. Selles, L. Malegat, M. G. Kwato Njock Dynamics of the helium atom close to the full fragmentation threshold: Double ionization. Phys. Rev. A 73, 022724 (2006)				
	$h\nu + He$	Photoionization	$75  \mathrm{eV}$	$\mathrm{Th}$	

496.	I. F. Barna, J. Wang, J. J. Angular distribution tosecond soft-x-ray pu Phys. Rev. A 73, 023402	Burgdorfer in two-photon double ionizatio Ilses. (2006)	on of helium by intense at-	
	$h\nu + He$	Photoionization	91.6  eV	$\mathrm{Th}$
	$2h\nu + He$	Photoionization	91.6  eV	$\mathrm{Th}$
497.	X. Guan, XM. Tong, S. Effect of electron corre in intense laser fields: hyperspherical coordin Phys. Rev. A 73, 023403	I. Chu elation on high-order-harmonic Time-dependent generalized nates. (2006)	generation of helium atoms pseudospectral approach in	
	$h\nu + He$	Total Absorption, Scattering	248.6 nm	Th
	$h\nu + He$	Photoexcitation	248.6 nm	Th
	$h\nu + He$	Photoionization	248.6 nm	Th
498.	X. Dai, EB.W. Lerch, S Coherent control thro Phys. Rev. A 73, 023404	. R. Leone <b>ugh near-resonant Raman tran</b> (2006)	isitions.	
	$\mathbf{h} u + \mathbf{L}\mathbf{i}_2$	Elastic Scattering	$12,500 \ cm^{-1}$	E/T
	$\mathbf{h} u + \mathbf{L}\mathbf{i}_2$	Fluorescence	$12,500 \ cm^{-1}$	E/T
	$h\nu + Li_2$	Photoexcitation	$12,500 \ cm^{-1}$	E/T
499.	S. X. Hu, L. A. Collins <b>Strong-field ionization</b> Phys. Rev. A 73, 023405	of molecules in circularly pole (2006)	arized few-cycle pulses.	
	$\mathbf{h} u$ + $\mathbf{H}_2^+$	Photoionization	800 nm	$\mathrm{Th}$
500.	C. C. Chirila, M. Lein <b>Strong-field approxim</b> Phys. Rev. A 73, 023410 $hu + H_0^+$	ation for harmonic generation (2006)	in diatomic molecules.	Th
	$h\nu + H_2$ $h\nu + H_3^+$	Photoionization		Th
501.	H. W. van der Hart Ionization rates for H between 248.6 and 39 Phys. Rev. A 73, 023417	Ie, Ne, and Ar subjected to la 0 nm . (2006)	aser light with wavelengths	
	$h\nu + He$	Photoionization	248.6-390 nm	$\mathrm{Th}$
	$h\nu + Ne$	Photoionization	248.6-390 nm	Th
	$h\nu + Ar$	Photoionization	248.6-390  nm	$\mathrm{Th}$
502.	B. A. Khan, S. Saha, S. S Kinetic-energy-angle of above-threshold disso fields: Effects of highl Phys. Rev. A 73, 023423	S. Bhattacharyya differential distribution of phot ciation of $D_2^+$ by linearly pola y excited electronic states. (2006)	tofragments in multiphoton arized 400-nm intense laser	
	$egin{array}{l} { m h} u + { m H_2}^+ \ { m h} u + { m D_2}^+ \end{array}$	Photodissociation Photodissociation	400 nm 400 nm	${ m Th}$ ${ m Th}$

503.	V. I. Korobov Bethe logarithm for the Phys. Rev. A 73, 024502 (	e hydrogen molecular ion $H_2^+$ 2006)		
	$h u + H_2^+$	Photoexcitation		$\mathrm{Th}$
504.	E. S. Shuman, T. F. Galla, Microwave spectroscop, Phys. Rev. A 73, 032511 (	gher y of autoionizing Ba $5d_{3/2}nl$ st 2006)	tates.	
	$f h  u + B f a \ h  u + B f a$	Photoexcitation Photoionization	50-70 GHz 50-70 GHz	$\begin{array}{c} Exp\\ Exp \end{array}$
505.	S. V. Nayak, N. M. Badige Measurement of K-shel Pb by an alternative m Phys. Rev. A 73, 032707 (	r l photoelectric absorption par ethod using a weak $\beta - particlowed 2006$ )	$ \begin{array}{l} \textbf{rameters of Hf, Ta, Au, and} \\ e \textbf{ source.} \end{array} $	
	$h\nu + Hf$	Total Absorption Scattering	40-140 eV	Exp
	$h\nu + Ta$	Total Absorption, Scattering	40-140 eV	Exp
	$h\nu + Au$	Total Absorption, Scattering	40-140 eV	Exp
	$h\nu + Pb$	Total Absorption, Scattering	40-140 eV	Exp
	$h\nu + Hf$	Photoionization	40-140  eV	Exp
	$h\nu$ + Ta	Photoionization	40-140  eV	Exp
	$\mathbf{h} u$ + $\mathbf{A}\mathbf{u}$	Photoionization	40-140  eV	$\operatorname{Exp}$
	$h\nu + Pb$	Photoionization	40-140  eV	$\operatorname{Exp}$
	Absolute photoionization Experiment and theory Phys. Rev. A 73, 032717 ( $h\nu + Xe^{4+}$ $h\nu + Xe^{5+}$ $h\nu + Xe^{6+}$	on cross sections for $Xe^{4+}$ , $Xe^{2006}$ Photoionization Photoionization Photoionization Photoionization	<sup>5+</sup> , and $Xe^{6+}$ near 13.5 nm: 90-110 eV 90-110 eV 90-110 eV	E/T E/T E/T
507.	H. Farrokhpour, M. Alagia M. Tabrizchi <b>Resonant Auger spectr</b> Phys. Rev. A 73, 032718 (	, M. Coreno, M. de Simone, K. C. oscopy of metastable molecula 2006)	Prince, R. Richter, S. Stranges, ar oxygen.	
	$h\nu + O_2$	Photoionization	110 MeV	Exp
508.	R. C. Bilodeau, J. D. Boze Photodetachment of <i>He</i> ments and postcollision Phys. Rev. A 73, 034701 (	k, G. D. Ackerman, A. Aguilar, N <sup></sup> <b>near the 1s threshold: Abso</b> interactions. 2006)	I. Berrah Diute cross-section measure-	
	$\mathbf{h} u + \mathbf{H}\mathbf{e}^-$ $\mathbf{h} u + \mathbf{H}\mathbf{e}^-$	Photodetachment Photoionization	38.5-40.5 eV 38.5-40.5 eV	Exp Exp
509.	LF. Zhu, HD. Cheng, Z. Generalized oscillator s Phys. Rev. A 73, 042703 (	-S. Yuan, XJ. Liu, JM. Sun, K trengths for the valence-shell 2006)	Z. Xu excitations of argon.	P
	$\mathbf{h} u$ + Ar	Photoexcitation	2500  eV	$\mathrm{E/T}$

510.	<ul> <li>W. Glaz, T. Bancewicz, JL. Godet, G. Maroulis, A. Haskopoulos</li> <li>Hyper-Rayleigh light-scattering spectra determined by ab initio collisional hyperpolarizabilities of He-Ne atomic pairs.</li> <li>Phys. Rev. A 73, 042708 (2006)</li> </ul>			
	$h\nu + HeNe$	Elastic Scattering	95-295 K	Th
511.	J. McKenna, M. Suresh, B. Stebbings, W. R. Newell, I. J. L. Collier <b>Ultrafast ionization stud</b>	Srigengan, I. D. Williams, W. A C.E. Turcu, J. M. Smith, E. J. Div ly of $N_2$ in intense linearly an	. Bryan, E.M.L. English, S. L. all, C. J. Hooker, A. J. Langley, d circularly polarized laser	
	fields. Phys. Rev. A 73, 043401 (2	2006)		
	$egin{array}{l} \mathbf{h} u+\mathbf{N}_2\ \mathbf{h} u+\mathbf{N}_2 \end{array}$	Photodissociation Photoionization	790 nm 790 nm	Exp Exp
512.	K. J. LaGattuta Behavior of $H_2^+$ and $H$ dynamics. Phys. Rev. A 73, 043404 (2	$_2$ in strong laser fields simulation (2006)	ated by fermion molecular	
	$egin{array}{l} { m h}  u + { m H}_2 \ { m h}  u + { m H}_2^+ \ { m h}  u + { m H}_2 \ { m h}  u + { m H}_2^+ \ { m h}  u + { m H}_2^+ \end{array}$	Photodissociation Photodissociation Photoionization Photoionization	758 nm 758 nm 758 nm 758 nm	Th Th Th Th
513.	G. Yang, Y. Zheng, X. Chi <b>Photodetachment of</b> $H^-$ Phys. Rev. A 73, 043413 (2	<b>in a static electric field near</b> 2006)	an elastic wall.	
	h u + H <sup>-</sup>	Photodetachment	$0.75\text{-}1.05~\mathrm{eV}$	Th
514.	R. N. Coffee, L. Fang, G. N. Light-induced potentials Phys. Rev. A 73, 043417 (2	Gibson signite dissociation of $N_2^{2+}$ .		
	$\mathbf{h} u$ + $\mathbf{N}_2$	Photodissociation	400-1200 nm	Exp
	$\mathbf{h}\mathbf{\nu} + \mathbf{N}_2$	Photoionization	400-1200 nm	Exp
515.	C. W. Walter, N. D. Gibso Aguilar <b>Shape resonance in K-s</b> Phys. Rev. A 73, 062702 (2	n, R. C. Bilodeau, N. Berrah, J. <b>nell photodetachment from</b> C 2006)	D. Bozek, G. D. Ackerman, A.	
	$h\nu + C^-$	Photodetachment	$281.3-282.3 \mathrm{eV}$	Exp
516.	D. Janby, L. B. Madsen, V. Control of autoionizatio Phys. Rev. A 73, 062708 (2	N. Ostrovsky n widths: Doubly excited col 2006)	nerent elliptic states.	
	$h\nu + He$	Photoexcitation		$\mathrm{Th}$
517.	F. Yoshida, L. Matsuoka, Hasegawa Analysis of 1s(2s2p <sup>3</sup> P) Be atom. Phys. Rev. A 73, 062709 (2	R. Takashima, T. Nagata, Y. A nl <b>Rydberg states in the K-s</b> 2006)	zuma, S. Obara, F. Koike, S. hell photoionization of the	

	$h\nu + Be$	Photoionization	126.5-128  eV	Exp
518.	A. K. Kazansky, N. M. Kaba Triple differential cross s ultrashort pulses. Phys. Rev. A 73, 062712 (20	achnik <b>ection for sequential double p</b> 006)	hotoionization of atoms by	
	$egin{array}{l} \mathbf{h} u + \mathbf{Ar} \ \mathbf{h} u + \mathbf{Kr} \end{array}$	Photoionization Photoionization	+2  eV +2  eV	Th Th
519.	M. P. Hertlein, H. Adaniya, H. Prior, A. Belkacem Inner-shell ionization of Phys. Rev. A 73, 062715 (20	J. Amini, C. Bressler, B. Feinberg potassium atoms ionized by a 006)	g, M. Kaiser, N. Neumann, M.	
	$h\nu + K$	Photoionization	$3.6-3.62 \mathrm{keV}$	Exp
520.	M. Ya. Amusia, L. V. Cherr Generalized oscillator st of spin-orbit-activated in Phys. Rev. A 73, 062716 (20	nysheva, Z. Felfli, A. Z. Msezane rengths for the 3d electrons of terchannel coupling. 006)	of Cs, Ba, and Xe: Effects	
	$h\nu + Xe$	Photoexcitation	0-4 a.u.	$\mathrm{Th}$
	$h\nu + Cs$	Photoexcitation	0-4 a.u.	$\mathrm{Th}$
	$h\nu + Ba$	Photoexcitation	0-4 a.u.	$\mathrm{Th}$
521.	M. S. Pindzola, F. Robichea Double autoionization of Phys. Rev. A 73, 062720 (20 $h\nu + He^-$	ux, J. Colgan $He^{-}(2s^{2}2p^{-2}P)$ . 006) Photoionization		Th
522.	J. Schulz, M. Maatta, S. H Svensson, S. Aksela, H. Akse <b>5p photoemission from la</b> Phys. Rev. A 73, 062721 (20	Ieinasmaki, M. Huttula, R. Sanl ela <b>aser-excited cesium atoms.</b> 006)	kari, E. Kukk, T. Rander, S.	
	$h\nu + Cs$	Photoexcitation	16-25  eV	Exp
523.	M. Lu, M. F. Gharaibeh, G S. Schlachter, A. Mueller, S. <b>Photoionization and elec</b> Phys. Rev. A 74, 012703 (20	. Alna'washi, R. A. Phaneuf, A.L. Schippers, J. Jacobi, S.W.J. Scultron-impact ionization of $Kr^{\xi}$	D. Kilcoyne, E. Levenson, A. lly, C. Cisneros	
	$\mathbf{h} u$ + $\mathbf{Kr}^{5+}$	Photoionization	74-175 eV	$\mathrm{E}/\mathrm{T}$
524.	J. Schulz, S. Heinasmaki, R. Svensson, E. Kukk, S. Aksel Characterization of wea laser-excited potassium. Phys. Rev. A 74, 012705 (20	Sankari, T. Rander, A. Lindblad, a, H. Aksela <b>kly excited final states by s</b> 006)	H. Bergersen, G. Oehrwall, S. hakedown spectroscopy of	
	$h\nu + K$	Photoionization	$60  \mathrm{eV}$	Exp
525.	M. Poygin, R. Puettner, M. S. Aksela, G. Kaindl Detailed study of the S 2 Phys. Rev. A 74, 012711 (20	Martins, V. Pennanen, M. Jurva $2p^{-1}$ -; X ${}^{1}S_{1}(2b_{1}^{-2})$ normal A 006)	ansuu, Y. H. Jiang, H. Aksela, Auger spectra of $H_2S$ .	

	$\mathbf{h} u + \mathbf{H}_2\mathbf{S}$	Photoionization	180-240  eV	Exp
526.	R. K. Singh, G. S. L. <b>Triply charged car</b> Phys. Rev. A 74, 02	odha, V. Sharma, I. A. Prajapati, bon dioxide molecular ion: F 2708 (2006)	, K. P. Subramanian, B. Bapat Cormation and fragmentation	n.
	$ \mathbf{h}\nu + \mathbf{CO}_2^{3+} \\ \mathbf{h}\nu + \mathbf{CO}_2^{3+} $	Photodissociation Photoionization	$\begin{array}{c} 200 \ \mathrm{eV} \\ 200 \ \mathrm{eV} \end{array}$	
527.	S. Hussain, M. Saleer Photoionization cr lium in the near-t Phys. Rev. A 74, 02	m, M. Rafiq, M. A. Baig coss section measurements of hreshold region. 2715 (2006)	the 3p $^{1,3}P$ excited states of	of he-
	$h\nu + He$	Photoionization	500  nm	Exp
528.	LY. Peng, Q. Wang Photodetachment magnetic fields. Phys. Rev. A 74, 02	g, A. F. Starace of $H^-$ by a short laser puls 3402 (2006)	se in crossed static electric	e and
	$\mathbf{h} u$ + $\mathbf{H}^{-}$	Photodetachment	$0-500 \ cm^{-1}$	Th
529.	C. B. Madsen, L. B. High-order harmonic including nuclear Phys. Rev. A 74, 02	Madsen onic generation from arbitran motion and field-free alignme 3403 (2006)	rily oriented diatomic mole nt.	ecules
	$h\nu + H_2$	Fluorescence	800  nm	$\mathrm{Th}$
	$h\nu + D_2$	Fluorescence	800 nm	$\mathrm{Th}$
	$h\nu + N_2$	Fluorescence	800 nm	$\mathrm{Th}$
	$h\nu + O_2$	Fluorescence	800 nm	$\mathrm{Th}$
	$h\nu + H_2$	Photoexcitation	800 nm	$\mathrm{Th}$
	$h\nu + D_2$	Photoexcitation	800 nm	$\mathrm{Th}$
	$h\nu + N_2$	Photoexcitation	800 nm	$\mathrm{Th}$
	$h\nu + O_2$	Photoexcitation	800 nm	$\mathrm{Th}$
	$h\nu + H_2$	Photoionization	800 nm	$\mathrm{Th}$
	$h\nu + D_2$	Photoionization	800 nm	$\mathrm{Th}$
	$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	800  nm	$\mathrm{Th}$
	$h\nu + O_2$	Photoionization	800 nm	Th
530.	T. K. Kjeldsen, L. B Strong-field ioniza Phys. Rev. A 74, 02	. Madsen tion of atoms and molecules: 7 3407 (2006)	Гhe two-term saddle-point m	nethod.
	$h\nu + H$	Photoionization	800  nm	$\mathrm{Th}$
531.	T. Nakajima, G. Bui Above-threshold is Origin of the subp Phys. Rev. A 74, 02	ca pnization of Mg by linearly an peaks in the photoelectron en 3411 (2006)	d circularly polarized laser f ergy spectra.	ields:
	$\mathbf{h}\mathbf{\nu} + \mathbf{M}\mathbf{g}$	Photoionization	$3  \mathrm{eV}$	$\mathrm{Th}$
532.	R. M. Potvliege, S. V High-order above- quet quasienergy s Phys. Rev. A 74, 02	Vucic threshold ionization of argon: spectrum. 3412 (2006)	Plateau resonances and the	e Flo-

	$h\nu + Ar$	Photoionization	800 nm	$\mathrm{Th}$
533.	X. Guan Oscillator strengt: with arbitrary mu Phys. Rev. A 74, 02	h spectrum of hydrogen in strong s itual orientation. 3413 (2006)	magnetic and electric fields	
	$h\nu + H$	Photoexcitation	$10^8 \text{ V/m}$	$\mathrm{Th}$
534.	L. Bai, JY. Zhang, Angular distributi fields. Phys. Rev. A 74, 02	X. Zhang, Z. Xu ions of multiphoton detachment of 5402 (2006)	$H^-$ in various infrared laser	
	$h\nu + H^-$	Photodetachment	2.3 nm	$\mathrm{Th}$
535.	P. N. Juranic, J. Nor Single- and double of a universal scal Phys. Rev. A 74, 04	rdberg, R. Wehlitz e-photoionization data of Na and H ing law for the ratio. 2707 (2006)	<b>K</b> corroborate the existence	
	$egin{array}{l} \mathbf{h} u + \mathbf{N}\mathbf{a} \ \mathbf{h} u + \mathbf{K} \end{array}$	Photoionization Photoionization	36.5-170 eV 36.5-170 eV	$\begin{array}{c} \text{Exp} \\ \text{Exp} \end{array}$
536.	I. A. Ivanov, A. S. K Single-photon dou Phys. Rev. A 74, 04	Theifets able ionization of helium in the pre- 2710 (2006)	sence of dc electric field.	
	$h\nu + He$	Photoionization	85-90  eV	$\operatorname{Th}$
537.	R. Wehlitz, P. N. Ju Resonant double p tion. Phys. Rev. A 74, 04	ranic photoionization of lithium studied v 2721 (2006)	with medium energy resolu-	
	$h\nu + Li$	Photoionization	148-161 eV	Exp
538.	U. Ekstrom, P. Norm X-ray absorption propagator approx Phys. Rev. A 74, 04	nan spectra from the resonant-converg ach. 2722 (2006)	gent first-order polarization	
	$egin{array}{l} \mathbf{h} u + \mathbf{H}_2\mathbf{O} \ \mathbf{h} u + \mathbf{CO} \ \mathbf{h} u + \mathbf{CG} \ \mathbf{h} u + \mathbf{C}_6\mathbf{H}_6 \ \mathbf{h} u + \mathbf{C}_4\mathbf{H}_4\mathbf{N} \end{array}$	Total Absorption, Scattering Total Absorption, Scattering Total Absorption, Scattering Total Absorption, Scattering	28-539 eV 28-539 eV 28-539 eV 28-539 eV	Th Th Th Th
539.	R. Santra, R. W. Du <b>Spin-orbit effect o</b> Phys. Rev. A 74, 04	nford, L. Young on strong-field ionization of kryptor 3403 (2006)	1.	
	$h\nu + Kr$	Photoionization	800 nm	Th
540.	SM. Wang, KJ. Y Phase control of t intense few-cycle	uan, YY. Niu, YC. Han, SL. Cong the photofragment branching ratio laser pulses.	of the HI molecule in two	

$\mathbf{h}\nu$	+	$\mathbf{HI}$
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Th

541. J. McKenna, M. Suresh, B. Srigengan, I. D. Williams, W. A. Bryan, E.M.L. English, S. L. Stebbings, W. R. Newell, I.C.E. Turcu, J. M. Smith, E. J. Divall, C. J. Hooker, A. J. Langley, J. L. Collier

Rescattering-enhanced dissociation of a molecular ion.

Phys. Rev. A 74, 043409 (2006)

$\mathbf{h}\nu + \mathbf{CO}_2^+$	Photodissociation	$3x10^{13} - 6x10^{16} \text{ W/}cm^2$	Exp
$\mathbf{h}\nu + \mathbf{CO}_2^+$	Photoionization	$3x10^{13} - 6x10^{16} \text{ W/}cm^2$	Exp

542. H. Ohmura, F. Ito, M. Tachiya

Phase-sensitive molecular ionization induced by a phase-controlled two-color laser field in methyl halides.

Phys. Rev. A 74, 043410 (2006)

$h\nu + CH_3I$	Photodissociation	$10^{12} - 10^{13} \text{ W/} cm^2$	Exp
$h\nu + CH_3Cl$	Photodissociation	$10^{12} - 10^{13} \text{ W/} cm^2$	Exp
$h\nu + CH_3Br$	Photodissociation	$10^{12} - 10^{13} \text{ W/} cm^2$	$\operatorname{Exp}$
$h\nu + CH_3F$	Photodissociation	$10^{12} - 10^{13} \text{ W/} cm^2$	$\operatorname{Exp}$
$h\nu + CH_3I$	Photoionization	$10^{12} - 10^{13} \text{ W/} cm^2$	$\operatorname{Exp}$
$h\nu + CH_3Cl$	Photoionization	$10^{12} - 10^{13} \text{ W/} cm^2$	$\operatorname{Exp}$
$h\nu + CH_3Br$	Photoionization	$10^{12} - 10^{13} \text{ W/} cm^2$	Exp
$h\nu + CH_3F$	Photoionization	$10^{12} - 10^{13} \text{ W/} cm^2$	$\operatorname{Exp}$

543. P. Q. Wang, A. M. Sayler, K. D. Carnes, J. F. Xia, M. A. Smith, B. D. Esry, I. Ben-Itzhak Dissociation of  $H_2^+$  in intense femtosecond laser fields studied by coincidence three-dimensional momentum imaging. Phys. Rev. A 74, 043411 (2006)

$\mathbf{h} u + \mathbf{H}_2^+$	Photodissociation	790 nm	E/T
$\mathbf{h}\nu + \mathbf{H}_2^+$	Photoionization	790 nm	E/T

544. M. Vafaee, H. Sabzyan, Z. Vafaee, A. Katanforoush Detailed instantaneous ionization rate of  $H_2^+$  in an intense laser field. Phys. Rev. A 74, 043416 (2006)

$h\nu + H_2^+$	Photoionization	$10^{14} { m W}/cm^2$	Th
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545. E. Shchekinova, C. Chandre, T. Uzer Phase-space structures and ionization dynamics of the hydrogen atom in elliptically polarized microwaves. Phys. Rev. A 74, 043417 (2006)

 $h\nu + H$ 

Photoionization

546. K.-J. Yuan, Z. Sun, S.-L. Cong, N. Lou Molecular photoelectron spectrum in ultrashort laser fields: Autler-Townes splitting under rotational and aligned effects. Phys. Rev. A 74, 043421 (2006)

 $\mathbf{h}\nu + \mathbf{N}\mathbf{a}_2$  Photoionization 2.5-7.5, 10<sup>11</sup> W/cm<sup>2</sup> Th

547. Y. H. Jiang, R. Puettner, R. Hentges, J. Viefhaus, M. Poygin, C. Cacho, U. Becker, J. M. Rost, G. Kaindl
Partial photoionization cross sections of doubly excited helium below the ionization thresholds I<sub>8</sub> and I<sub>9</sub>.
J. Phys. B 39, L9 (2006)

	$egin{array}{l} {f h} u + { m He} \ {f h} u + { m He}^* \end{array}$	Photoionization Photoionization	77.5-78.3 eV 77.5-78.3 eV	E/T $E/T$
548.	G. L. Yudin, S. Chelkow Coulomb continuum J. Phys. B 39, L17 (2006	ski, A. D. Bandrauk effects in molecular interference b)	e.	
	$\mathbf{h} u + \mathbf{H}_2^+$	Photoionization	100 eV	$\mathrm{Th}$
549.	K. Hosaka, JI. Adachi, ishita, S. K. Semenov, N Non-dipole effects in of $N_2$ molecule. J. Phys. B 39, L25 (2006)	A. V. Golovin, M. Takahashi, T. Ta . A. Cherepkov the angular distribution of phot	eramoto, N. Watanabe, A. Yag- toelectrons from the K-shell	
	$\mathbf{h} u$ + $\mathbf{N}_2$	Photoionization	500  eV	Exp
550.	A. Y. Istomin, A. F. Sta Nondipole effects in o J. Phys. B 39, L35 (2006	race, N. L. Manakov, A. V. Meremi louble photoionization of He at b)	anin, A. S. Kheifets, I. Bray z 450 eV excess energy.	
	$h\nu + He$	Photoionization	450  eV	$\mathrm{Th}$
551.	E. Melero Garcia, J. Al- Glass-Maujean, R. Richt Fluorescence study of J. Phys. B 39, 205 (2006	varez Ruiz, S. Menmuir, E. Rachlev er, M. Coreno f doubly excited states of molec b)	w, P. Erman, A. Kivimaeki, M. cular hydrogen.	
	$\mathbf{h} u$ + $\mathbf{H}_2$	Fluorescence	20-55  eV	Exp
552.	<ul><li>B. Lohmann, U. Kleiman</li><li>Approaches for calculatoms.</li><li>J. Phys. B 39, 271 (2006)</li></ul>	n ating alignment and orientation	n of photoionized open shell	
	$\begin{array}{l} \mathbf{h}\nu + \mathbf{K} \\ \mathbf{h}\nu + \mathbf{Sc} \\ \mathbf{h}\nu + \mathbf{Mn} \\ \mathbf{h}\nu + \mathbf{In} \\ \mathbf{h}\nu + \mathbf{Au} \\ \mathbf{h}\nu + \mathbf{Tl} \end{array}$	Photoionization Photoionization Photoionization Photoionization Photoionization Photoionization	0-8 Ry 0-8 Ry 0-8 Ry 0-8 Ry 0-8 Ry 0-8 Ry	Th Th Th Th Th Th
553.	A. Ehresmann, L. Werne Schartner, Ph. V. Demel <b>Studying the</b> $N_2^+(C^2\Sigma)$ J. Phys. B 39, 283 (2006)	r, S. Klumpp, S. Lucht, H. Schmora khin, M. P. Lemeshko, V. L. Sukhor $\Sigma_u^+ - \mathcal{I} X^2 \Sigma_2^+$ fluorescence excite b)	anzer, S. Mickat, R. Schill, KH. rukov ed via the $1s^{-1}\pi^*$ resonance.	
	$\mathbf{h}\nu + \mathbf{N}_2$	Fluorescence	135-190 nm	Exp
554.	N. Murphy, P. Niga, A. <b>4d</b> -; <b>5p</b> transitions in <b>Ba VI.</b> J. Phys. B 39, 365 (2006)	Cummings, P. Dunne, G. O'Sullivar n the EUV photoabsorption spe 5)	ectrum of Ba IV, Ba V and	
	$egin{array}{l} {f h}  u + {f Ba}^{3+} \ {f h}  u + {f Ba}^{4+} \ {f h}  u + {f Ba}^{5+} \ {f h}  u + {f Ba}^{3+} \ {f h}  u + {f Ba}^{4+} \ {f h}  u + {f Ba}^{4+} \ {f h}  u + {f Ba}^{5+} \end{array}$	Total Absorption, Scattering Total Absorption, Scattering Total Absorption, Scattering Photoexcitation Photoexcitation Photoexcitation	75-85 eV 75-85 eV 75-85 eV 75-85 eV 75-85 eV 75-85 eV	Exp Exp Exp Exp Exp Exp

555.	S. K. Semenov, N. A. Cherepkov, M. Matsumoto, K. Fujiwara, K. Ueda, E. Kukk, F. Tahara, T. Sunami, H. P. Yoshida, T. Tanaka, K. Nakagawa, M. Kitajima, H. Tanaka, A. De Fanis <b>Vibrationally resolved photoionization of the</b> $1\sigma_g$ and $1\sigma_u$ shells of $N_2$ molecule. J. Phys. B 39, 375 (2006)			
	$h\nu + N_2$	Photoionization	410-450  eV	E/T
556.	S. Kawazoe, T. Kai, I Excitation of the 4 J. Phys. B 39, 493 (2	R. Kumar Chauhan, R. Srivastav <sup>1</sup> P <sup>0</sup> state of calcium by elect 006)	za, S. Nakazaki <b>ron impact.</b>	
	$\mathbf{h} u$ + Ca	Photoexcitation	10-25  eV	$\mathrm{Th}$
557.	W. Wang, X. L. Cher Calculation of wave J. Phys. B 39, 519 (2)	ng, X. D. Yang, X. M. Tan elengths and oscillator stren 006)	gths in high-Z Mg-like ions.	
	$h_{\prime\prime} \perp Nd^{48+}$	Photoevcitation	$10^{-1} - 10$ a u	$\mathbf{T}\mathbf{h}$
	$h\nu + Pm^{49+}$	Photoexcitation	$10^{-1} - 10$ a.u.	Th
	$\mathbf{h} u + \mathbf{Sm}^{50+}$	Photoexcitation	$10^{-1} - 10$ a.u.	Th
	Influences on the strengths: The $A^1 h$ J. Phys. B 39, 641 (2 $h\nu + H_2O$	calculation of accurate and $B_1 := X^1 A_1$ transition of $H_2 O$ . 006) Photoexcitation	basis set extrapolated oscillator $10^{-2} - 10^{-1}$ a.u.	$^{\mathrm{Th}}$
559.	R. Diamant, R. Shard Structure of the C. J. Phys. B 39, 651 (2	on, W. A. Caliebe, CC. Kao, M o and Fe $K\alpha_{3,4}$ satellite spec 006)	. Deutsch etra.	
	$h\nu + Fe$	Fluorescence	8.0-10.5  keV	E/T
	$h\nu + Co$	Fluorescence	8.0-10.5  keV	E/T
	$\mathbf{h} u + \mathbf{F}\mathbf{e}$ $\mathbf{h} u + \mathbf{C}\mathbf{o}$	Photoexcitation Photoexcitation	8.0-10.5  keV 8.0-10.5  keV	E/T E/T
560.	A. K. Kazansky, N. M Non-stationary tre ionization of Ne by J. Phys. B 39, L53 (2	I. Kabachnik atment of energy distributio vultra-short pulses. 006)	on of electrons in resonant double	
	$\mathbf{h}\nu + \mathbf{Ne}$	Photoionization	$871.7~{\rm eV}$	Th
561.	U. Kleiman, T. Topcu The search for osc section of helium. J. Phys. B 39, L61 (2	n, M. S. Pindzola, F. Robicheaux illations in the near-thresho 006)	z old photo-double ionization cross	
	$h\nu + He$	Photoionization	$79.1\text{-}80.1\;\mathrm{eV}$	$\mathrm{Th}$
562.	H. Farrokhpour, M. A de Simone, R. Richter Observation of the ization of caesium	Alagia, M. Ya. Amusia, L. Avalor, S. Stranges, M. Tabrizchi spin-orbit activated intercha atoms.	di, L. V. Chernysheva, M. Coreno, M.	

J. Phys. B 39, 765 (2006)

$h\nu + Xe$	Photoionization	674-792  eV	Exp
$h\nu + Cs$	Photoionization	674-792  eV	Exp

563. K. Hoshina, A. Hishikawa, K. Kato, T. Sako, K. Yamanouchi, E. J. Takahashi, Y. Nabekawa, K. Midorikawa

Dissociative ATI of  $H_2$  and  $D_2$  in intense soft x-ray laser fields. J. Phys. B 39, 813 (2006)

$\mathbf{h}\nu + \mathbf{H}_2$	Photodissociation	41.7  eV	Exp
$h\nu + D_2$	Photodissociation	41.7  eV	Exp
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	41.7  eV	Exp
$h\nu + D_2$	Photoionization	41.7  eV	Exp

564.	L.A.A. Nikolopoulos, P. Lambropoulos
	Helium double ionization signals under soft-x-ray coherent radiation.
	J. Phys. B 39, 883 (2006)

$h\nu + He$	Photoionization	41.85-51.15  eV	Th
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565. C. Beylerian, S. Saugout, C. Cornaggia Non-sequential double ionization of  $H_2$  using ultrashort 10 fs laser pulses. J. Phys. B 39, L105 (2006)

$\mathbf{h}\nu + \mathbf{H}_2$ Photoionization	800  nm	Exp
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566. A. Ehresmann, L. Werner, S. Klumpp, Ph. V. Demekhin, M. P. Lemeshko, V. L. Sukhorukov, K.-H. Schartner, H. Schmoranzer Predissociation of the  $N_2^+(C^{-2}\Sigma_u^+)$  state observed via C  ${}^2\Sigma_u^+$  -; X  ${}^2\Sigma_g^+$  fluorescence after resonant  $1s^{-1}\pi^*$  excitation of  $N_2$  molecule. J. Phys. B 39, L119 (2006)

$\mathbf{h}\nu + \mathbf{N}_2$	Photodissociation	$400\text{-}403~\mathrm{eV}$	Exp
$\mathbf{h}\nu + \mathbf{N}_2$	Fluorescence	400-403  eV	Exp
$h\nu + N_2$	Photoionization	$400\text{-}403~\mathrm{eV}$	Exp

567. M. Murata, T. Odagiri, N. Kouchi Multiply excited states of molecular nitrogen in the vacuum ultraviolet range as studied by  $(\gamma, 2\gamma)$  method. J. Phys. B 39, 1285 (2006)

$\mathbf{h}\nu + \mathbf{N}_2$	Fluorescence	$28-49~{\rm eV}$	Exp
$\mathbf{h}\nu + \mathbf{N}_2$	Photoexcitation	28-49  eV	Exp

568. M. Kitajima, H. P. Yoshida, A. De Fanis, G. Pruemper, U. Hergenhahn, E. Kukk, T. Tanaka, K. Nakagawa, H. Tanaka, S. Fritzsche, I. P. Sazhina, N. M. Kabachnik, K. Ueda A study of inner-valence Auger transitions in  $Ne^+$  induced by the resonant Auger decay of photoexcited Ne  $1s^{-1}np$  states. J. Phys. B 39, 1299 (2006)

$h\nu + Ne$	Photoionization	869  eV	Exp
$\mathbf{h}\nu + \mathbf{Ne}^*$	Photoionization	869  eV	$\operatorname{Exp}$

569. Y. Morishita, Y. Tamenori, K. Okada, T. Oyama, K. Yamamoto, K. Tabayashi, T. Ibuki, K. Moribayashi, I. H. Suzuki Formation mechanisms of multi-charged Kr ions through 2p shell photoionization using a coincidence technique.

J. Phys. B 39, 1323 (2006)

	$h\nu + Kr$	Photoionization	$1660\text{-}1780\;\mathrm{eV}$	Exp
570.	G. Yu. Kashenock, V. Inner-shell resonar relaxation in collec J. Phys. B 39, 1379 (2010)	K. Ivanov at photodetachment of $C^-$ : ' tive response. 2006)	The dramatic role of dynan	nical
	$\mathbf{h} u$ + $\mathbf{C}^{-}$	Photodetachment	$281\text{-}284~\mathrm{eV}$	$\mathrm{Th}$
571.	C. Blondel, W. Chaib <b>The fine structure</b> J. Phys. B 39, 1409 (2	i, C. Delsart, C. Drag of S and $S^-$ measured with the 2006)	ne photodetachment microsc	ope.
	$h\nu + S^-$	Photodetachment	614.6-577.1  nm	Exp
572.	M. Meyer, D. Cubayr Strakhova, A. N. Gru <b>Probing the KII</b> 3 <b>excited potassium.</b> J. Phys. B 39, L153 (	nes, F. J. Wuilleumier, E. Heinecl m-Grzhimailo $p^54p$ fine structure by photo 2006)	ke, T. Richter, P. Zimmermann,	S. I. aser-
	$h\nu + K$	Photoionization	42  eV	E/T
573.	D. Zeidler, A. B. Bard Alignment indepen J. Phys. B 39, L159 (	lon, A. Staudte, D. M. Villeneuv dence of the instantaneous ior 2006)	e, R. Doerner, P. B. Corkum nization rate for nitrogen mol	ecules.
	$\mathbf{h} u$ + $\mathbf{N}_2$	Photoionization	0-8 eV	E/T
574.	SU. Haq, S. Mahmo Measurements of p excited states of st J. Phys. B 39, 1587 (2	od, N. Amin, Y. Jamil, R. Ali, M hotoionization cross sections rontium. 2006)	. A. Baig from the 5s5p ${}^1P_1$ and 5s6s	$s^{-1}S_{0}$
	$egin{array}{l} {f h} u + {f Sr} \ {f h} u + {f Sr}^* \end{array}$	Photoionization Photoionization	355-410  nm 355-410  nm	E/T E/T
575.	A. S. Kheifets, I. A. F Convergent close-co J. Phys. B 39, 1731 (2	vanov pupling calculations of two-ph 2006)	oton double ionization of heli	ium.
	$h\nu + He$	Photoionization	40-50  eV	$\mathrm{Th}$
576.	M. Hiyama, M. Kosug Application of R m J. Phys. B 39, 1797 (2	gi aatrix/MQDT method to vale 2006)	ence and core excitations in	NO.
	$h\nu + NO$	Photodissociation	405-420  eV	$\mathrm{Th}$
577.	G. Yang, Y. Zheng, X Photodetachment of J. Phys. B 39, 1855 (2)	. Chi of $H^-$ near an interface. 2006)		
	$h u + H^-$	Photodetachment	1  eV	$\mathrm{Th}$
578.	J. Colgan, M. S. Pind Energy differential J. Phys. B 39, 1879 (2	zola cross sections for the triple p 2006)	photoionization of lithium.	

	$\mathbf{h} u + \mathbf{L}\mathbf{i}$	Photoionization	300  eV	$\mathrm{Th}$
579.	<ul> <li>P. Bolognesi, A. Kheifets, S botti, L. Avaldi</li> <li>Photodouble ionization s conditions.</li> <li>J. Phys. B 39, 1899 (2006)</li> </ul>	. Otranto, M. Coreno, V. Feyer, $1$ studies of the $Ne(2s^2)$ state unit	F. D. Colavecchia, C. R. Gari- der unequal energy sharing	
	$h\nu + Ne$	Photoionization		Exp
580.	M. Kato, Y. Morishita, F. Matsudo, T. Gejo, I. H. Suz High-resolution absolute 1s2p resonant double ex J. Phys. B 39, 2059 (2006)	Koike, S. Fritzsche, H. Yamaoka uki, N. Saito e photoabsorption cross section citation.	a, Y. Tamenori, K. Okada, T.	
	$h\nu + Ne$	Total Absorption, Scattering	900-940 ${\rm eV}$	Exp
581.	S. Song, F. Peng, G. Jiang <b>Properties of the</b> $K\alpha$ and J. Phys. B 39, 2087 (2006)	d $k\beta$ x-ray transitions in CuX	X through CuXXVIII.	
	$egin{array}{l} \mathbf{h} u + \mathbf{C}\mathbf{u}^{19+} \ \mathbf{h} u + \mathbf{C}\mathbf{u}^{27+} \end{array}$	Photoexcitation Photoexcitation	5 eV 5 eV	Th Th
582.	LR. Wang, JT. Hsiao, K. <b>Doubly excited states of</b> J. Phys. B 39, L217 (2006)	-N. Huang the Be atom in the MCRRP	Ά.	
	$\mathbf{h} u + \mathbf{B}\mathbf{e}$ $\mathbf{h} u + \mathbf{B}\mathbf{e}$	Photoexcitation Photoionization	0.3-0.5 a.u. 0.3-0.5 a.u.	Th Th
583.	O. Zatsarinny, K. Bartschat <b>B-spline calculations of</b> J. Phys. B 39, 2145 (2006)	oscillator strengths in neutral	l argon.	
	$h\nu + Ar$	Photoexcitation	$10^{-7} - 10^{-1}$ a.u.	Th
584.	C. Froese-Fischer Some improved transition J. Phys. B 39, 2159 (2006)	on probabilities for neutral ca	rbon.	
	$h\nu + C$	Photoexcitation	$10^{-17} - 10^{-1}$ a.u.	Th
585.	<ul> <li>A. E. Kingston, A. Hibbert</li> <li>The spectrum of optical</li> <li>IV.</li> <li>J. Phys. B 39, 2217 (2006)</li> </ul>	ly allowed transitions from th	ne $3p^63d$ ground state of Ti	
	$\mathbf{h} u$ + $\mathbf{Ti}^{3+}$	Photoexcitation	$10^{-4} - 1$ a.u.	Th
586.	S. Mahmood, N. Amin, SU Measurements of oscilla resonances in neon. J. Phys. B 39, 2299 (2006)	J. Haq, N. M. Shaikh, S. Hussain, tor strengths of the $2p^5({}^2P_{1})$	M. A. Baig $J_2$ $nd J = 2,3$ autoionizing	
	$egin{array}{l} {f h} u+{f Ne}\ {f h} u+{f Ne} \end{array}$	Photoexcitation Photoionization	$10^{-6} - 10^{-3}$ a.u. $10^{-6} - 10^{-3}$ a.u.	Exp Exp

587.	. S. K. Semenov, N. A. Cherepkov, M. Matsumoto, T. Hatamoto, XJ. Liu, G. Pruemper, T. Tanaka, M. Hoashino, H. Tanaka, F. Gel'mukhanov, K. Ueda Interference modulation in the vibrationally resolved photoionization of the $1\sigma_g$ and $1\sigma_u$ core levels of the $N_2$ molecule. J. Phys. B 39, L261 (2006)			
	$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	$440-550 {\rm ~eV}$	Exp
588.	R. F. Fink, A. Eschner, M. Svensson, M. N. Piancastelli <b>Specific production of ve</b> <b>tation of the OCS molec</b> J. Phys. B 39, L269 (2006)	Magnuson, O. Bjoerneholm, I. H , S. L. Sorensen ery long-lived core-excited su ule followed by ultrafast disse	jelte, C. Miron, M. Bassler, S. lfur atoms by $2p^{-1}\sigma^*$ exci- ociation.	
	$h\nu + OCS$	Photodissociation	135-160 $eV$	Exp
589.	J. D. Hey On the determination of genic atoms and ions. J. Phys. B 39, 2641 (2006)	radial matrix elements for h	igh-n transitions in hydro-	
	$h\nu + A$	Photoexcitation		Th
590.	J. J. Camacho, A. Pardo, E. On the $1(\mathbf{A})^{1}\Sigma_{u}^{+}$ -; $1(\mathbf{X})^{1}\Sigma_{u}^{+}$ -; $1(\mathbf{X})^{1}\Pi_{u}$ station of the $1(\mathbf{B})^{1}\Pi_{u}$ statistical J. Phys. B 39, 2665 (2006)	Martin, J.M.L. Poyato ${}^{1}\Sigma_{g}^{+}$ emission of $Na_{2}$ observe ite.	ed following the laser exci-	
	$\mathbf{h} u$ + $\mathbf{N}\mathbf{a}_2$	Fluorescence	4900-6300 Å	Exp
591.	D. Toffoli, P. Decleva <b>Photoelectron angular d</b> <b>putational study on the</b> J. Phys. B 39, 2681 (2006)	istributions beyond the dipo $N_2$ molecule.	le approximation: A com-	
	$h\nu + N_2$	Photoionization	10-2000  eV	Th
592.	S. Cohen, I. Liontos, A. Bold <b>Two-photon ionization s</b> J. Phys. B 39, 2693 (2006)	ovinos, A. Lyras, S. Benec'h, H. H pectra of calcium above the 4	Bachau $s_{1/2}$ threshold.	
	$h\nu + Ca$	Photoionization	374-323 nm	$\mathrm{E}/\mathrm{T}$
593.	H. Yamaoka, M. Oura, K. Ta T. Mukoyama <b>The effect of Coster-Kro</b> <b>lowing Au L-shell photoi</b> J. Phys. B 39, 2747 (2006)	akahiro, K. Kawatsura, S. Ito, M. onig transitions on the anisot onization.	Mizumaki, H. Oohashi, Y. Ito, ropy of x-ray emission fol-	
	$\mathbf{h} u$ + Au	Photoionization	$13-15 \mathrm{keV}$	Exp
594.	S. Kammer, KH. Schartner Schmoranzer, I. D. Petrov, H Cross sections for photo of the doubly excited Ar J. Phys. B 39, 2757 (2006)	, S. Mickat, R. Schill, A. Ehresman Ph. V. Demekhin, V. L. Sukhoruk absorption and $3p^44s$ , $3d$ satel $3p^4({}^3P)4s^2P_{3/2,1/2}$ np resonant	ann, L. Werner, S. Klumpp, H. cov lite production at energies nces.	
	$h\nu + Ar$	Photoexcitation	32.5-33.0  eV	$\mathrm{E}/\mathrm{T}$

595.	L. Argenti, R. Moccia <b>K-matrix method with B-splines:</b> $\sigma_{nl}$ , $\beta_n$ and resonances in He photoionization below N = 4 threshold. J. Phys. B 39, 2773 (2006)			
	$h\nu + He$	Photoionization	73.5-75.6  eV	$\mathrm{Th}$
596.	O. Zatsarinny, K. Ba Oscillator strength fur. J. Phys. B 39, 2861 (	rtschat <b>as for allowed and intercombinatio</b> (2006)	n transitions in neutral sul-	
	h u + S	Photoexcitation	$83,000-830 \ cm^{-1}$	Th
597.	A. Emmanouilidou, J Triple photoioniza J. Phys. B 39, L99 (2	J. M. Rost tion of lithium near threshold. 2006)		
	$h\nu + Li$	Photoionization	0-10 eV	$\mathrm{E}/\mathrm{T}$
598.	M. Martins, K. Gode Open shells and m metal atoms. J. Phys. B 39, R79 (2	husen, T. Richter, P. Wernet, P. Zimme ulti-electron interactions: Core lev 2006)	ermann rel photoionization of the 3d	
	$h\nu + Sc$	Total Absorption, Scattering	30-90 eV	E/T
	$h\nu + Ti$	Total Absorption, Scattering	30-90  eV	E'/T
	$h\nu + V$	Total Absorption, Scattering	30-90  eV	$\dot{E/T}$
	$h\nu + Cr$	Total Absorption, Scattering	30-90  eV	$\dot{E/T}$
	$h\nu + Mn$	Total Absorption, Scattering	30-90  eV	$\dot{E/T}$
	$h\nu + Fe$	Total Absorption, Scattering	30-90  eV	E'/T
	$h\nu + Co$	Total Absorption, Scattering	30-90  eV	E'/T
	$h\nu + Ni$	Total Absorption, Scattering	30-90  eV	E'/T
	$h\nu + Cu$	Total Absorption, Scattering	30-90 eV	$\dot{E/T}$
	$h\nu + Sc$	Photoionization	30-90  eV	E'T
	$h\nu + Ti$	Photoionization	30-90 eV	E'T
	$h\nu + V$	Photoionization	30-90  eV	$\dot{E/T}$
	$h\nu + Cr$	Photoionization	30-90  eV	E'/T
	$h\nu + Mn$	Photoionization	30-90  eV	E'/T
	$h\nu + Fe$	Photoionization	30-90  eV	E'/T
	$h\nu + Co$	Photoionization	30-90  eV	E'/T
	$h\nu + Ni$	Photoionization	30-90  eV	E'/T
	$\mathbf{h}\nu + \mathbf{Cu}$	Photoionization	30-90  eV	$\dot{E/T}$
599.	A. Kivimaeki, M. Co Feyer, G. Vall-llosera <b>Fluorescence emiss</b> J. Phys. B 39, 1101 (	reno, R. Richter, J. Alvarez Ruiz, E. M., K. C. Prince sion following core excitations in t. (2006)	Ielero-Garcia, M. de Simone, V. <b>he water molecule.</b>	
	$h_{\mu} \perp H_{z}O$	Photodissociation	$532_{-}542 \text{ eV}$	Fyp
	$h u + H_2O$ $h u + H_2O$	Fluorescence	532-542 eV	Exp

600. H. P. Saha

MCHF studies of partial photoionization cross section of atomic fluorine. J. Phys. B 39, 1209 (2006)

$\mathbf{h}\mathbf{\nu} + \mathbf{F}$	Photoionization	20-24  eV	E/T
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601.	<ul> <li>J. Wu, J. Yuan</li> <li>The resonance structures in the cross sections of slow electron interaction with barium atoms: A fully relativistic R-matrix study.</li> <li>J. Phys. B 39, 2493 (2006)</li> </ul>			
	$h\nu + Ba$	Photodetachment	0-10  ev; 0-2.5  eV	$\mathrm{E}/\mathrm{T}$
602.	K. Zrost, A. Rudenko, Th Moshammer, J. Ullrich Multiple ionization of I dynamics studied with i J. Phys. B 39, S371 (2006)	. Ergler, B. Feuerstein, V.L.B. Ne and Ar by intense 25 fs on momentum spectroscopy.	de Jesus, C. D. Schroeter, R. laser pulses: Few-electron	
	$egin{array}{ll} {f h} u+{f Ne}\ {f h} u+{f Ar} \end{array}$	Photoionization Photoionization	795 nm 795 nm	Exp Exp
603.	E. Gubbini, U. Eichmann, I Multiple ionization of K J. Phys. B 39, S381 (2006)	M. Kalashnikov, W. Sandner r in an intense circularly po	larized laser field.	
	$h\nu + Kr$	Photoionization	815 nm	Exp
604.	M. Awasthi, A. Saenz Internuclear-distance de J. Phys. B 39, S389 (2006)	ependence of ionization of $H_2$	in strong laser fields.	
	$\mathbf{h} u$ + $\mathbf{H}_2$	Photoionization	800 nm	$\mathrm{Th}$
605.	E. Foumouo, S. Laulan, B. <b>Dynamics of two-photon</b> J. Phys. B 39, S427 (2006)	Piraux, H. Bachau n double-ionization of helium	at the attosecond scale.	
	$h\nu + He$	Photoionization	1.42-2.1 a.u.	$\mathrm{Th}$
606.	A. S. Alnaser, I. Litvinyuk, Ranitovic, I. Bochareva, D. Momentum-imaging inv tion of acetylene to viny J. Phys. B 39, S485 (2006)	T. Osipov, B. Ulrich, A. Lander Ray, C. L. Cocke estigations of the dissociation vlidene by intense short laser	s, E. Wells, C. M. Maharjan, P. n of $D_2^+$ and the isomeriza- pulses.	
	$egin{aligned} & { m h}  u + { m H}_2 \ & { m h}  u + { m D}_2 \ & { m h}  u + { m C}_2 { m H}_2 \ & { m h}  u + { m H}_2 \ & { m h}  u + { m H}_2 \ & { m h}  u + { m D}_2 \ & { m h}  u + { m C}_2 { m H}_2 \end{aligned}$	Photodissociation Photodissociation Photodissociation Photoionization Photoionization Photoionization	800 nm 800 nm 800 nm 800 nm 800 nm 800 nm	Exp Exp Exp Exp Exp Exp
607.	Th. Ergler, A. Rudenko, B. Ultrafast mapping of $H_2$ -explosion imaging. J. Phys. B 39, S493 (2006)	Feuerstein, K. Zrost, C. D. Schro $^+$ $(D_2^+)$ nuclear wave packets	beter, R. Moshammer, J. Ullrich using time-resolved Coulomb	
	$\mathbf{h}\nu + \mathbf{H}_2$	Photodissociation	795 nm	Exp

1 notouissociation	795 1111	Exp
Photodissociation	795  nm	$\operatorname{Exp}$
Photoionization	795  nm	Exp
Photoionization	795  nm	Exp
	Photodissociation Photoionization Photoionization	Photodissociation795 nmPhotoionization795 nmPhotoionization795 nmPhotoionization795 nm

608. F. Legare, K. F. Lee, A. D. Bandrauk, D. M. Villeneuve, P. B. Corkum Laser Coulomb explosion imaging for probing ultra-fast molecular dynamics. J. Phys. B 39, S503 (2006)

$h\nu + H_2$	Photodissociation	810 nm	Exp
$h\nu + D_2$	Photodissociation	810 nm	Exp
$h\nu + SO_2$	Photodissociation	810 nm	Exp
$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	810 nm	Exp
$\mathbf{h}\nu + \mathbf{D}_2$	Photoionization	810 nm	Exp
$h\nu + SO_2$	Photoionization	810 nm	Exp

609. T. Okino, Y. Furukawa, P. Liu, T. Ichikawa, R. Itakura, K. Hoshina, K. Yamanouchi, H. Nakano

Ejection dynamics of hydrogen molecular ions from methanol in intense laser fields.

J. Phys. B 39, S515 (2006)

$h\nu + CH_3OH$	Photodissociation	800 nm	Exp
$h\nu + CH_3OD$ $h\nu + CD_3OH$	Photodissociation	800 nm	Exp Exp
$h\nu + CH_3OH$	Photoionization	800  nm	$\operatorname{Exp}$
$h\nu + CH_3OD$	Photoionization	800  nm	Exp
$h\nu + CD_3OH$	Photoionization	800  nm	Exp

610.	J.K.G. Watson A formula for line streng J. Phys. B 39, L291 (2006)	ths of hydrogenic atoms.		
	$h\nu + H$	Photoexcitation		Th
611.	<ul> <li>A. A. Sorokin, S. V. Bobashe</li> <li>Multi-photon ionization</li> <li>pulses.</li> <li>J. Phys. B 39, L299 (2006)</li> </ul>	ev, K. Tiedtke, M. Richter of molecular nitrogen by fem	ntosecond soft x-ray FEL	
	$\mathbf{h} u$ + $\mathbf{N}_2$	Photoionization	38 eV	Exp
612.	M. Uhlmann, T. Kunert, R. Non-adiabatic quantum s tems. J. Phys. B 39, 2989 (2006)	Schmidt molecular dynamics: Ionizat	ion of many-electron sys-	
	$egin{array}{l} {f h}  u + {f H}_2 \ {f h}  u + {f H}_2^+ \ {f h}  u + {f H}_2 \ {f h}  u + {f H}_2 \ {f h}  u + {f H}_2^+ \end{array}$	Photodissociation Photodissociation Photoionization Photoionization	0.5 a.u. 0.5 a.u. 0.5 a.u. 0.5 a.u.	Th Th Th Th

613. M. Hoshino, K. Nakagawa, T. Tanaka, M. Kitajima, H. Tanaka, A. De Fanis, K. Wang, B. Zimmermann, V. McKoy, K. Ueda Vibrationally resolved partial cross sections and asymmetry parameters for carbon K-shell photoionization of the  $CO_2$  molecule. J. Phys. B 39, 3047 (2006)

$h\nu + CO_2$	Photoionization	$300\text{-}340~\mathrm{eV}$	E/T
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614. X. Liu, C. F. de Morisson Faria, W. Becker, P. B. Corkum Attosecond electron thermalization by laser-driven electron recollision in atoms. J. Phys. B 39, L305 (2006)

 $h\nu + Ne$ 

615.	<ul> <li>5. I. D. Petrov, V. L. Sukhorukov, T. Peters, O. Zehnder, H. J. Woerner, F. Merkt, H. Hotop Autoionizing even 2p<sub>1/2</sub><sup>5</sup>nl'[K']<sub>0,1,2</sub>(l' = 1,3) Rydberg series of Ne: A comparison of many-electron theory and experiment.</li> <li>J. Phys. B 39, 3159 (2006)</li> </ul>			L
	$h\nu + Ne$	Elastic Scattering	4  eV	E/T
	$\mathbf{h}\nu + \mathbf{Ne}^*$	Elastic Scattering	$4  \mathrm{eV}$	$\dot{E/T}$
	$h\nu + Ne$	Photoionization	4  eV	E/T
	$h\nu + Ne^*$	Photoionization	4  eV	E/T
616.	A. S. Alnaser, C. M. Multi-photon reso experimental long J. Phys. B 39, L323	Maharjan, P. Wang, I. V. Litviny onant effects in strong-field i itudinal momentum distributi (2006)	uk onization: Origin of the dip in ions.	
	$egin{array}{l} {f h} u + {f Ne} \ {f h} u + {f Ar} \end{array}$	Photoionization Photoionization	400-800 nm 400-800 nm	$\operatorname{Exp}$
617.	Y. Hikosaka, T. Aoto Auger decay of No cidence method. J. Phys. B 39, 3457	o, P. Lablanquie, F. Penent, E. Sh <b>1s photoionization satellites</b> (2006)	igemasa, K. Ito studied by a multi-electron coin-	
	$h\nu + Ne$	Photoionization	950  eV	Exp
618.	M. Ahmad, P. Labla Structure and fra experiments. J. Phys. B 39, 3599	nquie, F. Penent, J. G. Lambourn gmentation dynamics of $N_2^{2+}$ (2006)	e, R. I. Hall, J.H.D. Eland ions in double photoionization	L
	$\begin{array}{l} \mathbf{h}\nu + \mathbf{N}_2 \\ \mathbf{h}\nu + \mathbf{N}_2 \end{array}$	Photodissociation Photoionization	43-46 eV 43-46 eV	$\operatorname{Exp}$
619.	M. Hoshino, K. Naka X. O. Brykalova, A. Vibrationally reso gen K-shell photo J. Phys. B 39, 3655	agawa, T. Tanaka, M. Kitajima, H. A. Pavlychev, T. Hatamoto, K. U- lved partial cross sections and ionization of the $CO_2$ molecule (2006)	. Tanaka, A. De Fanis, D. A. Mistrov, eda l <b>asymmetry parameters for oxy-</b> e.	
	$\mathbf{h}\nu + \mathbf{CO}_2$	Photoionization	$550\text{-}570~\mathrm{eV}$	Exp
620.	S. Mar, J. A. del Va Castro, J. A. Aparic <b>Measurement of t</b> J. Phys. B 39, 3709	al, F. Rodriguez, R. J. Pelaez, V. io <b>ransition probabilities in Kr I</b> (2006)	. R. Gonzalez, A. B. Gonzalo, A. de I UV and visible spectral lines.	;
	$h\nu + Kr^+$	Photoexcitation	350-720  nm	Exp
621.	J. P. Brichta, WK. Comparison of AD population measu J. Phys. B 39, 3769	Liu, A. A. Zaidi, A. Trottier, J. H <b>OK ionization rates as a diagno</b> rement. (2006)	I. Sanderson stic for selective vibrational level	
	$\mathbf{h}\nu + \mathbf{H}_2$	Photoionization	$4.3-8.0\ 10^{13}\ { m W}/cm^2$	Th
	$h\nu + H_2^*$	Photoionization	$4.3-8.0 \ 10^{13} \ \mathrm{W/cm^2}$	Th
	$h\nu + CO_2$	Photoionization	$4.3-8.0 \ 10^{13} \ \mathrm{W}'/cm^2$	$\mathrm{Th}$
	$\mathbf{h}\nu + \mathbf{CO}_2^*$	Photoionization	$4.3-8.0 \ 10^{13} \ \mathrm{W}/cm^2$	Th
	$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	$4.3-8.0\ 10^{13}\ \mathrm{W/cm^2}$	Th
	$\mathbf{h}\nu + \mathbf{N}_2^*$	Photoionization	$4.3-8.0\ 10^{13}\ W/cm^2$	Th
622.	J. Wu, H. Zeng, C. Gu Non-sequential dou NO. J. Phys. B 39, 3849 (2	ble ionization in slow charge	fragmentation of doubly ionized	
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	$\begin{array}{l} \mathbf{h}\nu + \mathbf{NO} \\ \mathbf{h}\nu + \mathbf{NO} \end{array}$	Photodissociation Photoionization	800 nm 800 nm	Exp Exp
623.	S.W.J. Scully, I. Alvar Lubell, A. Mueller, R. P. Ballance, B. M. Mcl <b>Doubly excited reso</b> <b>and theory.</b> J. Phys. B 39, 3957 (2)	ez, C. Cisneros, E. D. Emmons, A. Phaneuf, R. Puettner, A. S. Laughlin <b>phances in the photoionizatio</b> 006)	M. F. Gharaibeh, D. Leitner, M. S. Schlachter, S. Schippers, W. Shi, C. on spectrum of $Li^+$ : Experiment	
	$\mathbf{h} u$ + $\mathbf{L}\mathbf{i}^+$	Photoionization	$140-180 {\rm ~eV}$	Exp
624.	M. A. Bautista <b>Photoionization of I</b> J. Phys. B 39, L361 (2	Fe V around the 3p -; 3d co 2006)	re excitation region.	
	$\mathbf{h} u$ + $\mathbf{Fe}^{4+}$	Photoionization	70-120  eV	Th
625.	M. Ya. Amusia, L. V. Non-dipole angular shell atoms. J. Phys. B 39, 4627 (2	Chernysheva anisotropy parameters of 006)	photoelectrons from semi-filled	
	$h\nu + Li$	Photoionization	0-120 eV	Th
	$h\nu + P$	Photoionization	0-120  eV	Th
	$h\nu + Cr$	Photoionization	0-120  eV	Th
	$h\nu + Cr^*$	Photoionization	0-120  eV	Th
	$h\nu + Mn$	Photoionization	0-120  eV	Th
	$h\nu + Eu$	Photoionization	0-120  eV	$\mathrm{Th}$
626.	M. Oura, Y. Tamenori Study of the 2p -; r ization of Ne. J. Phys. B 39, 4637 (2	, M. Machida, T. Mukoyama <b>np (n = 3-6) excitation proc</b> 006)	esses accompanying 1s photoion-	
	$h\nu + Ne$	Photoexcitation	908-1080 eV	Exn
	$h\nu + Ne$ $h\nu + Ne$	Photoionization	908-1080 eV	Exp
627.	Y. Zou, M. Oura, R. I Mukoyama Study of vacancy de energy range of 5.6 of double L-vacancy J. Phys. B 39, 4775 (2	Hutton, H. Yamaoka, N. Takesh cays in the L-shell photoioniz -30 keV: From $L_2$ edge to ex- production. 006)	ima, K. Takahiro, K. Kawatsura, T. zation of barium in the excitation nergy high above the thresholds	
	$\mathbf{h}\nu + \mathbf{B}\mathbf{a}$	Fluorescence	$5.6-30 \mathrm{keV}$	Exp
	$h\nu + Ba$	Photoionization	$5.6-30 \mathrm{keV}$	Exp
628.	A. M. Juarez, E. Soke Coreno	ll, P. Bolognesi, M.R.F. Siggel-	King, G. C. King, M. de Simone, M.	
	of $D_2$ .	$1^{N}$ - $1^{N}$ =4) ro-vibrational t	ransition in the photoionization	

J. Phys. B 39, L377 (2006)

	$egin{array}{l} \mathbf{h} u + \mathbf{H}_2 \ \mathbf{h} u + \mathbf{D}_2 \end{array}$	Photoionization Photoionization	$\begin{array}{c} 15.65\text{-}15.68 \; \mathrm{eV} \\ 15.65\text{-}15.68 \; \mathrm{eV} \end{array}$	$\begin{array}{c} \text{Exp} \\ \text{Exp} \end{array}$
629.	X. J. Liu, N. A. Ch T. Lischke, T. Tana Young's double-s iting Cohen-Fano J. Phys. B 39, 4801	erepkov, S. K. Semenov, V. Kimb- ka, M. Hoshino, H. Tanaka, K. Ueo lit experiment using core-level 's two-centre interference pher (2006)	erg, F. Gel'mukhanov, G. Pruemp la photoemission from $N_2$ : Rev nomenon.	oer, vis-
	$\mathbf{h}\nu + \mathbf{N}_2$	Photoionization	400-1600 $\mathrm{eV}$	E/T
630.	J. R. Harries, J. P. Photoionization of distribution of th J. Phys. B 39, 4819	Sullivan, P. Hammond, Y. Azuma of He in the 31nl' doubly-excit e fluorescence from the residua (2006)	ed state energy region: Angual ion $He^+(2p)^2P$ .	lar
	$h\nu + He$	Fluorescence	$72.5-73.0 { m eV}$	E/T
	$h\nu + He$	Photoionization	72.5-73.0  eV	E/T
631.	J. D. Bozek, J. E. F K. W. McLaughlin, <b>Production of exc</b> sociation. J. Phys. B 39, 4871	urst, T. J. Gay, H. Gould, A.L.D. J. L. Sanz-Vicario <b>ited atomic hydrogen and deu</b> (2006)	Kilcoyne, J. R. Machacek, F. Mart $t$ erium from $H_2$ and $D_2$ photod	tin, lis-
	$ \begin{aligned} \mathbf{h} \boldsymbol{\nu} + \mathbf{H}_2 \\ \mathbf{h} \boldsymbol{\nu} + \mathbf{D}_2 \end{aligned} $	Photodissociation Photodissociation	24-60 eV 24-60 eV	E/T E/T
632.	L. Ponce, R. Taieb, Attosecond-scale J. Phys. B 39, 4985	V. Veniard, A. Maquet dynamics in ion-atom collision (2006)	versus laser-atom interaction	1.
	$h\nu + H$	Photoionization	1-2 a.u.; 1 $\mu$ m	$\mathrm{Th}$
633.	M. Saleem, S. Hussa Simultaneous mea from 3p ${}^{2}P_{1/2,3/2}$ J. Phys. B 39, 5025	ain, M. Rafiq, M. A. Baig asurements of photoionization (2006)	cross-sections of lithium isotop	pes
	$h\nu + Li$	Photoionization	0-3  eV	Exp
634.	M. Foster, J. Colgar <b>Charge-depender</b> J. Phys. B 39, 5067	n <b>t effects in double photoioniza</b> (2006)	tion of He-like ions.	
	$h\nu + He$	Photoionization	30-320  eV	$\mathrm{Th}$
	$h\nu + Li^+$	Photoionization	30-320 eV	Th
	$h\nu + Be^{2+}$ $h\nu + P^{3+}$	Photoionization	30-320 eV 20.220 eV	Th Th
	$\mathbf{h} u + \mathbf{B}^{e+1}$ $\mathbf{h} u + \mathbf{O}^{6+1}$	Photoionization	30-320 eV 30-320 eV	$1 \mathrm{n}$ Th
635.	A. K. Kazansky, N. Calculations of the photoionization of J. Phys. B 39, 5173	M. Kabachnik ne double differential cross sect f atoms. (2006)	ion for attosecond laser-assist	ted
	$h\nu + Ar$	Photoionization	1.6-90  eV	$\mathrm{Th}$

636.	G. Ljung, H. Nilsson, M. As New and improved exper dance of zirconium. Astron. Astrophys. 456, 118	plund, S. Johansson rimental oscillator strengths i 81 (2006)	n Zr II and the solar abun-	
	$\mathbf{h} u + \mathbf{Zr}^+$	Photoexcitation	5400-2500 ${\r{A}}$	Exp
637.	S. N. Nahar Atomic data from the Ir Fe XVIII in relativistic I Astron. Astrophys. 457, 721	on Project. LXII. Allowed an Breit-Pauli approximation. (2006)	nd forbidden transitions in	
	$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{17+}$	Photoexcitation	0-60 Ry	Th
638.	G. Del Zanna <b>Benchmarking atomic da</b> Astron. Astrophys. 459, 307	ata for astrophysics: Fe XVII 7 (2006)	I.	
	$\mathbf{h} u$ + $\mathbf{F}\mathbf{e}^{17+}$	Photoexcitation	$7 \log T[K]$	Th
639.	K. M. Aggarwal, F. P. Keen <b>Energy levels and radiat</b> Astron. Astrophys. 460, 331	an, T. Kato, I. Murakami ive rates for transitions in Fe (2006)	e IX.	
	$h\nu + Fe^{8+}$	Photoexcitation	0-7.0 Ry	Th
640.	K. M. Aggarwal, F. P. Keen Energy levels and radiat Astron. Astrophys. 460, 959	an ive rates for transitions in Ni 0 (2006)	i XIX.	
	$\mathbf{h} u$ + $\mathbf{Ni}^{18+}$	Photoexcitation	0-100 Ry	Th
641.	M. Aldenius, J. D. Tanner, a Experimental Mg I oscil applications on metal-po Astron. Astrophys. 461, 767	S. Johansson, H. Lundberg, S. G. lator strengths and radiative or stars. New data for the M 7 (2007)	Ryan lifetimes for astrophysical IG I b triplet.	
	$h\nu + Mg$	Photoexcitation	5180-2700 $\mathring{A}$	Exp
642.	K. M. Aggarwal, F. P. Keen Energy levels and radiat Astron. Astrophys. 463, 399	an ive rates for inner shell trans ) (2007)	sitions of Fe XVI.	
	$\mathbf{h} u$ + $\mathbf{Fe}^{15+}$	Photoexcitation	0-60 Ry	$\mathrm{Th}$
643.	J. Wu, H. Zeng, J. Wang, C Dynamics of triple-ioniza fields. Phys. Rev. A 73, 051402 (2	. Guo tion-induced dissociation in d 006)	liatomic molecules in strong	
	$\begin{array}{l} \mathbf{h}\nu + \mathbf{N}_2 \\ \mathbf{h}\nu + \mathbf{O}_2 \\ \mathbf{h}\nu + \mathbf{N}_2 \\ \mathbf{h}\nu + \mathbf{O}_2 \end{array}$	Photodissociation Photodissociation Photoionization Photoionization	800 nm 800 nm 800 nm 800 nm	Exp Exp Exp Exp
644.	N. Kolachevsky, M. Haas, Holzwarth, Th. Udem, C. H Photoionization broaden gen. Phys. Rev. A 74, 052504 (2	U. D. Jentschura, M. Herrman . Keitel, T. W. Haensch ing of the 1S-2S transition in 006)	n, P. Fendel, M. Fischer, R.	

	$egin{array}{l} {f h} u + {f H} \ {f 2} {f h} u + {f H} \end{array}$	Photoionization Photoionization	243 nm 243 nm	E/T $E/T$
645.	W. Vanroose, D. A. Horne <b>Double photoionization</b> Phys. Rev. A 74, 052702 (	r, F. Martin, T. N. Rescigno, C. V. of aligned molecular hydrogo 2006)	W. McCurdy e <b>n.</b>	
	$egin{array}{l} \mathbf{h} u + \mathbf{H}_2 \ \mathbf{h} u + \mathbf{H}_2 \end{array}$	Photodissociation Photoionization	75 eV 75 eV	E/T E/T
646.	S. Hussain, M. Saleem, M. Angular momentum de cited states of lithium. Phys. Rev. A 74, 052705 (	A. Baig pendence of photoionization 2006)	cross sections from the ex-	
	$egin{array}{l} {f h} u+{f L}{f i}\ {f h} u+{f L}{f i}^* \end{array}$	Photoionization Photoionization	317-1457 nm 317-1457 nm	E/T $E/T$
647.	O. Zatsarinny, K. Bartscha Low-energy electron sc. Phys. Rev. A 74, 052708 (	t, S. Gedeon, V. Gedeon, V. Lazu attering from Ca atoms and p 2006)	$r$ bhotodetachment of $Ca^-$ .	
	h u + Ca <sup>-</sup>	Photodetachment	0-4 eV	$\mathrm{E}/\mathrm{T}$
648.	K. Krajewska, I. I. Fabrika Threshold effects in st ments and angular dist Phys. Rev. A 74, 053407 (	ant, A. F. Starace rong-field detachment of $H^-$ ribution variations. 2006)	and $F^-$ : Plateau enhance-	
	$egin{array}{l} \mathbf{h} u+\mathbf{H}^-\ \mathbf{h} u+\mathbf{F}^-\ \mathbf{n}\mathbf{h} u+\mathbf{H}^-\ \mathbf{n}\mathbf{h} u+\mathbf{F}^- \end{array}$	Photodetachment Photodetachment Photodetachment Photodetachment	$\begin{array}{l} 0.0043\text{-}0.0253\;\omega(a.\mathrm{u.})\\ 0.0043\text{-}0.0253\;\omega(a.\mathrm{u.})\\ 0.0043\text{-}0.0253\;\omega(a.\mathrm{u.})\\ 0.0043\text{-}0.0253\;\omega(a.\mathrm{u.}) \end{array}$	E/T E/T E/T E/T
649.	S. Huang, C. Chandre, T. Reducing multiphoton control. Phys. Rev. A 74, 053408 (	Uzer <b>ionization in a linearly polariz</b> 2006)	zed microwave field by local	
	$f h  u + H \ nh  u + H$	Photoionization Photoionization	$\begin{array}{c} 0.675 \; \omega(a.{ m u.}) \\ 0.675 \; \omega(a.{ m u.}) \end{array}$	$_{\mathrm{Th}}$
650.	M. Gustafsson, L. Fromma Infrared absorption by intermolecular interact Phys. Rev. A 74, 054703 (	hold $H_2 - Ar$ collisional complexes ion potential. 2006)	s and the anisotropy of the	
	$egin{array}{l} \mathbf{h} u + \mathbf{Ar} + \mathbf{H}_2 \ \mathbf{h} u + \mathbf{Ar}\mathbf{H}_2 \end{array}$	Total Absorption, Scattering Total Absorption, Scattering	195 K 195 K	$_{\mathrm{Th}}$
651.	L. B. Zhao, P. C. Stancil <b>Photoionization of hyd</b> Phys. Rev. A 74, 055401 (	rogen in white dwarf strength 2006)	n magnetic fields.	
	$h\nu + H$	Photoionization	$0-60,000 \ cm^{-1}$	Th
652.	S. R. Federman, M. Brown Oscillator strengths for	, S. Torok, S. Cheng, R. E. Irving ultraviolet transitions in P I	, R. M. Schectman, L. J. Curtis I.	

Astrophys. J., Part 1 660, 919 (2006)

	$h u + P^+$	Photoexcitation	1154 $\mathring{A}$	Exp
653.	W. Carrier, Y. Osam Laboratory investi- – directing the idea of Jupiter and Sat Astrophys. J., Part 1	ura, W. Zheng, R. I. Kaiser gations on the infrared absorp ntification of organo-germani urn. 654, 687 (2007)	otions of germanium-bearing um molecules in the atmosph	molecules ieres
	$egin{array}{l} {f h}  u + {f Ge}_2 {f H}_6 \ {f h}  u + {f Ge}_2 {f H}_2 \ {f h}  u + {f Ge}_2 {f H}_3 \ {f h}  u + {f Ge}_2 {f H}_3 \ {f h}  u + {f Ge}_2 {f H}_4 \ {f h}  u + {f Ge}_2 {f H}_5 \end{array}$	Photoexcitation Photoexcitation Photoexcitation Photoexcitation Photoexcitation	$\begin{array}{c} 500\text{-}4500\ cm^{-1}\\ 500\text{-}4500\ cm^{-1}\\ 500\text{-}4500\ cm^{-1}\\ 500\text{-}4500\ cm^{-1}\\ 500\text{-}4500\ cm^{-1}\\ \end{array}$	Exp Exp Exp Exp Exp
654.	M. F. Gu, P. Beiersde Wavelength measu Astrophys. J., Part 1	orfer, G. V. Brown, H. Chen, D. <b>rements of Ni L-shell lines b</b> 657, 1172 (2007)	B. Thorn, S. M. Kahn etween 9 and 15 Å.	
	$h\nu + Ni^{18+-25+}$	Photoexcitation	15.0-9.0 $\mathring{A}$	E/T
655.	J. N. Das, S. Paul, K <b>Double photoioniz</b> Eur. Phys. J. D 39, 2	. Chakrabarti ation of helium atoms at 1 e 223 (2006)	V above threshold.	
	$h\nu + He$	Photoionization	1 eV excess	$\mathrm{Th}$
656.	N. Amin, S. Mahmoo Photoionization cre of lithium. Eur. Phys. J. D 40, 3	d, M. Saleem, M. A. Kalyar, M. oss-section measurements fro 331 (2006)	A. Baig m the 2p, 3d and 3s excited st	tates
	$egin{array}{l} { m h} u + { m Li} \ { m h} u + { m Li}^* \end{array}$	Photoionization Photoionization	532-266  nm 532-266  nm	$\operatorname{Exp}$
657.	R. Feifel, J.H.D. Elar An experimental a time-of-flight photo troscopy. J. Chem. Phys. 125,	nd, L. Storchi, F. Tarantelli and theoretical study of dou pelectron-photoelectron (pho 194318 (2006)	ble photoionization of $CF_4$ utoion-photoion) coincidences	ising spec-
	$h\nu + CF_4$	Photoionization	0-50  eV	$\mathrm{E}/\mathrm{T}$
658.	D. L. Kokkin, G. B. I Oscillator strength and d ${}^{3}\Pi_{g}$ ;- c ${}^{3}\Sigma_{u}{}^{-}$ J. Chem. Phys. 126,	Bacskay, T. W. Schmidt s and radiative lifetimes for C systems. 084302 (2007)	2: Swan, Ballik-Ramsay, Phi	llips,
	$\mathbf{h}\nu + \mathbf{C}_2$	Photoexcitation	$1.0~\AA$	$\mathrm{Th}$
659.	M. Glass-Maujean, S Cross sections for range. J. Chem. Phys. 126,	Klumpp, L. Werner, A. Ehresm the ionization continuum o 094306 (2007)	ann, H. Schmoranzer f $H_2$ in the 15.3-17.2 eV en	ergy
	$\mathbf{h} u$ + $\mathbf{H}_2$	Photoionization	15.3-17.2  eV	Exp

660.	<ul> <li>M. Glass-Maujean, S. Klumpp, L. Werner, A. Ehresmann, H. Schmoranzer</li> <li>Study of the B"Boverbar <sup>1</sup>Σ<sub>u</sub><sup>+</sup> state of H<sub>2</sub>: Transition probabilities from the ground state, dissociative widths, and Fano parameters.</li> <li>J. Chem. Phys. 126, 144303 (2007)</li> </ul>		ıe	
	$\mathbf{h}\nu + \mathbf{H}_2$	Photoexcitation	$15.3\text{-}17.2\;\mathrm{eV}$	Exp
661.	F. Innocenti, L. Zuin Measurement of t rameters of S ato ionic-state spectro J. Chem. Phys. 126,	n, M. L. Costa, A. A. Dias, A. Mo the partial photoionization cr ms in the photon energy rar pscopy. 154310 (2007)	rris, S. Stranges, J. M. Dyke coss sections and asymmetry pa nge 10.0-30.0 eV using constan	a- t-
	$h\nu + S$	Photoionization	10-30 eV	Exp
662.	M. Hochlaf, C. Nicol <b>Photoionization o</b> J. Chem. Phys. 127,	as, L. Poisson f $C_4$ molecular beam: Ab init 014310 (2007)	io calculations.	
	$\mathbf{h}\nu + \mathbf{C}_4$	Photoionization	10  eV	$\mathrm{Th}$
663.	S. B. Whitfield, R. W <b>Resonance-induce</b> tion. J. Phys. B 39, L335	Vehlitz, H. R. Varma, T. Banerjee d deviations of $\beta$ from 2.0 for (2006)	, P. C. Deshmukh, S. T. Manson rare gas s-subshell photoioniza	a-
	$h\nu + Kr$	Photoionization	$64-95~{\rm eV}$	E/T
664.	H. Kjeldsen Photoionization cr J. Phys. B 39, R325	ross sections of atomic ions fr (2006)	om merged-beams experiments	
	$h\nu + He^-$	Photodetachment	8-295  eV	E/T
	$\mathbf{h} u + \mathbf{L}\mathbf{i}^{-}$	Photodetachment	8-295  eV	É/T
	$h\nu + B^-$	Photodetachment	8-295  eV	É/T
	$h\nu + C^-$	Photodetachment	8-295  eV	E/T
	$h\nu + Na^-$	Photodetachment	8-295  eV	E/T
	$h\nu + Cl^-$	Photodetachment	8-295  eV	E/T
	$h u + V^-$	Photodetachment	8-295  eV	E/T
	$h u + Cr^-$	Photodetachment	8-295  eV	E/T
	$h\nu + Co^-$	Photodetachment	8-295  eV	E/T
	$h\nu + Ni^-$	Photodetachment	8-295 eV	E/T
	$h\nu + Te^-$	Photodetachment	8-295 eV	E/T
	$h\nu + I^-$	Photodetachment	8-295 eV	E/T
	$h\nu + I^+$	Photoexcitation	8-295 eV	E/T
	$h\nu + I^2$	Photoexcitation	8-295 eV	E/T E/T
	$h\nu + Xe$	Photoexcitation	8-295 eV	E/T E/T
	$n\nu + Ae^{-\omega}$	Photoexcitation	8-295 eV	E/1 E/T
	$n\nu + Cs^+$	Photoexcitation	8-295 eV	E/1 E/T
	$n\nu + Ba^+$	Photoexcitation	8-295 eV 8-205 eV	E/1 E/T
	$n\nu + Da^{+}$	Photoexcitation	8-295 eV	E/I E/T
	$\mu\nu + Da^+$ $h\nu \pm Ta^+$	Photoexcitation	0-290 EV 8 205 oV	ይ/ 1 ፑ /ጥ
	$\mu \mu + \mu a^{3+}$	Photoevertation	0-299 EV 8-205 oV	Ľ/ I F/T
	$h\nu + La$ $h\nu \perp Ca^{4+}$	Photoevertation	0-299 EV 8-205 oV	Ľ/ I F/T
	$h\nu + Ue$	Photoionization	0-299 EV 8-205 oV	Ľ/ 1 F /т
	$h\nu + He^+$	Photoionization	8-295 eV	Б/Т Е/Т
	$\mathbf{n}_{h} \perp \mathbf{n}_{c}$	1 HOUDIOHIZAUIOH	0-230 CV	12/ I

$h\nu + Li$	Photoionization	8-295  eV	E/T
$h\nu + B^+$	Photoionization	8-295  eV	E/T
$h\nu + C^+$	Photoionization	8-295  eV	E/T
$\mathbf{h} u + \mathbf{C}^{2+}$	Photoionization	8-295  eV	E/T
$h\nu + N$	Photoionization	8-295  eV	E/T
$h\nu + N^+$	Photoionization	8-295  eV	E/T
$\mathbf{h} u$ + $\mathbf{N}^{2+}$	Photoionization	8-295  eV	E/T
$\mathbf{h} u + \mathbf{N}^{3+}$	Photoionization	8-295  eV	E/T
$h\nu + O$	Photoionization	8-295  eV	E/T
$h\nu + O^{+-4+}$	Photoionization	8-295  eV	E/T
$\mathbf{h} u + \mathbf{F}^{2+}$	Photoionization	8-295  eV	E/T
$\mathbf{h} u + \mathbf{F}^{3+}$	Photoionization	8-295  eV	E/T
$\mathbf{h} u + \mathbf{F}^{4+}$	Photoionization	8-295  eV	E/T
$h\nu + Ne$	Photoionization	8-295  eV	E/T
$h\nu + Ne^+$	Photoionization	8-295  eV	É/T
$h\nu + Ne^{3+}$	Photoionization	8-295  eV	É/T
$h\nu + Ne^{4+}$	Photoionization	8-295  eV	E/T
$h\nu + Na$	Photoionization	8-295  eV	É/T
$h\nu + Mg^+$	Photoionization	8-295  eV	É/T
$h\nu + Al^+$	Photoionization	8-295  eV	É/T
$h\nu + Al^{2+}$	Photoionization	8-295  eV	É/T
$h\nu + Si^{2+}$	Photoionization	8-295  eV	É/T
$h\nu + S^+$	Photoionization	8-295  eV	E/T
$h\nu + Ar$	Photoionization	8-295  eV	E/T
$h\nu + K^+$	Photoionization	8-295  eV	E/T
$h\nu + Ca^+$	Photoionization	8-295  eV	E/T
$h\nu + Ca^{2+}$	Photoionization	8-295  eV	E/T
$h\nu + Sc^+$	Photoionization	8-295  eV	E/T
$h\nu + Sc^{2+}$	Photoionization	8-295  eV	E/T
$h\nu + Ti^+$	Photoionization	8-295  eV	E/T
$h\nu + Ti^{3+}$	Photoionization	8-295  eV	E/T
$h\nu + V^+$	Photoionization	8-295  eV	E/T
$h\nu + Cr^+$	Photoionization	8-295  eV	É/T
$h\nu + Mn^+$	Photoionization	8-295  eV	É/T
$h\nu + Fe^+$	Photoionization	8-295  eV	É/T
$h\nu + Fe^{4+}$	Photoionization	8-295  eV	É/T
$h\nu + Co^+$	Photoionization	8-295  eV	É/T
$h\nu + Ni^+$	Photoionization	8-295  eV	E/T
$h\nu + Zn^+$	Photoionization	8-295  eV	E/T
$h\nu + Ga^+$	Photoionization	8-295  eV	E/T
$h\nu + Kr$	Photoionization	8-295  eV	E/T
$h\nu + Sr^+$	Photoionization	8-295  eV	E/T
$h\nu + I^+$	Photoionization	8-295  eV	E/T
$h\nu + I^{2+}$	Photoionization	8-295  eV	É/T
$h\nu + Xe$	Photoionization	8-295  eV	É/T
$h\nu + Xe^{+-6+}$	Photoionization	8-295  eV	É/T
$h\nu + Cs$	Photoionization	8-295  eV	—, 1 E/T
$h\nu + Cs^+$	Photoionization	8-295  eV	—, 1 E/T
$h\nu + Ba$	Photoionization	8-295  eV	—, 1 E/T
$h\nu + Ba^+$	Photoionization	8-295  eV	—/ 1 E/T
$h\nu + Ba^{2+}$	Photoionization	8-295  eV	—/ 1 E/T
$h\nu + Ba^{3+}$	Photoionization	8-295  eV	—/ 1 E/T
$h\nu + La^+$	Photoionization	8-295  eV	E/T
$h\nu + La^{3+}$	Photoionization	8-295  eV	—/ 1 E/T
$h\nu + Ce^{4+}$	Photoionization	8-295  eV	E/T
	1 motoromization	0 200 0 1	

665. Z. Chen, A. Z. Msezane

	Random-phase app Effects of inter-she J. Phys. B 39, 4355 (	proximation with exchange fo ell correlations. (2006)	r inner-shell electron transitions:	
	$\mathbf{h}\nu + \mathbf{X}\mathbf{e}^+$	Photoionization	30-140  eV	$\mathrm{Th}$
666.	S. S. Tayal Electron impact ex J. Phys. B 39, 4393 (	ccitation of forbidden and all 2006)	owed transitions in O II.	
	$h\nu + O^+$	Photoexcitation	0.1-40  eV	Th
667.	A. Cerkic, D. B. Mild <b>The contribution</b> <b>to the above-thres</b> J. Phys. B 39, 4419 (	osevic of incoherent photoelectron s hold ionization and detachme (2006)	scattering off neighboring atoms ent spectra.	
	$egin{array}{l} \mathbf{h} u + \mathbf{F}^- \ \mathbf{h} u + \mathbf{H} \end{array}$	Photodetachment Photoionization	0-900 eV 0-900 eV	${ m Th}$ ${ m Th}$
668.	L. Partanen, M. Hutt Effects of electron J. Phys. B 39, 4515 (	cula, SM. Huttula, H. Aksela, S. correlation on the $M_{4,5}NN_{4,5}$ (2006)	Aksela 5 Auger transitions in xenon.	
	$\mathbf{h}\nu + \mathbf{X}\mathbf{e}$	Photoionization	$320\text{-}550~\mathrm{eV}$	$\mathrm{E}/\mathrm{T}$
669.	T. Badr, M. D. Plim: Observation by tw clock transition in Phys. Rev. A 74, 062	mer, P. Juncar, M. E. Himbert, Y o-photon laser spectroscopy of atomic silver. 2509 (2006)	7. Louyer, D.J.E. Knight of the $4d^{10}5s \ ^2S_{1/2}$ -; $4d^95s^2 \ ^2D_{5/2}$	
	$\mathbf{h} u$ + Ag	Photoexcitation	661 nm	Exp
670.	S. Hannemann, E. J. W. Ubachs Frequency metrolo $D_2$ . Phys. Rev. A 74, 062	Salumbides, S. Witte, R. T. Zink ogy on the EF ${}^{1}\Sigma_{g}^{+}$ - $\overset{\cdot}{\iota}$ X ${}^{1}\Sigma_{g}$ 2514 (2006)	stok, EJ. van Duijn, K.S.E. Eikema, + $(0,0)$ transition in $H_2$ , HD, and	
	$\mathbf{h}\nu + \mathbf{H}_2$	Photoexcitation	202-355 nm	Exp
	$h\nu + HD$	Photoexcitation	202-355 nm	Exp
	$h\nu + D_2$	Photoexcitation	202-355 nm	Exp
671.	M. Lu, G. Alna'wash Levenson, A. S. Schla <b>Photoionization ar</b> Phys. Rev. A 74, 062	ni, M. Habibi, M. F. Gharaibeh, achter, C. Cisneros, G. Hinojosa ad electron-impact ionization 2701 (2006)	R. A. Phaneuf, A.L.D. Kilcoyne, E. of $Kr^{3+}$ .	
	h u + Kr <sup>3+</sup>	Photoionization	39-179  eV	Exp
672.	K. Jankala, J. Schulz Svensson, S. Aksela, Effects of initial-st decay of Rb. Phys. Rev. A 74, 062	z, M. Huttula, A. Calo, S. Urpela H. Aksela <b>ate laser excitation on inner</b> - 2704 (2006)	ainen, S. Heinasmaki, S. Fritzsche, S. -shell photoionization and Auger	
	$\mathbf{h} u + \mathbf{R}\mathbf{b}$ $\mathbf{h} u + \mathbf{R}\mathbf{b}$	Photoexcitation Photoionization	200 eV 200 eV	Exp Exp

673.	R. Feifel, T. Tanaka, M. Quenching and restor spectra of CO in the Phys. Rev. A 74, 062717	Hoshino, H. Tanaka, Y. Tame ing of the A ${}^{2}\Pi$ cationic s vicinity of the O ls -; $2\pi$ r (2006)	enori, V. Carravetta, K. Ueda state in resonant Auger electron resonance.	
	$h\nu + CO$	Photoionization	$510\text{-}533~\mathrm{eV}$	Exp
674.	E. Foumouo, G. L. Kamt Theory of multiphoto tems driven by short- Phys. Rev. A 74, 063409	a, G. Edah, B. Piraux n single and double ioniza wavelength electric fields: (2006)	ation of two-electron atomic sys- An ab initio treatment.	
	$egin{array}{l} \mathbf{h} u+\mathbf{H}^-\ \mathbf{h} u+\mathbf{He} \end{array}$	Photoionization Photoionization	11-250  eV 11-250  eV	Th Th
675.	L.A.A. Nikolopoulos, P. I Multiphoton ionizatio Phys. Rev. A 74, 063410	Cambropoulos n of helium under uv rad (2006)	iation: Role of the harmonics.	
	$h\nu + He$	Photoionization	$13 \mathrm{~eV}$	$\mathrm{Th}$
676.	O. Atabek, R. Lefebvre, I Zero-width resonance: Phys. Rev. A 74, 063412	F. X. Gadea s in intense-field molecula (2006)	r photodissociation.	
	$\mathbf{h} u$ + $\mathbf{H}_2^+$	Photodissociation	80 nm	Th
677.	Y. Oezdemir Differential and total elements between Au Nucl. Instrum. Methods	M-shell X-ray production and U at 5.96 keV. Phys. Res. B 256, 581 (2007)	n cross-sections of some selected	
	$h\nu + Au$	Photoionization Db st size i == ti ==	5.96 keV	Exp
	$n\nu + Hg$	Photoionization	5.96 keV 5.96 keV	Exp Evp
	$h\nu + Ph$	Photoionization	5.96 keV	Exp
	$h\nu + Bi$	Photoionization	5.96 keV	Exp
	$h\nu + Dh$ $h\nu + Th$	Photoionization	5.96 keV	Exp
	$h\nu + U$	Photoionization	5.96  keV	Exp
678.	J. Colgan, M. S. Pindzola <b>Triple differential cros</b> Phys. Rev. Lett. 98, 153	a, F. Robicheaux ss sections for the double 001 (2007)	photoionization of $H_2$ .	
	$\mathbf{h} u$ + $\mathbf{H}_2$	Photodissociation	25  eV	$\mathrm{Th}$
	$\mathbf{h} u + \mathbf{H}_2$	Photoionization	$25 \mathrm{eV}$	$\mathrm{Th}$
679.	R. M. Potvliege, S. Vucie Stark-shift induced re Phys. Scr. 74, 655 (2006)	sonances in multiphoton	ionization.	
	$h\nu + Ar$	Photoionization		$\mathrm{Th}$
680.	C. L. Cocke Momentum imaging in Phys. Scr. T110, 9 (2004	n atomic collisions. )		

	$egin{array}{ll} {f h}  u + {f He} \ {f h}  u + {f Ne} \ {f h}  u + {f Ar} \ {f h}  u + {f Ar} \ {f h}  u + {f H}_2 \ {f h}  u + {f D}_2 \end{array}$	Photoionization Photoionization Photoionization Photoionization Photoionization	3.6-8 MeV/u; 1-100 eV; 2 keV 3.6-8 MeV/u; 1-100 eV; 2 keV	E/T E/T E/T E/T E/T
681.	N. Berrah, R. C. Bilodea W. Walter, A. Aguilar <b>Probing negative ions</b> Phys. Scr. T110, 51 (200	u, G. Ackerman, J. D. Bozek, a <b>from within.</b> 94)	G. Turri, B. Rude, N. D. Gibson, C.	
	$egin{array}{l} { m h} u+{ m He}^-\ { m h} u+{ m Li}^-\ { m h} u+{ m B}^- \end{array}$	Photodetachment Photodetachment Photodetachment	57-65  eV 57-65 eV 57-65 eV	Exp Exp Exp
682.	JM. Bizau, JP. Champ A. Compant la Fontaine, <b>L shell photoionisatio</b> Phys. Scr. T110, 57 (200	beaux, D. Cubaynes, C. Blancar A. Girard, F. J. Wuilleumier <b>n of</b> $N^{2+}$ <b>and</b> $O^{3+}$ <b>isoelectr</b> $M^{4}$	rd, D. Hitz, J. Bruneau, J. L. Lemaire,	
	$egin{array}{l} \mathbf{h} u+\mathbf{N}^{2+}\ \mathbf{h} u+\mathbf{O}^{3+} \end{array}$	Photoionization Photoionization	24-100 eV 24-100 eV	E/T E/T
683.	P. Bolognesi, L. Avaldi, Malegat, P. Selles, G. Tu <b>The photodouble ioni</b> Phys. Scr. T110, 62 (200	I. Bray, R. Camilloni, M. Cor urri, M. Zitnik sation of helium and heavi )4)	eno, K. Kazansky, A. S. Kheifets, L.	
	$egin{array}{l} {f h} u+{f He}^+\ {f h} u+{f Ar}^+ \end{array}$	Photoionization Photoionization	30-40 eV 30-40 eV	E/T $E/T$
684.	C. Bordas, F. Lepine, C. <b>Photoionization micro</b> Phys. Scr. T110, 68 (200	Nicole, M.J.J. Vrakking oscopy. 94)		
	$h\nu + Xe$	Photoionization		Exp
685.	N. Saito, A. De Fanis, I. Nuclear dynamics of c by multiple coinciden Phys. Scr. T110, 90 (200	Koyano, K. Ueda core-excited and ionized sm ce momentum imaging tec )4)	all polyatomic molecules probed hnique.	
	$ \begin{aligned} \mathbf{h} \boldsymbol{\nu} + \mathbf{CO}_2 \\ \mathbf{h} \boldsymbol{\nu} + \mathbf{CO}_2 \end{aligned} $	Photodissociation Photoionization	$\begin{array}{c} 290\text{-}292 \ \mathrm{eV} \\ 290\text{-}292 \ \mathrm{eV} \end{array}$	Exp Exp
686.	S. L. Sorensen Fragmentation of mol trons. Phys. Scr. T110, 96 (200	lecules and clusters after $100$	resonant excitation of core elec-	
	$ \begin{aligned} \mathbf{h} \boldsymbol{\nu} &+ \mathbf{N} \mathbf{H}_3 \\ \mathbf{h} \boldsymbol{\nu} &+ \mathbf{N} \mathbf{H}_3 \end{aligned} $	Photodissociation Photoionization	100-400  eV 100-400  eV	Exp Exp
687.	G. G. Paulus, F. Lindner <b>Phase-controlled sing</b> Phys. Scr. T110, 120 (20	r, D. B. Milosevic, W. Becker le-cycle strong-field photoi 004)	onization.	
	$\mathbf{h}\mathbf{\nu} + \mathbf{X}\mathbf{e}$	Photoionization	1.55  eV	Exp

688.	<ul> <li>A. Czasch, M. S. Schoeffler, T. Jahnke, S. Schoessler, M. Hattass, T. Weber, M. Weckenbrock,</li> <li>J. Titze, C. Wimmer, A. Staudte, S. Kammer, S. Voss, R. Doerner, H. Schmidt-Boecking, J.</li> <li>M. Rost, T. Schneider, C. Liu</li> <li>Doubly excited states in helium close to the double ionization threshold: Angular</li> <li>and energy resolved partial cross sections.</li> <li>Phys. Scr. T110, 141 (2004)</li> </ul>			
	$h\nu + He$	Photoionization	$78-79~{\rm eV}$	Exp
689.	A. Chutjian Ion collisions in the high Phys. Scr. T110, 203 (2004	nly charged universe.		
	$egin{array}{l} { m h} u+{ m N}^+ \ { m h} u+{ m O}^+ \end{array}$	Photoionization Photoionization	0-42 eV 0-42 eV	E/T E/T
690.	<ul> <li>A. Emmanouilidou, J. M. R</li> <li>The Coulomb four-body of lithium.</li> <li>J. Phys. B 39, 4037 (2006)</li> </ul>	tost problem in a classical framew	ork: Triple photoionization	
	$h\nu + Li$	Photoionization	220  eV	Th
691.	M. Madine, H. W. van der Resonance effects on the shell and outer-shell elec J. Phys. B 39, 4049 (2006)	Hart le competition between mult ctrons.	iphoton emission of inner-	
	$h\nu + He$	Photoionization	$10^{13} \mathrm{~W}/cm^2$	Th
692.	K. F. Lee, F. Legare, D. M. <b>Measured field-free align</b> J. Phys. B 39, 4081 (2006)	Villeneuve, P. B. Corkum ament of deuterium by few-c	vcle pulses.	
	$egin{array}{l} \mathbf{h} u+\mathbf{H}_2\ \mathbf{h} u+\mathbf{D}_2 \end{array}$	Photoionization Photoionization	$\begin{array}{c} 2x10^{14} \ \mathrm{W}/cm^2 \\ 2x10^{14} \ \mathrm{W}/cm^2 \end{array}$	Th Th
693.	<ul> <li>A. Calo, S. Atanassova, R.</li> <li>The Kr valence photoel the 3d threshold.</li> <li>J. Phys. B 39, 4169 (2006)</li> </ul>	Sankari, A. Kivimaki, H. Aksela, ectron satellite lines in the p	S. Aksela hoton energy region below	
	$h\nu + Kr$	Photoionization	60-88 eV	Exp
694.	J. Wu, H. Zeng, C. Guo <b>Triple-ionization-induce</b> Phys. Rev. A 74, 031404 (2	d dissociation of NO in stron 2006)	g laser fields.	
	h u + NO h u + NO	Photodissociation Photoionization	$\begin{array}{l} 5x10^{13}-6x10^{14}~{\rm W}/cm^2\\ 5x10^{13}-6x10^{14}~{\rm W}/cm^2 \end{array}$	Exp Exp
695.	C. Bouri, P. Selles, L. Male, <b>Parabolic versus spheric</b> <b>He near threshold.</b> Phys. Rev. A 74, 032704 (2	gat, M. G. Kwato Njock cal partial cross sections for pl 2006)	notoionization excitation of	
	$h\nu + He$	Photoionization	80  eV	Th

696.	<ul> <li>V. K. Dolmatov, S. T. Manson</li> <li>Strong final-state term dependence of nondipole photoelectron angular distributions from half-filled shell atoms.</li> <li>Phys. Rev. A 74, 032705 (2006)</li> </ul>			
	$\mathbf{h} u$ + Mn	Photoionization	10-14 eV	$\mathrm{Th}$
697.	K. Alioua, M. Bouledro Classical and quanta of lithium (2s-2p) pe Phys. Rev. A 74, 03271	ua Il studies of the satellite feature erturbed by helium. 1 (2006)	es in the absorption spectra	
	h u + Li	Total Absorption, Scattering	500-3000 K	$\mathrm{Th}$
698.	A. K. Bhatia, W. Eissne Atomic data and spe At. Data Nucl. Data Ta	er ectral line intensities for Fe VIII ables 76, 270 (2000)		
	$\mathbf{h} u$ + $\mathbf{Fe}^{7+}$	Photoexcitation	10-70 Ry	Th
699.	M. B. Trzhaskovskaya, Photoelectron angula photoelectron energy At. Data Nucl. Data Ta	V. I. Nefedov, V. G. Yarzhemsky ar distribution parameters for el y range 100-5000 eV. ables 77, 97 (2001)	ements Z=1 to Z=54 in the	
	$h\nu + H$	Photoionization	100-5000  eV	Th
	$h\nu + He$	Photoionization	100-5000  eV	Th
	$h\nu + Li$	Photoionization	100-5000  eV	Th
	$h\nu + Be$	Photoionization	100-5000  eV	Th
	$h\nu + B$	Photoionization	100-5000  eV	Th
	$h\nu + C$	Photoionization	100-5000  eV	Th
	$h\nu + N$	Photoionization	100-5000  eV	Th
	$h\nu + O$	Photoionization	100-5000  eV	Th
	$h\nu + F$	Photoionization	100-5000  eV	Th
	$h\nu + Ne$	Photoionization	100-5000  eV	Th
	$h\nu + Na$	Photoionization	100-5000  eV	Th
	$h\nu + Mg$	Photoionization	100-5000  eV	Th
	$h\nu + Al$	Photoionization	100-5000  eV	Th
	$h\nu + Si$	Photoionization	100-5000  eV	Th
	$h\nu + P$	Photoionization	100-5000  eV	Th
	$h\nu + S$	Photoionization	100-5000  eV	Th
	$h\nu + Cl$	Photoionization	100-5000  eV	Th
	$h\nu + Ar$	Photoionization	100-5000  eV	Th
	$h\nu + K$	Photoionization	100-5000  eV	Th
	$h\nu + Ca$	Photoionization	100-5000  eV	Th
	$h\nu + Sc$	Photoionization	100-5000  eV	Th
	$h\nu + Ti$	Photoionization	100-5000  eV	Th
	$h\nu + V$	Photoionization	100-5000  eV	Th
	$h\nu + Cr$	Photoionization	100-5000  eV	Th
	$h\nu + Mn$	Photoionization	100-5000  eV	Th
	$h\nu + Fe$	Photoionization	100-5000  eV	Th
	$h\nu + Co$	Photoionization	100-5000  eV	Th
	$h\nu + Ni$	Photoionization	100-5000  eV	Th
	$h\nu + Cu$	Photoionization	100-5000  eV	Th
	$h\nu + Zn$	Photoionization	100-5000  eV	Th
	$\mathbf{h} u$ + Ga	Photoionization	100-5000  eV	Th
	$\mathbf{h}\nu + \mathbf{Ge}$	Photoionization	100-5000  eV	$\mathrm{Th}$

$h\nu + As$	Photoionization	100-5000  eV	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Se}$	Photoionization	100-5000  eV	$\mathrm{Th}$
$h\nu + Br$	Photoionization	100-5000  eV	$\mathrm{Th}$
$h\nu + Kr$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$\mathbf{h} u + \mathbf{R}\mathbf{b}$	Photoionization	100-5000  eV	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Sr}$	Photoionization	100-5000  eV	$\mathrm{Th}$
$h\nu + Y$	Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Zr}$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$h\nu + Nb$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$h\nu + Mo$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$h\nu + Tc$	Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$
$\mathbf{h} u$ + $\mathbf{R}\mathbf{u}$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$\mathbf{h} u$ + $\mathbf{R}\mathbf{h}$	Photoionization	100-5000  eV	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Pd}$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$\mathbf{h} u$ + Ag	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$\mathbf{h} u + \mathbf{Cd}$	Photoionization	100-5000  eV	$\mathrm{Th}$
$\mathbf{h} u$ + In	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$\mathbf{h} u + \mathbf{Sn}$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$h\nu + Sb$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$h\nu + Te$	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$h\nu + I$	Photoionization	100-5000  eV	$\mathrm{Th}$
$h\nu + Xe$	Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$
$h\nu + Cl Z = ?-?$ $h\nu + Cl$ $h\nu + Cl^{+-16+}$ 701. A. K. Bhatia, G. A. Dos Atomic data and spece	Photoexcitation Photoexcitation Photoexcitation chek, W. Eissner ctral line intensities for Fe	• XI.	Th Th Th
At. Data Nucl. Data Ta $\mathbf{h}\boldsymbol{\mu} + \mathbf{F} \mathbf{e}^{10+}$	Photoevcitation	1-75 By	Th
$\mathbf{n}\nu + \mathbf{re}$	1 hotoexcitation	1-10 Ity	111
702. M. B. Trzhaskovskaya, V Photoelectron angula photoelectron energy At. Data Nucl. Data Ta	V. I. Nefedov, V. G. Yarzhems r distribution parameters range 100-5000 eV. bles 82, 257 (2002)	ky for elements Z-55 to Z-100 ir	n the
$h\nu + Ne$	Photoionization	100-5000  eV	$\mathrm{Th}$
$\mathbf{h}\mathbf{\nu} + \mathbf{X}\mathbf{e}$	Photoionization	100-5000  eV	$\mathrm{Th}$
$h\nu + Ba$	Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$
$\mathbf{h} u$ + La	Photoionization	$100\text{-}5000~\mathrm{eV}$	Th
$h\nu + Ce$	Photoionization	100-5000  eV	$\mathrm{Th}$
$h\nu + Pr$	Photoionization	100-5000  eV	$\mathrm{Th}$
$\mathbf{h} u$ + Nd	Photoionization	100-5000  eV	$\mathrm{Th}$
$h\nu + Pm$	Photoionization	100-5000  eV	$\mathrm{Th}$
$\mathbf{h} u$ + Sm	Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$
$\mathbf{h} u$ + Eu	Photoionization	100-5000  eV	$\mathrm{Th}$
$\mathbf{h} u$ + $\mathbf{G}\mathbf{d}$	Photoionization	100-5000  eV	$\mathrm{Th}$
$h\nu + Th$			<b>T</b> 1
	Photoionization	100-5000  eV	Th
h u + Dy	Photoionization Photoionization	$\begin{array}{c} 100\text{-}5000 \text{ eV} \\ 100\text{-}5000 \text{ eV} \end{array}$	Th Th

 $100\text{-}5000\;\mathrm{eV}$ 

 $\mathrm{Th}$ 

Photoionization

 $h\nu + Er$ 

Photoionization	100-5000  eV	$\mathrm{Th}$
Photoionization	100-5000  eV	$\mathrm{Th}$
Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$
Photoionization	100-5000  eV	$\mathrm{Th}$
Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$
Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$
Photoionization	$100-5000 {\rm ~eV}$	$\mathrm{Th}$
Photoionization	$100-5000 {\rm ~eV}$	$\mathrm{Th}$
Photoionization	$100-5000 {\rm ~eV}$	$\mathrm{Th}$
Photoionization	$100\text{-}5000~\mathrm{eV}$	$\mathrm{Th}$
Photoionization	$100-5000 {\rm ~eV}$	$\mathrm{Th}$
Photoionization	100-5000  eV	Th
	Photoionization Photoionization	Photoionization100-5000 eVPhotoionization100-5000 eVPhotoionization<

## 703. H. L. Zhang, D. H. Sampson

Relativistic distorted-wave collision strengths and oscillator strengths for the  $45\Delta = 0$  transitions with n=2 in the 79 O-like ions with 14iZi92.

At. Data Nucl. Data Tables 82, 357 (2002)

$\mathbf{h} u + \mathbf{Si}^{6+}$	Photoexcitation	$0-10,000 \mathrm{~Ry}$	$\mathrm{Th}$
$h\nu + P^{7+}$	Photoexcitation	$0-10,000 { m Ry}$	$\mathrm{Th}$
$h\nu + S^{8+}$	Photoexcitation	0-10,000 Ry	Th
$h\nu + Cl^{9+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Ar}^{10+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u$ + $\mathbf{K}^{11+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{C}\mathbf{a}^{12+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Sc}^{13+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Ti}^{14+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{V}^{15+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{C}\mathbf{r}^{16+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Mn}^{17+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{18+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Co^{19+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u$ + $\mathbf{Ni}^{20+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{C}\mathbf{u}^{21+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Zn}^{22+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{G}\mathbf{a}^{23+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{G}\mathbf{e}^{24+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{As}^{25+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$

$h\nu + Se^{26+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Br^{27+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Kr^{28+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Rb^{29+}$	Photoexcitation	$0-10,000 { m Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Sr}^{30+}$	Photoexcitation	$0-10,000 \mathrm{~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Y}^{31+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Zr^{32+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Nb^{33+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Mo^{34+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Tc^{35+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{R}\mathbf{u}^{36+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Rh^{37+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Pd}^{38+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Ag^{39+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Cd}^{40+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{In}^{41+}$	Photoexcitation	$0\text{-}10,000 \mathrm{~Ry}$	$\mathrm{Th}$
$h\nu + Sn^{42+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Sb^{43+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Te^{44+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{I}^{45+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{X}\mathbf{e}^{46+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Cs^{47+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Ba^{48+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + La^{49+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{C}\mathbf{e}^{50+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Pr^{51+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Nd^{52+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Pm^{53+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Sm^{54+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Eu^{55+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Gd}^{56+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Tb^{57+}$	Photoexcitation	$0\text{-}10,000 \mathrm{~Ry}$	$\mathrm{Th}$
$h\nu + Dy^{58+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Ho^{59+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Er}^{60+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Tm^{61+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Y}\mathbf{b}^{62+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{L}\mathbf{u}^{63+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Hf^{64+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Ta^{65+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{W}^{66+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Re}^{67+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Os^{68+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Ir^{69+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Pt^{70+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Au^{71+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Hg^{72+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Tl^{73+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Pb^{74+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Bi^{75+}$	Photoexcitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Po^{76+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + At^{77+}$	Photoexcitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Rn^{\prime \circ +}$	Photoexcitation	0-10,000 Ry	$\underline{Th}$
$h\nu + Fr'^{9+}$	Photoexcitation	0-10,000 Ry	$\underline{Th}$
$h\nu + Ra^{00+}$	Photoexcitation	0-10,000 Ry	΄Γh
$h\nu + Ac^{\circ 1+}$	Photoexcitation	0-10,000 Ry	΄Γh
$h\nu + Th^{\circ 2+}$	Photoexcitation	0-10,000  Ry	$\mathrm{Th}$

	$egin{array}{l} \mathbf{h} u + \mathbf{Pa}^{81+} \ \mathbf{h} u + \mathbf{U}^{82+} \end{array}$	Photoexcitation Photoexcitation	0-10,000 Ry 0-10,000 Ry	Th Th
704.	A. K. Bhatia, E. Landi, H. I Atomic data and spectra At. Data Nucl. Data Tables	E. Mason Il line intensities for Ni XXI. 83, 71 (2003)		
	$\mathbf{h} u$ + $\mathbf{N}\mathbf{i}^{20+}$	Photoexcitation	85-425 Ry	Th
705.	A. K. Bhatia, R. J. Thomas Atomic data and spectra At. Data Nucl. Data Tables	, E. Landi Il line intensities for Ne III. 83, 113 (2003)		
	$h\nu + Ne^{2+}$	Photoexcitation	5-45 Ry	$\mathrm{Th}$

706. U. I. Safronova, M. Sataka, J. R. Albritton, W. R. Johnson, M. S. Safronova Relativistic many-body calculations of electric-dipole lifetimes, transition rates, and oscillator strengths for n=3 states in Al-like ions. At. Data Nucl. Data Tables 84, 1 (2003)

Photoexcitation Photoexcitation Photoexcitation Photoexcitation	$\begin{array}{r} 10^{-4} - 10^{0} \\ 10^{-4} - 10^{0} \\ 10^{-4} - 10^{0} \\ 10^{-4} - 10^{0} \end{array}$	Th Th Th
Photoexcitation Photoexcitation Photoexcitation	$\frac{10^{-4} - 10^{0}}{10^{-4} - 10^{0}}$ $\frac{10^{-4} - 10^{0}}{10^{-4} - 10^{0}}$	Th Th
Photoexcitation Photoexcitation	$10^{-4} - 10^{0}$ $10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	
Photoevcitation	10 - 10	$\mathrm{Th}$
1 HOUOCACIUATION	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
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Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
	Photoexcitation Photoexcitation	Photoexcitation $10^{-4} - 10^{0}$ <t< th=""></t<>

$\mathbf{h}\nu + \mathbf{T}\mathbf{e}^{39+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{I}^{40+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Xe^{41+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Cs^{42+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Ba^{43+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + La^{44+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{C}\mathbf{e}^{45+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{Pr}^{46+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{N}\mathbf{d}^{47+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Pm^{48+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Sm^{49+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{E}\mathbf{u}^{50+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Gd^{51+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{T}\mathbf{b}^{52+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Dy^{53+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Ho^{54+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Er^{55+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Tm}^{56+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Yb^{57+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{L}\mathbf{u}^{58+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Hf^{59+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h} u$ + $\mathbf{Ta}^{60+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{W}^{61+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{R}\mathbf{e}^{62+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h} u + \mathbf{Os}^{63+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h} u + \mathbf{Ir}^{64+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h} u + \mathbf{Pt}^{65+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h} u + \mathbf{A}\mathbf{u}^{66+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h} u + \mathbf{H}\mathbf{g}^{67+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h} u + \mathbf{Tl}^{68+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h} u + \mathbf{P}\mathbf{b}^{69+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{Bi}^{70+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Po^{71+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{A}\mathbf{t}^{72+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Rn^{73+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{Fr}^{74+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Ra^{75+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{A}\mathbf{c}^{76+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{T}\mathbf{h}^{\gamma\gamma+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Pa^{78+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{U}^{79+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{N}\mathbf{p}^{80+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$\mathbf{h}\nu + \mathbf{P}\mathbf{u}^{81+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Am^{82+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Cm^{83+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Bk^{84+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Cf^{s_{5+}}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Es^{86+}$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Fm^{87+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$

## 707. Neerja, G. P. Gupta, A. N. Tripathi, A. Z. Msezane Energy levels, oscillator strengths, and transition probabilities for fine-structure transitions in Mg-like chlorine. At. Data Nucl. Data Tables 84, 85 (2003)

 $h\nu + Cl^{5+}$ 

Photoexcitation

ned

 $\mathrm{Th}$ 

708.	A. K. Bhatia, G. A. Dosch Atomic data and spect At. Data Nucl. Data Tabl	nek <b>ral line intensities for Fe X</b> les 85, 1 (2003)	ζVII.	
	$\mathbf{h} u$ + $\mathbf{Fe}^{16+}$	Photoexcitation	$58.5\text{-}425~\mathrm{Ry}$	$\mathrm{Th}$
709.	A. K. Bhatia, E. Landi Atomic data and spect At. Data Nucl. Data Tabl	ral line intensities for S IX les 85, 169 (2003)	ζ.	
	$\mathbf{h} u$ + $\mathbf{S}^{8+}$	Photoexcitation	25-125 Ry	$\mathrm{Th}$
710.	A. K. Bhatia, E. Landi Atomic data and spect At. Data Nucl. Data Tabl	ral line intensities for Si V les 85, 317 (2003)	7III.	
	$\mathbf{h} u$ + $\mathbf{Si}^{7+}$	Photoexcitation	20-80 Ry	$\mathrm{Th}$
711.	G. Correge, A. Hibbert <b>Transitions in C II, N</b> At. Data Nucl. Data Tabl	<b>III, and O IV.</b> les 86, 19 (2004)		
	$h\nu + C^+$	Photoexcitation	0-10	$^{\mathrm{Th}}$
	$h\nu + C^{3+}$	Photoexcitation	0-10	$\mathrm{Th}$
	$\mathbf{h} u$ + $\mathbf{N}^{2+}$	Photoexcitation	0-10	Th
712.	G. Liang, G. Dong, J. Zen Atomic data and spect At. Data Nucl. Data Tabl	ng <b>ral line intensities for Ar</b> 2 les 88, 83 (2004)	XIII.	
	$\mathbf{h} u$ + $\mathbf{Ar}^{12+}$	Photoexcitation	$10^5 - 10^7 {\rm K}$	Th
713.	G. P. Gupta, A. Z. Msezar Large scale CIV3 calculand lifetimes in Fe XIV At. Data Nucl. Data Tabl	ne lations of fine-structure en V and Ni XVI. les 89, 1 (2005)	ergy levels, oscillator strengths,	
	$h\nu + Fe^{13+}$	Photoexcitation	$10^{-9} - 10^{0}$	Th
	$h\nu + Ni^{10+}$	Photoexcitation	$10^{-9} - 10^{0}$	Th
714.	R. Karpuskiene, P. Bogda <b>Ab initio oscillator st</b> $2s^22p^23l$ and $2s2p^33l$ in S At. Data Nucl. Data Tabl	novich, A. Udris rengths and transition pr S X. les 89, 45 (2005)	obabilities of transitions from	
	$\mathbf{h} u$ + $\mathbf{S}^{9+}$	Photoexcitation	$10^{-5} - 10^{0}$	$\mathrm{Th}$
715.	J. Y. Zhong, J. Zhang, J. Energy levels, transition ble X-ray line emission At. Data Nucl. Data Tabl	L. Zeng, G. Zhao, M. F. Gu on probabilities, and electrons of Ni-like tantalum ions. les 89, 101 (2005)	on impact excitations for possi-	
	$\mathbf{h} u$ + $\mathbf{Ta}^{45+}$	Photoexcitation	4-600 Ry	$\mathrm{Th}$
716.	W. Eissner, E. Landi, A. I Atomic data and spect At. Data Nucl. Data Tabl	K. Bhatia ral line intensities for Ar 2 les 89, 139 (2005)	XII.	

	$\mathbf{h} u + \mathbf{Ar}^{11+}$	Photoexcitation	35-175 Ry	Th
717.	E. Landi, A. K. Bhatia Atomic data and spectra At. Data Nucl. Data Tables	al line intensities for Ne III. s 89, 195 (2005)		
	$h\nu + Ne^{2+}$	Photoexcitation	5.2-25 Ry	Th
718.	E. Landi, A. K. Bhatia Atomic data and spectra At. Data Nucl. Data Tables	al line intensities for Ca XIV. s 90, 177 (2005)		
	$\mathbf{h} u$ + $\mathbf{Ca}^{13+}$	Photoexcitation	45-255 Ry	Th
719.	J. Zeng, J. Zhong, G. Zhao, Electron impact collision Eu, Gd, Ta, and W ions At. Data Nucl. Data Tables	J. Yuan n strengths and oscillator stre s 90, 259 (2005)	engths for Ni-like Nd, Sm,	
	$egin{array}{l} {f h}  u + {f Nd}^{32+} \ {f h}  u + {f Sm}^{34+} \ {f h}  u + {f Eu}^{35+} \ {f h}  u + {f Gd}^{36+} \ {f h}  u + {f Ta}^{45+} \ {f h}  u + {f W}^{46+} \end{array}$	Photoexcitation Photoexcitation Photoexcitation Photoexcitation Photoexcitation Photoexcitation	5-20,000 eV 5-20,000 eV 5-20,000 eV 5-20,000 eV 5-20,000 eV 5-20,000 eV	Th Th Th Th Th Th
720.	A. K. Bhatia, E. Landi, W. Atomic data and spectra At. Data Nucl. Data Tables	Eissner al line intensities for Mg V. s 92, 105 (2006)		
	${ m h} u + { m Mg}^{4+}$	Photoexcitation	10-50 Ry	Th
721.	F. Wang, B. Gou Relativistic energy, fine lying core-excited states isoelectronic sequence. At. Data Nucl. Data Tables	structure, and hyperfine-structure, $^{5}P(n)$ (n = 1-3) and $^{5}S^{o}(m)$ s 92, 176 (2006)	(m = 1-3) for the Be-like	
	$\mathbf{h}\nu + \mathbf{N}^{3+}$	Photoexcitation	$10^{-2} - 10^{-1}$	$\mathbf{T}\mathbf{h}$
	$h\nu + \Omega^{4+}$	Photoexcitation	$10^{-2} - 10^{-1}$	Th
	$h\nu + F^{5+}$	Photoexcitation	$10^{-2} - 10^{-1}$	Th
	$\mathbf{h} u + \mathbf{N}\mathbf{e}^{6+}$	Photoexcitation	$10^{-2} - 10^{-1}$	Th
722.	W. O. Younis, S. H. Allam, Fine-structure calculation probabilities for sodiume At. Data Nucl. Data Tables	Th. M. El-Sherbini ons of energy levels, oscillator like ions (Co XVII-Kr XXVI s 92, 187 (2006)	r strengths, and transition ).	
	$h\nu + Co^{16+}$	Photoexcitation	$10^{-3} - 10^{0}$	Th
	$h u + Ni^{17+}$	Photoexcitation	$10^{-3} - 10^{0}$	Th
	$\mathbf{h} u + \mathbf{C}\mathbf{u}^{18+}$	Photoexcitation	$10^{-3} - 10^{0}$	Th
	$\mathbf{h} u + \mathbf{Zn}^{19+}$	Photoexcitation	$10^{-3} - 10^{0}$	Th
	$\mathbf{h} u + \mathbf{Ga}^{20+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$
	$\mathbf{h} u + \mathbf{G}\mathbf{e}^{21+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$
	$h\nu + As^{22+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$
	$\mathrm{h} u$ + $\mathrm{Se}^{23+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$
	$h\nu + Br^{24+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$
	$h\nu + Kr^{25+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$

723. M. B. Trzhaskovskaya, V. K. Nikulin, V. I. Nefedov, V. G. Yarzhemsky
Non-dipole second order parameters of the photoelectron angular distribution
for elements Z = 1-100 in the photoelectron energy range 1-10 keV.
At. Data Nucl. Data Tables 92, 245 (2006)

$h\nu + H$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + He$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Li$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Be$	Photoionization	1-10 keV	Th
$h\nu + B$	Photoionization	1-10  keV	Th
$h\nu + C$	Photoionization	1-10  keV	Th
$h\nu + N$	Photoionization	1-10  keV	Th
$h\nu + \Omega$	Photoionization	1-10  keV	Th
$h\nu + C$ $h\nu + F$	Photoionization	1-10  keV	Th
$h\nu + Ne$	Photoionization	1-10  keV	Th
$h\nu + Na$	Photoionization	1-10  keV	Th
$h\nu + Mg$	Photoionization	1-10  keV	Th
$h\nu + Al$	Photoionization	1-10  keV	Th
$h\nu + Si$	Photoionization	1-10  keV	Th
$h\nu + P$	Photoionization	1-10  keV	Th
$h\nu + S$	Photoionization	1-10  keV	Th
$h\nu + Cl$	Photoionization	1-10  keV	Th
$h\nu + Ar$	Photoionization	1-10  keV	Th
$h\nu + K$	Photoionization	1-10  keV	Th
$h\nu + \Omega$ $h\nu + Ca$	Photoionization	1-10  keV	Th
$h\nu + Sc$	Photoionization	1-10  keV	Th
$h\nu + Sc$ $h\nu + Ti$	Photoionization	1-10  keV	Th
$h\nu + V$ $h\nu + V$	Photoionization	1-10  keV	Th
$h\nu + Cr$	Photoionization	1-10  keV	Th
$h\nu + Or$ $h\nu + Mn$	Photoionization	1-10  keV	Th
$h\nu + Fe$	Photoionization	1-10  keV	Th
$h\nu + Co$	Photoionization	1-10  keV	Th
$h\nu + Ni$	Photoionization	1-10  keV	Th
$h\nu + Cu$	Photoionization	1-10  keV	Th
$h\nu + Zn$	Photoionization	1-10  keV	Th
$h\nu + Ga$	Photoionization	1-10  keV	Th
$h\nu + Ge$	Photoionization	1-10  keV	Th
$h\nu + As$	Photoionization	1-10  keV	Th
$h\nu + Se$	Photoionization	1-10 keV	Th
$h\nu + Br$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Kr$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Rb$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Sr$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Y$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Zr$	Photoionization	1-10 keV	$\mathrm{Th}$
$h\nu + Nb$	Photoionization	1-10 keV	$\mathrm{Th}$
$h\nu + Mo$	Photoionization	1-10 keV	$\mathrm{Th}$
$h\nu + Tc$	Photoionization	1-10 keV	$\mathrm{Th}$
$h\nu + Ru$	Photoionization	1-10 keV	$\mathrm{Th}$
$h\nu + Rh$	Photoionization	1-10 keV	$\mathrm{Th}$
$h\nu + Pd$	Photoionization	1-10 keV	$\mathrm{Th}$
$h\nu + Ag$	Photoionization	1-10 keV	Th
$h\nu + Cd$	Photoionization	1-10 keV	Th
$h\nu + In$	Photoionization	1-10 keV	Th
$h\nu + Sn$	Photoionization	1-10 keV	Th
$h\nu + Sb$	Photoionization	1-10 keV	Th
$h\nu + Te$	Photoionization	1-10 keV	Th

$h\nu + I$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Xe$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Cs$	Photoionization	1-10  keV	Th
$h\nu + Ba$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + La$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Ce$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Pr$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Nd$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Pm$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Sm$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Eu$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Gd$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Tb$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Dy$	Photoionization	1-10  keV	Th
$h\nu + Ho$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Er$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Tm$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Yb$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Lu$	Photoionization	1-10  keV	$\mathrm{Th}$
$h\nu + Hf$	Photoionization	1-10  keV	Th
$h\nu + Ta$	Photoionization	1-10  keV	Th
$h\nu + W$	Photoionization	1-10  keV	Th
$h\nu + Re$	Photoionization	1-10  keV	Th
$h\nu + Os$	Photoionization	1-10  keV	Th
$h\nu + Ir$	Photoionization	1-10 keV	Th
$h\nu + Pt$	Photoionization	1-10 keV	Th
$h\nu + Au$	Photoionization	1-10 keV	Th
$h\nu + Hg$	Photoionization	1-10 keV	Th
$h\nu + Tl$	Photoionization	1-10 keV	Th
$h\nu + Pb$	Photoionization	1-10 keV	Th
$n\nu + B_1$	Photoionization	1-10 keV	
$n\nu + Po$	Photoionization	1-10 KeV	
$n\nu + At$	Photoionization	1-10 KeV	1 II Th
$n\nu + nn$	Photoionization	1-10  keV 1 10 keV	111 Th
$h\nu + Pr$	Photoionization	1 - 10  keV	111 Th
$h\nu + ha$	Photoionization	1-10  keV 1-10  keV	
$h\nu + Ac$ $h\nu \perp Pa$	Photoionization	1-10  keV 1-10  keV	Th
$h\nu + Ia$ $h\nu + II$	Photoionization	1-10 keV	Th
$h\nu + 0$ $h\nu + Nn$	Photoionization	1-10  keV	Th
$h\nu + Pu$	Photoionization	1-10  keV	Th
$h\nu + Am$	Photoionization	1-10  keV	Th
$h\nu + Cm$	Photoionization	1-10  keV	Th
$h\nu + Bk$	Photoionization	1-10  keV	Th
$h\nu + Cf$	Photoionization	1-10  keV	Th
$h\nu + Es$	Photoionization	1-10  keV	Th
$h\nu + Fm$	Photoionization	1-10  keV	Th

724. E. Landi, A. K. Bhatia

Atomic data and spectral line intensities for Ar XI. At. Data Nucl. Data Tables 92, 305 (2006)

$\mathbf{h}\nu + \mathbf{Ar}^{10+}$	Photoexcitation	30-150 Ry	$\mathrm{Th}$
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725. J. Y. Zhong, G. Zhao, J. Zhang Energy levels, transition probabilities, and electron impact excitations for La XXX.

At. Data Nucl. Data Tables 92, 481 (2006)

 $h\nu + La^{29+}$ 

726. C. F. Fischer, G. Tachiev, A. Irimia

Relativistic energy levels, lifetimes,	and transition	probabilities	for the	sodium-
like to argon-like sequences.				

At. Data Nucl. Data Tables 92, 607 (2006)

$h\nu + Na$	Photoexcitation	$10^{-4} - 10^{0}$	Th
$h\nu + Mg$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Mg^+$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Al$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Al^+$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Al}^{2+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Si$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Si^+$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$\mathbf{h} u$ + $\mathbf{Si}^{2+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Si}^{3+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + P$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + P^{+-4+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + S$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + S^{+-5+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Cl$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Cl^{+-6+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Ar$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Ar^{+-7+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + K^{+-8+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Ca^{2+-9+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Sc^{3+-10+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Ti^{4+-11+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + V^{5+-12+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Cr^{6+-13+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$h\nu + Mn^{7+-14+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{8+15+}$	Photoexcitation	$10^{-4} - 10^{0}$	$\mathrm{Th}$
E. Landi, A. K. Bhatia			

727. E. Landi, A. K. Bhatia
Atomic data and spectral line intensities for Mg VI.
At. Data Nucl. Data Tables 93, 1 (2007)

$\mathbf{h} u + \mathbf{Mg}^{5+}$	Photoexcitation	12-60 Ry	$\mathrm{Th}$
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728. M. Mohan, A. K. Singh, A.K.S. Jha, P. Jha

Level energies, oscillator strengths, and lifetimes for transitions in Ti VI. At. Data Nucl. Data Tables 93, 105 (2007)

10 - 10	$\mathbf{h} u$ + $\mathbf{Ti}^{5+}$	Photoexcitation	$10^{-3} - 10^{0}$	$\mathrm{Th}$
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729. S. Kahane

Incoherent scattering cross sections for some ions of solar abundance. At. Data Nucl. Data Tables 93, 183 (2007)

$h\nu + He$	Elastic Scattering	$1-20,000 {\rm ~keV}$	$\mathrm{Th}$
$h\nu + He^+$	Elastic Scattering	$1-20,000 {\rm ~keV}$	$\mathrm{Th}$
$h\nu + C$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$
$h\nu + C^{+-5+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$
$h\nu + N$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$
$h\nu + N^{+-5+}$	Elastic Scattering	1-20,000  keV	$\mathrm{Th}$
$h\nu + O$	Elastic Scattering	$1-20,000 {\rm ~keV}$	$\mathrm{Th}$

	$\mathbf{h}\nu + \mathbf{O}^{+-7+}$	Elastic Scattering	1-20,000  keV	Th
	$\mathbf{h}\nu + \mathbf{Ne}$	Elastic Scattering	1-20,000  keV	Th
	$\mathbf{h}\nu + \mathbf{N}\mathbf{e}^{+-9+}$	Elastic Scattering	$1-20,000 {\rm ~keV}$	Th
	$\mathbf{h}\nu + \mathbf{Mg}$	Elastic Scattering	$1-20,000 {\rm ~keV}$	Th
	$\mathbf{h}\nu + \mathbf{Mg}^{+-10+}$	Elastic Scattering	$1-20,000 {\rm ~keV}$	Th
	$h\nu + Si$	Elastic Scattering	1-20,000  keV	Th
	$\mathbf{h}\nu + \mathbf{Si}^{+-10+}$	Elastic Scattering	$1-20,000 {\rm ~keV}$	Th
	$h\nu + S$	Elastic Scattering	$1-20,000 {\rm ~keV}$	Th
	$h\nu + S^{+-10+}$	Elastic Scattering	1-20,000  keV	Th
	$\mathbf{h}\nu + \mathbf{Ar}$	Elastic Scattering	$1-20,000 {\rm ~keV}$	Th
	$\mathbf{h}\nu + \mathbf{Ar}^{+-10+}$	Elastic Scattering	1-20,000  keV	Th
	$\mathbf{h}\nu + \mathbf{Fe}$	Elastic Scattering	1-20,000  keV	Th
	$h\nu + Fe^{+-10+}$	Elastic Scattering	1-20,000  keV	Th
730.	J. Zeng, G. Zhao, J. Yuan Electron impact collisi Cu-, Ni-, and Co-like A At. Data Nucl. Data Tabl	on strengths and oscillato au ions. es 93, 199 (2007)	or strengths for Ge-, Ga-, Zn-,	
	$\mathbf{h}\nu + \mathbf{A}\mathbf{u}^{47+\underline{5}2+}$	Photoexcitation	5-40,000  eV	Th
731.	A. K. Bhatia, E. Landi Atomic data and spect At. Data Nucl. Data Tabl	ral line intensities for Si X es 93, 275 (2007)	Ί.	
	$\mathbf{h} u + \mathbf{Si}^{10+}$	Photoexcitation	35-175 Ry	$\mathrm{Th}$
732.	N. C. Deb, A. Hibbert Breit-Pauli energy leve E1 transitions among t At. Data Nucl. Data Tabl	Is belonging to $2p^4$ , $2s2p^5$ , these levels in Mg V. es 93, 585 (2007)	$2p^6, 2p^3 3\ell$ configurations and all	
	$\mathbf{h} u + \mathbf{Mg}^{4+}$	Photoexcitation	$10^{-7} - 10^{0}$	$\mathrm{Th}$
733.	K. M. Aggarwal, V. Tayal <b>Energy levels and radia</b> At. Data Nucl. Data Tabl	, G. P. Gupta, F. P. Keenan tive rates for transitions in es 93, 615 (2007)	Mg-like iron, cobalt and nickel.	
	$\mathbf{h}_{\mu} \perp \mathbf{F} \mathbf{e}^{14+}$	Photoevcitation	$10^{-15} - 10^{0}$	$\mathbf{T}\mathbf{h}$
	$h\nu + Co^{15+}$	Photoexcitation	$10^{-15} - 10^{0}$	Th
	$\mathbf{h} u + \mathbf{N}\mathbf{i}^{16+}$	Photoexcitation	$10^{-15} - 10^{0}$	Th
734.	A. K. Bhatia, E. Landi Atomic data and spect At. Data Nucl. Data Tabl	ral line intensities for Mg es 93, 742 (2007)	IX.	
	$\mathbf{h} u + \mathbf{M}\mathbf{g}^{8+}$	Photoexcitation	$25\text{-}125 \mathrm{~Ry}$	Th
	3.2.2 Electron Col	lisions		
735.	S. Fritzsche, A. Surzhykov Radiative recombinatio	, T. Stoehlker on into high-Z few-electron	ions: Cross sections and angu-	

**lar distributions.** Phys. Rev. A 72, 012704 (2005)

$\mathbf{e} + \mathbf{U}^{89+}$	Angular Scattering	$2.18-218 { m MeV/u}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{U}^{91+}$	Angular Scattering	2.18-218  MeV/u	$\mathrm{Th}$
$\mathbf{e} + \mathbf{U}^{89+}$	Recombination	2.18-218  MeV/u	$\mathrm{Th}$
$e + U^{91+}$	Recombination	$2.18\text{-}218 \ \mathrm{MeV/u}$	$\mathrm{Th}$

736.	D. V. Fursa, I. Bray, R. Panajotovic, D. Sevic, V. Pejcev, D. M. Filipovic, B. P. Marinkovic <b>Excitations of</b> <sup>1</sup> <i>P</i> <b>levels of zinc by electron impact on the ground state.</b> Phys. Rev. A 72, 012706 (2005)			
	$\mathbf{e} + \mathbf{Zn} \\ \mathbf{e} + \mathbf{Zn}$	Angular Scattering Excitation	15-60 eV 15-60 eV	${ m E/T} { m E/T}$
737.	H. B. Pedersen, H. Buhr, S. Ruette, E. M. Staicu-Casagr Dissociative recombination lium dimer ion. Phys. Rev. A 72, 012712 (20)	Altevogt, V. Andrianarijaona, H ande, D. Schwalm, D. Strasser, X on and low-energy inelastic el 005)	I. Kreckel, L. Lammich, N. de . Urbain, D. Zajfman, A. Wolf ectron collisions of the he-	
	$egin{array}{lll} \mathbf{e} + \mathbf{H} \mathbf{e}_2^+ \ \mathbf{e} + \mathbf{H} \mathbf{e}_2^+ \ \mathbf{e} + \mathbf{H} \mathbf{e}_2^+ \end{array}$	Dissociation Recombination Excitation	$10^{-4} - 50 \text{ eV}$ $10^{-4} - 50 \text{ eV}$ $10^{-4} - 50 \text{ eV}$	Exp Exp Exp
738.	HD. Cheng, LF. Zhu, ZS Generalized oscillator str Phys. Rev. A 72, 012715 (20	S. Yuan, XJ. Liu, JM. Sun, W. rengths for the valence-shell 6 005)	-C. Jiang, KZ. Xu excitations of neon.	
	e + Ne	Excitation	$2500~{\rm eV}$	$\mathrm{E}/\mathrm{T}$
739.	M. S. Pindzola, F. Robichea Electron-impact excitation distorted-wave method. Phys. Rev. A 72, 012716 (20)	ux, J. A. Ludlow, J. Colgan, D. Con and ionization of $H_2^+$ usin 005)	C. Griffin ng a configuration-average	
	$\mathbf{e} + \mathbf{H}_2^+ \ \mathbf{e} + \mathbf{H}_2^+$	Excitation Ionization	10-250 eV 10-250 eV	$_{\mathrm{Th}}$
740.	M.H.F. Bettega, M.A.P. Lim Addendum to "Elastic so Phys. Rev. A 72, 014702 (20	na, L. G. Ferreira cattering of low-energy electr 005)	ons by OCS".	
	e + OCS	Elastic Scattering	0-2  eV	$\mathrm{Th}$
741.	J. Gao, D. H. Madison, J. L Fully differential cross so trogen molecules. Phys. Rev. A 72, 020701 (20	. Peacher ections for low-energy electro 005)	on-impact ionization of ni-	
	$\mathbf{e} + \mathbf{N}_2$	Ionization	$35.6\text{-}400\;\mathrm{eV}$	$\mathrm{Th}$
742.	O. I. Zatsarinny, K. Bartscha Benchmark calculations : Phys. Rev. A 72, 020702 (20	at for electron collisions with Fe 005)	<sub>2</sub> +.	
	$e + Fe^+$	Excitation	0-10 Ry	$\mathrm{Th}$
743.	V. Kokoouline, C. H. Greene Theoretical study of diss tion to $H_2D^+$ and $D_2H^+$ . Phys. Rev. A 72, 022712 (20	ociative recombination of $C_{2n}$	u triatomic ions: Applica-	
	$\mathbf{e} + \mathbf{H}_3{}^+$	Dissociation	$10^{-3} - 10 \text{ eV}$	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{H}_2 \mathbf{D}^+$	Dissociation	$10^{-3} - 10 \text{ eV}$	Th
	$e + HD_2^+$	Dissociation	$10^{-3} - 10 \text{ eV}$ $10^{-3} - 10 \text{ eV}$	Th Th
	$\mathbf{e} + \mathbf{n}_3'$ $\mathbf{e} + \mathbf{H}_2 \mathbf{D}^+$	Recombination	$10^{-3} - 10 \text{ eV}$ $10^{-3} - 10 \text{ eV}$	1 n Th
	$\mathbf{e} + \mathbf{H}_2 \mathbf{D}^+$	Recombination	$10^{-3} - 10 \text{ eV}$	Th

744.	J. Royal, A. E. Orel <b>Dissociative recombinat</b> Phys. Rev. A 72, 022719 (2	ion of $He_2^+$ . 2005)		
	$\mathbf{e} + \mathbf{H} \mathbf{e}_2^{2+}$	Dissociation	1-15  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{H} \mathbf{e}_2^{2+}$	Recombination	1-15  eV	$\mathrm{Th}$
745.	R. O. Jung, J. B. Boffard, I Electron-impact excitati Phys. Rev. A 72, 022723 (2	L. W. Anderson, C. C. Lin ion cross sections from the xe 2005)	enon J=2 metastable level.	
	e + Xe	Excitation	0.5-10  eV	Exp
746.	J. N. Das, S. Paul, K. Chal- Ionization of hydrogen threshold. Phys. Rev. A 72, 022725 (2	arabarti <b>atoms by electron impact at</b> 2005)	5 1, 0.5, and 0.3 eV above	
	e + H	Ionization	15  eV	$\mathrm{Th}$
747.	K. Bartschat, O. Vorov Channel-coupling, targe ionization of Ar(3p) and Phys. Rev. A 72, 022728 (2	t-structure, and second-order l Ar(3s). 2005)	r effects in electron-impact	
	$\mathbf{e} + \mathbf{Ar}$	Ionization	113.5-200  eV	$\mathrm{Th}$
748.	S. E. Michelin, O. Pessoa, H I. Iga, MT. Lee <b>Inner-shell excitation of</b> Phys. Rev. A 72, 022730 (2	H. L. Oliveira, E. Veiteinheimer, A acetylene by electron impact 2005)	M.S. Santos, M. M. Fujimoto,	
	$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$	Excitation	$300\text{-}800~\mathrm{eV}$	$\mathrm{Th}$
749.	S.W.J. Scully, V. Senthil, J. Direct evidence of a stree $C_3H_4$ . Phys. Rev. A 72, 030701 (2)	A. Wyer, M. B. Shah, E. C. Montong isomer effect in electron-i	tenegro, M. Kimura, H. Tawara impact double ionization of	
	$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_4$	Ionization	25-1000  eV	Exp
750.	A. Larson, A. E. Orel Wave-packet study of the Phys. Rev. A 72, 032701 (2	e products formed in dissociat 2005)	ive recombination of $HeH^+$ .	
	$f e + HeH^+ \ e + HeH^+$	Dissociation Recombination	0-2 eV 0-2 eV	Th Th
751.	A. Prideaux, D. H. Madison Exchange distortion and impact ionization of arg Phys. Rev. A 72, 032702 (2	n, K. Bartschat postcollision interaction for in on. 2005)	ntermediate-energy electron-	
	e + Ar e + Ar	Angular Scattering Ionization	$\begin{array}{c} 113.5\text{-}200 \text{ eV} \\ 113.5\text{-}200 \text{ eV} \end{array}$	Th Th

752.	N. Watanabe, Y. Kha Chuluunbaatar, K. A. (e,2e) and (e,3-1e) s Phys. Rev. A 72, 032	ajuria, M. Takahashi, Y. Uda Kouzakov studies on double processe 705 (2005)	gawa, P. S. Vinitsky, Yu. V. Popov, s of He at large momentum transfe	O. er.
	e + He	Ionization	2080  eV	E/T
753.	M. Barbatti, A. B. Ro Young-type interfer impact. Phys. Rev. A 72, 032	ocha, C. E. Bielschowsky <b>rence pattern in molecula</b> 711 (2005)	r inner-shell excitations by electro	on
	$e + CO_2$	Excitation	250-500 eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{C}_4 \mathbf{H}_6$	Excitation	250-500  eV	Th
	Phys. Rev. A 72, 032 $e + Pb^{+-10+}$	713 (2005) Ionization	0-1000 eV	$\mathrm{E/T}$
755.	M. A. Uddin, A.K.F. Electron-impact ion Phys. Rev. A 72, 032	Haque, A. K. Basak, K. R. K nization of hydrogen and 1 713 (2005)	arim, B. C. Saha lithiumlike systems.	
	· ·			
	e + H	Ionization	10-10,000 eV	$\frac{\mathrm{Th}}{\mathrm{-}}$
	$e + He^+$	Ionization	10-10,000 eV	Th
	e + Li	Ionization	10-10,000 eV	Th
	$e + C^{3+}$	Ionization	10-10,000 eV	Th
	$\mathbf{e} + \mathbf{N}^{++}$	Ionization	10-10,000 eV	Th
	$\mathbf{e} + \mathbf{N}^{0+}$	Ionization	10-10,000 eV	Th
	$e + 0^{7+}$	Ionization	10-10,000 eV	Th
	e + 0''	Ionization	10-10,000 eV	
	$e + 1Ne^{-1}$	Ionization	10-10,000 eV	
	$e + 11^{\circ}$	Ionization	10-10,000 eV	1 N Th
	$\mathbf{e} + \mathbf{v}^{21+}$	Ionization	10-10,000 eV	1 fl Th
	e + Or	Ionization	10-10,000  eV	111 Th
	e + mn	TOHIZATION	10-10,000 ev	111

$\mathbf{e} + \mathbf{M} \mathbf{n}^{22+}$	Ionization	10-10,000  eV
$\mathbf{e} + \mathbf{F} \mathbf{e}^{23+}$	Ionization	10-10,000  eV
$\mathbf{e} + \mathbf{Mo}^{41+}$	Ionization	10-10,000  eV
$\mathbf{e}$ + $\mathbf{D}\mathbf{y}^{65+}$	Ionization	10-10,000  eV
$\mathbf{e} + \mathbf{U}^{89+}$	Ionization	10-10,000  eV
$\mathbf{e} + \mathbf{U}^{90+}$	Ionization	10-10,000  eV
$\mathbf{e} + \mathbf{U}^{91+}$	Ionization	10-10,000  eV

Th Th Th Th Th Th

756. J. Gao, D. H. Madison, J. L. Peacher Interference effects for low-energy electron-impact ionization of nitrogen molecules. Phys. Rev. A 72, 032721 (2005)

$\mathbf{e} + \mathbf{N}_2$	Angular Scattering	75.6  eV	Th
$\mathbf{e} + \mathbf{N}_2$	Ionization	75.6  eV	Th

757. J. A. Ludlow, S. D. Loch, M. S. Pindzola Electron-impact ionization of  $Mo^+$ . Phys. Rev. A 72, 032729 (2005)

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758. K. M. Dunseath, M. Terao-Dunseath, G. Bourhis Selection rules for laser-assisted electron-atom collisions with the laser field normal to the scattering plane. Phys. Rev. A 72, 033410 (2005)

e + He	Elastic Scattering	4-22  eV	$\mathrm{Th}$
e + He	Angular Scattering	4-22  eV	$\mathrm{Th}$

759. L. U. Ancarani, P.-A. Hervieux

Scaling law for total electron-impact ionization cross sections of Li-like ions. Phys. Rev. A 72, 034701 (2005)

$e + Be^+$	Ionization	0-200  eV	E/T
$\mathbf{e} + \mathbf{B}^{2+}$	Ionization	0-200  eV	É/T
$\mathbf{e} + \mathbf{C}^{3+}$	Ionization	0-200  eV	É/T
$\mathbf{e} + \mathbf{N}^{4+}$	Ionization	0-200  eV	É/T
$e + O^{5+}$	Ionization	0-200  eV	É/T
$\mathbf{e} + \mathbf{F}^{6+}$	Ionization	0-200  eV	É/T
$\mathbf{e} + \mathbf{N}\mathbf{e}^{7+}$	Ionization	0-200  eV	É/T
$e + Na^{8+}$	Ionization	0-200  eV	É/T
$\mathbf{e} + \mathbf{M} \mathbf{g}^{9+}$	Ionization	0-200  eV	É/T
$\mathbf{e} + \mathbf{Al}^{\overline{10}+}$	Ionization	0-200  eV	E/T

760. F. Fremont, C. Leclercq, A. Hajaji, A. Naja, P. Lemennais, S. Boulbain, V. Broquin, J.-Y. Chesnel

Fragment emission following multiple ionization in 20-200-eV  $e^- + H_2O$  collisions. Phys. Rev. A 72, 042702 (2005)

$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Dissociation	20-200  eV	Exp
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Ionization	20-200  eV	Exp

761. O. Sueoka, C. Makochekanwa, H. Tanino, M. Kimura

Total cross-section measurements for positrons and electrons colliding with alkane molecules: Normal hexane and cyclohexane. Phys. Rev. A 72, 042705 (2005)

$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{12}$ Elastic Scattering 0.4-1000 eV	Exp
$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{14}$ Excitation 0.4-1000 eV	$\operatorname{Exp}$
$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{12}$ Excitation 0.4-1000 eV	$\operatorname{Exp}$
$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{14}$ Ionization 0.4-1000 eV	$\operatorname{Exp}$
$\mathbf{e} + \mathbf{C}_6 \mathbf{H}_{12}$ Ionization 0.4-1000 eV	Exp

762. J. Zeng, J. Wu, F. Jin, G. Zhao, J. Yuan Cross sections for electron-impact excitation of krypton from the levels of  $4p^6$ ,  $4p^55s$ , and  $4p^55p$  configurations. Phys. Rev. A 72, 042707 (2005)

e + Kr	Elastic Scattering	1.5-30  eV	$\mathrm{Th}$
${ m e}+{ m Kr}^*$	Elastic Scattering	1.5-30  eV	$\mathrm{Th}$
e + Kr	Excitation	1.5-30  eV	$\mathrm{Th}$
$e + Kr^*$	Excitation	1.5-30  eV	$\mathrm{Th}$

763. G. F. Collins, D. J. Pegg, K. Fritioff, J. Sandstroem, D. Hanstorp, R. D. Thomas, F. Hellberg, A. Ehlerding, M. Larsson, F. Osterdahl, A. Kaellberg, H. Danared **Electron-impact fragmentation of** Cl<sub>2</sub><sup>-</sup>. Phys. Rev. A 72, 042708 (2005)

	$\mathbf{e} + \mathbf{Cl}_2^- \ \mathbf{e} + \mathbf{Cl}_2^-$	Dissociation Detachment	$\begin{array}{c} 0-200 \ {\rm eV} \\ 0-200 \ {\rm eV} \end{array}$	$\operatorname{Exp}$
764.	X. G. Ren, C. G. Ni <b>Ionization excitat</b> Phys. Rev. A 72, 04	ng, J. K. Deng, G. L. Su, S. F. Z ion of helium by the (e,2e) n 2718 (2005)	Zhang, Y. R. Huang, G. Q. Li reaction.	
	e + He e + He	Excitation Ionization	$\begin{array}{c} 1000\text{-}1600 \ \mathrm{eV} \\ 1000\text{-}1600 \ \mathrm{eV} \end{array}$	$\operatorname{Exp}$
765.	C. Winstead, V. Mc. Elastic electron so Phys. Rev. A 72, 04	Koy, M.H.F. Bettega cattering by ethylene, $C_2H_4$ . 2721 (2005)		
	$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4 \\ \mathbf{e} + \mathbf{C}_2 \mathbf{H}_4 \\ \mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Elastic Scattering Angular Scattering Total Scattering	0.5-20 eV 0.5-20 eV 0.5-20 eV	Th Th Th
766.	S. Mondal, R. Shank Differential cross- in 10-28-keV $e^-$ – Phys. Rev. A 72, 05	ter section measurements of mut Xe collisions. 2705 (2005)	ltiply charged xenon ions produ	uced
	e + Xe	Ionization	10-28  keV	Exp
767.	S. D. Loch, J. A. Lu Electron-impact is Phys. Rev. A 72, 05	dlow, M. S. Pindzola, A. D. Wh pnization of atomic ions in t 2716 (2005)	iteford, D. C. Griffin he W isonuclear sequence.	
	$\mathbf{e} + \mathbf{W}^{+-73+}$	Ionization	0-250  keV	$\mathrm{Th}$
768.	D. A. Erwin, J. A. H Electron-impact d Phys. Rev. A 72, 05	Kunc lissociation of the methane 1 2719 (2005)	nolecule into neutral fragment	s.
	$\mathbf{e} + \mathbf{CH}_4$	Dissociation	0-500  eV	$\mathrm{Th}$
769.	A. Chattopadhyay, G Ionization of a hy of a laser field. Phys. Rev. A 72, 05	C. Sinha drogenic ion by electron an 3406 (2005)	d positron impact in the prese	ence
	${ m e}+{ m He}^+$	Ionization	$200\text{-}500~\mathrm{eV}$	Th
770.	C. Champion, J. Ha Erratum: Influen sections for the ( (2001)]. Phys. Rev. A 72, 05	nssen, P. A. Hervieux ce of molecular orientation e,2e) process on a water mo 9906(E) (2005)	on the multiple differential co blecule [Phys. Rev. A 63, 052	ross 720
	$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Ionization	$25 {\rm ~eV}$	$\mathrm{Th}$
771.	J. P. Marler, C. M. Systematic compa brational mode of Phys. Rev. A 72, 06	Surko arison of positron- and elect $CF_4$ . 2702 (2005)	ron-impact excitation of the $ u_3$	vi-
	$\mathbf{e} + \mathbf{CF}_4$	Excitation	0.1-2  eV	Exp

772. A. J. Murray

(e,2e) ionization studies of alkaline-earth-metal and alkali-earth-metal targets: Na, Mg, K, and Ca, from near threshold to beyond intermediate energies. Phys. Rev. A 72, 062711 (2005)

	e + Na	Angular Scattering	10-75  eV	Exp
	e + Mg	Angular Scattering	10-75  eV	Exp
	e + K	Angular Scattering	10-75  eV	Exp
	e + Ca	Angular Scattering	10-75  eV	Exp
	e + Na	Ionization	10-75  eV	Exp
	e + Mg	Ionization	10-75  eV	Exp
	e + K	Ionization	10-75  eV	Exp
	e + Ca	Ionization	10-75  eV	Exp
773.	E. Schow, K. Hazlett Khakoo <b>Low-energy electro</b> Phys. Rev. A 72, 062	t, J. G. Childers, C. Medina, G. on-impact ionization of helium 2717 (2005)	Vitug, I. Bray, D. V. Fursa, T.	М. А.
	e + He	Angular Scattering	26.3-40.7  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{H}\mathbf{e}$	Ionization	$26.3\text{-}40.7\;\mathrm{eV}$	$\mathrm{Th}$
774.	C. S. Trevisan, A. E. <b>Resonant electron</b> -Phys. Rev. A 72, 062	Orel, T. N. Rescigno <b>CF collision processes.</b> 2720 (2005)		
	e + CF	Attachment	0-2  eV	$\mathrm{Th}$
	e + CF	Dissociation	0-2  eV	$\mathrm{Th}$
	e + CF	Excitation	0-2  eV	$\mathrm{Th}$
775.	S. Mondal, R. Shanke Coincidence electr gon. Phys. Rev. A 72, 062	er on spectroscopy of electron-in 2721 (2005)	npact multiple ionization o	of ar-
	$o \perp \Lambda r$	Angular Scattering	12-24 keV	Evn
	e + Ar	Ionization	12-24 KeV 12-24 keV	Exp
	e + AI	Tomzation	12-24 KCV	Exp
776.	A. Zecca, C. Perazzol <b>Positron and elect</b> J. Phys. B 38, 2079 (	li, M. J. Brunger ron scattering from tetrahydr 2005)	ofuran.	
	$\mathbf{e} + \mathbf{C}_4 \mathbf{H}_8 \mathbf{O}$	Elastic Scattering	2-21 eV	Exp
777.	M.H.F. Bettega, M.A Electron collisions J. Phys. B 38, 2087 (	P. Lima, L. G. Ferreira with $CS_2$ . 2005)		
	$e + CS_{2}$	Elastic Scattering	0-10 eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{CS}_2$	Angular Scattering	0-10  eV	Th
	5 1 052	ingua paweing	0 10 0 1	<b>1</b> 11
778.	<ul> <li>A. R. Milosavljevic, V</li> <li>P. Marinkovic</li> <li>Elastic scattering of</li> <li>J. Phys. B 38, 2195 (</li> </ul>	V. I. Kelemen, D. M. Filipovic, S. of electrons by krypton in the 2005)	M. Kazakov, V. Pejcev, D. Sev energy range 20-260 eV.	vic, B.

e + Kr	Elastic Scattering	20-260  eV	E/T
e + Kr	Angular Scattering	20-260  eV	E/T

779.	I. Iga, P. Rawat, I. P. Sanch An experimental study of the low and intermediate J. Phys. B 38, 2319 (2005)	es, MT. Lee, M.G.P. Homem n elastic electron-trifluorome e energy ranges.	$ethane (CHF_3)$ scattering in	
	$\mathbf{e} + \mathbf{CHF}_3$ $\mathbf{e} + \mathbf{CHF}_3$	Elastic Scattering Angular Scattering	20-500 eV 20-500 eV	Exp Exp
780.	S. Milisavljevic, D. Sevic, R Marinkovic Differential and integrat calcium atom. J. Phys. B 38, 2371 (2005)	. K. Chauhan, V. Pejcev, D. M.	Filipovic, R. Srivastava, B. P. stic electron scattering by	
	e + Ca	Elastic Scattering	$10-100 {\rm eV}$	$\mathrm{E}/\mathrm{T}$
781.	R. K. Chauhan, R. Srivastav Electron impact excitation J. Phys. B 38, 2385 (2005)	va, A. D. Stauffer on of the $4^1P_1$ state of calcium	m.	
	e + Ca	Excitation	10-100  eV	Th
782.	R. J. Pelaez, C. Perez, V. R Experimental measureme lines. J. Phys. B 38, 2505 (2005)	. Gonzalez, F. Rodriguez, J. A. A ents of shifts and asymmetries	aparicio, S. Mar s of He II $P_{\alpha}$ and $P_{\beta}$ spectral	
	$egin{array}{lll} {f e} + {f H} {f e}^+ \ {f e} + {f H} {f e}^+ \end{array}$	Line Broadening Fluorescence	1.75 eV 1.75 eV	Exp Exp
783.	V. V. Serov, B. B. Joulakian Ionization excitation of electron impact: A prob J. Phys. B 38, 2765 (2005)	n, V. L. Derbov, S. I. Vinitsky diatomic systems having tw e to electron correlation.	o active electrons by fast	
	$egin{array}{lll} {f e} + {f H}_2 \ {f e} + {f H}_2 \end{array} \end{array}$	Excitation Ionization	4087 eV 4087 eV	Th Th
784.	P. V. Johnson, P. W. Zetner Electron impact coheren on the $(6s6p \ ^1P_1)$ level o J. Phys. B 38, 2793 (2005)	nce parameters for superelas f the barium atom.	tic transitions terminating	
	e + Ba	Elastic Scattering	20  eV	Exp
	$e + Ba^*$	Elastic Scattering	20  eV	Exp
	e + Ba $e + Ba^*$	Excitation	20 eV 20 eV	Exp Exp
785.	B. Fabian, A. Mueller, H. Br Electron-impact double i J. Phys. B 38, 2833 (2005)	raeuning, J. Jacobi, F. A. Scheuer ionization of $Pb^{q+}$ ions for $q =$	rmann, E. Salzborn = 1-9.	Ĩ
	$\mathbf{e} + \mathbf{P}\mathbf{b}^{+\_9+}$	Ionization	20-1000  eV	Exp
786.	<ul> <li>P. Syty, J. E. Sienkiewicz</li> <li>Relativistic multiconfiguration argon atoms.</li> <li>J. Phys. B 38, 2859 (2005)</li> </ul>	ration method in low-energy s	scattering of electrons from	

	e + Ar e + Ar	Elastic Scattering Angular Scattering	2-10 eV 2-10 eV	Th Th
787.	M. J. Hussey, A. J. Murray Low energy (e, 2e) different molecular orbitals of <i>CO</i> J. Phys. B 38, 2965 (2005)	prential cross-section measure $D_2$ .	ements on the $1\pi_g$ and $4\sigma_g$	
	$e + CO_2$	Angular Scattering	20-100 eV	Exp
	$\mathbf{e} + \mathbf{CO}_2$	Ionization	$20\text{-}100~\mathrm{eV}$	Exp
788.	C. A. Ramsbottom, C. J. N Electron impact excitati J. Phys. B 38, 2999 (2005)	oble, V. M. Burke, M. P. Scott, R on of Fe II: Total LS effective	. Kisielius, P. G. Burke collision strengths.	
	$\mathbf{e} + \mathbf{F}\mathbf{e}^+$	Excitation	30-100,000 K	Th
789.	H. P. Saha, D. J. Murray Extension of the single-of J. Phys. B 38, 3015 (2005)	channel MCHF method to inc	clude multichannels.	
	e + H	Elastic Scattering	0.026-218 eV	Th
	e + He	Elastic Scattering	0.026-218 eV	Th
	$e + He^+$	Elastic Scattering	0.026-218  eV	Th
	$\mathbf{e} + \mathbf{H}$	Excitation	0.026-218  eV	Th
	e + He	Excitation	0.026-218  eV	Th
	$e + He^+$	Excitation	0.026-218  eV	$\mathrm{Th}$
790.	M. S. Pindzola, F. Robichea Electron-impact ionization J. Phys. B 38, L285 (2005)	bux, J. Colgan on of $H_2^+$ using a time-depend	ent close-coupling method.	
	$\mathbf{e}+\mathbf{H}_{2}^{+}$	Ionization	20-160  eV	$\mathrm{E}/\mathrm{T}$
791.	D. Payne, B. Krueger, K. B Channel coupling and re- ium. J. Phys. B 38, 3349 (2005)	artschat elativistic effects in electron-i	mpact excitation of rubid-	
	e + Bb	Angular Scattering	20 eV	$\mathbf{T}\mathbf{h}$
	e + Rb	Excitation	20 eV 20 eV	Th
792.	W. E. Guinea, G. F. Hanne Payne, W. R. MacGillivray, <b>Spin asymmetries in elas</b> J. Phys. B 38, 3359 (2005)	, M. R. Went, M. L. Daniell, M. A B. Lohmann stic and inelastic scattering fr	A. Stevenson, K. Bartschat, D. rom rubidium.	
	$a \perp Bb$	Elastic Scattoring	15-80 eV	<b>F</b> /т
	e + Rb	Angular Scattering	15-80 eV	ъ/т Е/т
	e + Bb	Excitation	15-80 eV	ь/ 1 Е/Т
	6 T IU		10.00 0 1	ш/ т
793.	I. Iga, I. P. Sanches, P. Raw	at, M.G.P. Homem, MT. Lee	(E) collisions in the law	

Experimental study on electron-hexafluoroethane  $(C_2F_6)$  collisions in the lowand intermediate-energy ranges. J. Phys. B 38, 3477 (2005)

276

	${f e} + {f C}_2 {f F}_6 \ {f e} + {f C}_2 {f F}_6$	Dissociation Elastic Scattering Angular Scattering Ionization	30-1000 eV 30-1000 eV 30-1000 eV 30-1000 eV	Exp Exp Exp Exp
794.	B. Predojevic, D. Se Electron scatterin and $6s7p$ $^{1}P_{1}$ ) and J. Phys. B 38, 3489	vic, V. Pejcev, B. P. Marinkovic, D <b>g by ytterbium: II. Excitation</b> $1 4f^{13}5d6s^2$ (7/2, 5/2) <sub>1</sub> states. (2005)	9. M. Filipovic <b>n of the</b> $4f^{14}(6s6p \ ^{3}P_{1}, \ 5d6$	$s^{-1}D_2$
	$e + Yb \\ e + Yb$	Angular Scattering Excitation	10-40 eV 10-40 eV	$\operatorname{Exp}$
795.	M. Lukomski, J. A. Kedzierski, T. J. Rev New measuremen using a magneto-o J. Phys. B 38, 3535	MacAskill, D. P. Seccombe, C. M ddish, J. W. McConkey ts of absolute total cross section optical trap. (2005)	CGrath, S. Sutton, J. Teeuwe	en, W.
	e + Cs	Elastic Scattering	5-100 eV	Exp
796.	S. S. Tayal, O. Zatsa B-spline R-matrix atomic nitrogen. J. Phys. B 38, 3631	arinny <b>x with pseudostates approach f</b> (2005)	or electron impact excitat	ion of
	e + N	Excitation	2-120 eV	Th
797.	M. Allan Measurement of t over a wide angul J. Phys. B 38, 3655	he elastic and $\nu = 0$ -; 1 different ar range. (2005)	ential $electron - N_2$ cross see	ctions
	$\mathbf{e} + \mathbf{N}_2 \\ \mathbf{e} + \mathbf{N}_2$	Elastic Scattering Excitation	$0.8-5 \ {\rm eV}$ $0.8-5 \ {\rm eV}$	
798.	S. Cohen, S. I. Then Construction of R polarizabilities an J. Phys. B 38, 3705	nelis <b>KR-QDT atomic model potenti</b> <b>d hyper-polarizabilities.</b> (2005)	als for the calculation of Li	thium
	e + Li	Excitation		$\mathrm{Th}$
799.	MT. Lee, L. E. Ma A theoretical stud- energy range. J. Phys. B 38, 3795	chado, L. M. Brescansin, I. Iga dy on elastic $electron - CH_x$ (x (2005)	x=1,2,3,4) collisions in the	e low-
	e + CH	Elastic Scattering	0.1-20  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{C}\mathbf{H}_2$	Elastic Scattering	0.1-20  eV	$\mathrm{Th}$
	$e + CH_3$	Elastic Scattering	0.1-20 eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{CH}_4$	Elastic Scattering	0.1-20 eV	Th
	e + CH	Angular Scattering	0.1-20 eV	Th
	$e + OH_2$	Angular Scattering	0.1-20 eV	Th
	$e + CH_{o}$	Angular Scattering	0.1-20 eV	Th

800.	<ul> <li>0. YL. Peng, XY. Han, MS. Wang, JM. Li</li> <li>A theoretical study of dielectronic recombination processes of C<sup>2+</sup> ions in planetary nebulae.</li> <li>J. Phys. B 38, 3825 (2005)</li> </ul>			plan-	
	$\mathbf{e} + \mathbf{C}^{2+}$	Recombination	0-100,000 K	Th	
801.	S. Kaur, K. L. Baluja Electron-impact study of formaldehyde using the R-matrix method. J. Phys. B 38, 3917 (2005)				
	$\mathrm{e} + \mathrm{CH}_2\mathrm{O} \ \mathrm{e} + \mathrm{CH}_2\mathrm{O} \ \mathrm{e} + \mathrm{CH}_2\mathrm{O} \ \mathrm{e} + \mathrm{CH}_2\mathrm{O}$	Elastic Scattering Angular Scattering Total Scattering	$\begin{array}{c} 0.00820 \ \mathrm{eV} \\ 0.00820 \ \mathrm{eV} \\ 0.00820 \ \mathrm{eV} \end{array}$	${ m Th}\ { m Th}\ { m Th}$	
802.	M. Gaupta, K. L. Baluja Electron collisions with an ozone molecule using the R-matrix method. J. Phys. B 38, 4057 (2005)				
	$\mathbf{e} + \mathbf{O}_3$ $\mathbf{e} + \mathbf{O}_3$ $\mathbf{e} + \mathbf{O}_3$ $\mathbf{e} + \mathbf{O}_3$	Elastic Scattering Angular Scattering Total Scattering Excitation	0-15 eV 0-15 eV 0-15 eV 0-15 eV	Th Th Th Th	
803.	D. O. Brown, A. Crov Electron scattering J. Phys. B 38, 4123 (	we, D. V. Fursa, I. Bray, K. Bartso g from magnesium at an incide 2005)	hat ent energy of 20 eV.		
	$egin{array}{lll} { m e} + { m Mg} \ { m e} + { m Mg} \end{array}$	Angular Scattering Excitation	20 eV 20 eV	$\begin{array}{c} \text{Exp} \\ \text{Exp} \end{array}$	
804.	<ul> <li>Z. Chen, D. H. Madison</li> <li>Second-order distorted wave calculation for electron-impact ionization of helium to He<sup>+</sup> (n=1 and 2).</li> <li>J. Phys. B 38, 4195 (2005)</li> </ul>				
	e + He e + He	Excitation Ionization	200-570 eV 200-570 eV	E/T E/T	
805.	R. F. da Costa, F. J. da Paixao, M.A.P. Lima Cross sections for electron-impact excitation of the $H_2$ molecule using the MOB- SCI strategy. J. Phys. B 38, 4363 (2005)				
	$\mathbf{e}+\mathbf{H}_2 \ \mathbf{e}+\mathbf{H}_2$	Angular Scattering Excitation	12-30 eV 12-30 eV	${ m Th}$ Th	
<ul> <li>806. M. Fogle, N. R. Badnell, P. Glans, S. D. Loch, S Pindzola, R. Schuch</li> <li>Electron-ion recombination of Be-like C, N, Astron. Astrophys. 442, 757 (2005)</li> </ul>			dzunkov, Sh. A. Abdel-Naby, O.	M. S.	
	$egin{array}{lll} {f e} + {f C}^{2+} \ {f e} + {f N}^{3+} \ {f e} + {f O}^{4+} \end{array}$	Recombination Recombination Recombination	$10 - 10^7 \text{ K}$ $10 - 10^7 \text{ K}$ $10 - 10^7 \text{ K}$	E/T E/T E/T	
807.	E. Landi, A. K. Bhat Atomic data and s	ia pectral line intensities for Ca	XIII.		

Atomic data and spectral line i Astron. Astrophys. 444, 305 (2005)

	$\mathbf{e} + \mathbf{C}\mathbf{a}^{12+}$	Excitation	40-200 Ry	$\mathrm{Th}$
808.	M. C. Witthoeft, N. R. Bad Atomic data from the II 4 levels of $Fe^{17+}$ . Astron. Astrophys. 446, 361	nell, G. Del Zanna, K. A. Berring RON project. LX. Electron-in . (2006)	ton, J. C. Pelan npact excitation of $n = 3$ ,	
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{17+}$	Excitation	0-20 Ry	$\mathrm{Th}$
4 levels of $Fe^{1.74}$ . Astron. Astrophys. 446, 361 (2006) $\mathbf{e} + \mathbf{F}\mathbf{e}^{17+}$ Excitation 0-20 Ry Ti 809. B. M. McLaughlin, A. Hibbert, M. P. Scott, C. J. Noble, V. M. Burke, P. G. Burke Electron collisions with Fe-peak elements: Fe IV. I. Forbidden transitions: $3d^5$ - $3d^44s$ and $3d^5$ - $3d^44p$ manifolds. Astron. Astrophys. 446, 1185 (2006)				
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{3+}$	Excitation	3.3-6.0 log $T_e(k)$	Th

810. O. Zatsarinny, T. W. Gorczyca, J. Fu, K. T. Korista, N. R. Badnell, D. W. Savin Dielectronic recombination data for dynamic finite-density plasmas. IX. The fluorine isoelectronic sequence.

Astron. Astrophys. 447, 379 (2006)

$e + Ne^+$	Recombination	$0-10^5 {\rm ~eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{N} \mathbf{a}^{2+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{M} \mathbf{g}^{3+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Al}^{4+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Si}^{5+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{P}^{6+}$	Recombination	$0 - 10^5 { m eV}$	$\mathrm{Th}$
$e + S^{7+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$e + Cl^{8+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$e + Ar^{9+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{K}^{10+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{C} \mathbf{a}^{11+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{S} \mathbf{c}^{12+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{T} \mathbf{i}^{13+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{V}^{14+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{C} \mathbf{r}^{15+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{M} \mathbf{n}^{16+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{F} \mathbf{e}^{17+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$e + Co^{18+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{N} \mathbf{i}^{19+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{C} \mathbf{u}^{20+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{21+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{K} \mathbf{r}^{27+}$	Recombination	$0 - 10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Mo}^{33+}$	Recombination	$0 - 10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{X} \mathbf{e}^{45+}$	Recombination	$0-10^5 {\rm ~eV}$	$\mathrm{Th}$

## 811. N. R. Badnell

Dielectronic recombination data for dynamic finite-density plasmas. X. The hydrogen isoelectronic sequence.

Astron. Astrophys. 447, 389 (2006)

$e + He^+$	Recombination	$0-10^5 { m eV}$	Th
$\mathbf{e} + \mathbf{L}\mathbf{i}^{2+}$	Recombination	$0 - 10^5 \text{ eV}$	Th
$\mathbf{e} + \mathbf{B}\mathbf{e}^{3+}$	Recombination	$0 - 10^5 \text{ eV}$	Th
$\mathbf{e} + \mathbf{B}^{4+}$	Recombination	$0 - 10^5 \text{ eV}$	Th
$\mathbf{e} + \mathbf{C}^{5+}$	Recombination	$0 - 10^5 \text{ eV}$	Th
$\mathbf{e} + \mathbf{N}^{6+}$	Recombination	$0 - 10^5 { m eV}$	Th

	$e + O^{7+}$	Recombination	$0 - 10^5 { m eV}$	$\mathrm{Th}$	
	$\mathbf{e} + \mathbf{F}^{8+}$	Recombination	$0 - 10^5 { m eV}$	Th	
	$\mathbf{e} + \mathbf{N}\mathbf{e}^{9+}$	Recombination	$0-10^5 { m eV}$	Th	
	$\mathbf{e} + \mathbf{N} \mathbf{a}^{10+}$	Recombination	$0 - 10^5 { m eV}$	Th	
	$\mathbf{e} + \mathbf{M} \mathbf{g}^{11+}$	Recombination	$0 - 10^5 { m eV}$	Th	
	$\mathbf{e} + \mathbf{A} \mathbf{l}^{12+}$	Recombination	$0 - 10^5 { m eV}$	Th	
	$\mathbf{e} + \mathbf{S} \mathbf{i}^{13+}$	Recombination	$0-10^5 { m eV}$	Th	
	$\mathbf{e} + \mathbf{P}^{14+}$	Recombination	$0-10^5 { m eV}$	Th	
	$\mathbf{e} + \mathbf{S}^{15+}$	Recombination	$0 - 10^5 { m eV}$	$\mathrm{Th}$	
	$\mathbf{e} + \mathbf{Cl}^{16+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$	
	$\mathbf{e} + \mathbf{A} \mathbf{r}^{17+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$	
	$\mathbf{e} + \mathbf{K}^{18+}$	Recombination	$0-10^5 { m eV}$	$\mathrm{Th}$	
	$\mathbf{e} + \mathbf{C} \mathbf{a}^{19+}$	Recombination	$0-10^5 \mathrm{~eV}$	$\mathrm{Th}$	
	$\mathbf{e} + \mathbf{S}\mathbf{c}^{20+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	
	$e + Ti^{21+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	
	$\mathbf{e} + \mathbf{V}^{22+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	
	$\mathbf{e} + \mathbf{C}\mathbf{r}^{23+}$	Recombination	$0 - 10^5 { m eV}$	$\mathrm{Th}$	
	$\mathbf{e} + \mathbf{M} \mathbf{n}^{24+}$	Recombination	$0 - 10^5 \text{ eV}$	Th	
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{25+}$	Recombination	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	
	$e + Co^{26+}$	Recombination	$0 - 10^5 \text{ eV}$	$\mathrm{Th}$	
	$e + Ni^{27+}$	Recombination	$0 - 10^{5} \text{ eV}$	Th	
	$e + Cu^{28+}$	Recombination	$0 - 10^{5} \text{ eV}$	$\mathrm{Th}$	
	$e + Zn^{29+}$	Recombination	$0 - 10^{5} \text{ eV}$	Th	
	$e + Kr^{35+}$	Recombination	$0 - 10^{5} \text{ eV}$	Th	
	$e + Mo^{41+}$	Recombination	$0 - 10^{5} \text{ eV}$	Th	
	$\mathbf{e} + \mathbf{X} \mathbf{e}^{33+}$	Recombination	$0 - 10^{3} \text{ eV}$	Th	
	S V. Astron. Astrophys. 452,	1113 (2006)	the electron impact excitation of		
	$\mathbf{e} + \mathbf{S}^{4+}$	Excitation	$4.0-6.0 \log T(k)$	$\mathrm{Th}$	
813.	813. E. Landi, M. F. Gu Atomic data for high-energy configurations in Fe XVII-XXIII. Astrophys. J., Part 1 640, 1171 (2006)				
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{16 + \underline{22} + \underline{22}$	Excitation	1-100 Ry	$\mathrm{Th}$	
814.	<ul> <li>D. W. Savin, G. Gwinner, M. Grieser, R. Repnow, M. Schnell, D. Schwalm, A. Wolf, SG. Zhou, S. Kieslich, A. Mueller, S. Schippers, J. P. Colgan, S. D. Loch, N. R. Badnell, M. H. Chen, M. F. Gu</li> <li>Dielectronic recombination of Fe XXIII forming Fe XXII: Laboratory measurements and theoretical calculations. Astrophys. J., Part 1 642, 1275 (2006)</li> </ul>				
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{22+}$	Recombination	$0.0\text{-}100.0~\mathrm{eV}$	$\mathrm{E}/\mathrm{T}$	
815.	<ul> <li>5. S. Telega, F. A. Gianturco</li> <li>Vibrational inelastic <i>electron</i> - H<sub>2</sub> scattering revisited: Numerically converged coupled channels space frame calculations with model interactions.</li> <li>Eur. Phys. J. D 36, 271 (2005)</li> </ul>				
	$\mathbf{e} + \mathbf{H}_2$	Excitation	0-6 eV	$\mathrm{Th}$	
816.	L. K. Jha, B. N. Roy Electron impact doub Eur. Phys. J. D 37, 51 (	ble ionization of $Fe^+$ and (2006)	$Fe^{3+}$ .		

	$f e+Fe^+ \ e+Fe^{3+}$	Ionization Ionization	50-1000  eV 50-1000  eV	${ m Th}$ ${ m Th}$
817.	M. Vinodkumar, K. Electron impact t and radicals. Eur. Phys. J. D 37,	N. Joshipura, C. G. Limbachiya, otal and ionization cross-sectio 67 (2006)	B. K. Antony ns for some hydrocarbon molecul	es
	$\mathbf{e} + \mathbf{CH}_4 \\ \mathbf{e} + \mathbf{CH}_4$	Excitation Ionization	0-2000 eV 0-2000 eV	${ m Th}$ ${ m Th}$
818.	J. Gao, D. H. Madis Distorted wave H culations of the f nitrogen molecule J. Chem. Phys. 123	son, J. L. Peacher Born and three-body distorted fully differential cross section es. 8, 204314 (2005)	l wave Born approximation cal- for electron-impact ionization o	- f
	$\mathbf{e} + \mathbf{N}_2$	Ionization	$35.6\text{-}400\;\mathrm{eV}$	$\mathrm{Th}$
819.	J. Gao, D. H. Madison, J. L. Peacher, A. J. Murray, M. J. Hussey Experimental and theoretical (e,2e) ionization cross sections for a hydrogen tar- get at 75.3 eV incident energy in a coplanar asymmetric geometry. J. Chem. Phys. 124, 194306 (2006)			
	$\mathbf{e} + \mathbf{H}_2$	Ionization	$10-60 \mathrm{~eV}$	E/T
820.	S. Tsuge, A. Shimano, Y. Tohyama, E. Kayama, S. Obara, T. Nagata Absolute total (counting) and charge-separated partial cross-sections for electron impact ionization of La, Pr, Ho, Tm, and Lu atoms. J. Phys. Soc. Japan 74, 3193 (2005)			
	e + La	Excitation	0-900  eV	Exp
	e + Pr	Excitation	0-900  eV	Exp
	e + Ho	Excitation	0-900  eV	Exp
	e + Tm	Excitation	$0-900 {\rm ~eV}$	Exp
	e + Lu	Excitation	0-900 eV	Exp
	e + La	Ionization	0-900 eV	Exp
	e + Pr	Ionization	0-900 eV	Exp
	e + Ho	Ionization	0-900 eV	Exp
	e + Tm	Ionization	0-900 eV	Exp
	e + Lu	Ionization	0-900  eV	Exp
821.	C. A. Quarles, S. Portillo <b>Review of bremsstrahlung experiments with free gas atom targets.</b> Nucl. Instrum. Methods Phys. Res. B 241, 14 (2005)			
	e + Ne	Bremsstrahlung	28-50  keV	Exp
	e + Ar	Bremsstrahlung	28-50  keV	Exp
	e + Kr	Bremsstrahlung	28-50  keV	Exp
	e + Xe	Bremsstrahlung	28-50  keV	Exp
822.	<ul> <li>R. D. DuBois, A.C.S. Santos, M. A. Thomason, J. Gavin</li> <li>Doubly and triply differential ionization studies using positrons and electrons.</li> <li>Nucl. Instrum. Methods Phys. Res. B 241, 19 (2005)</li> </ul>			
	$\mathbf{e} + \mathbf{Ar}$	Angular Scattering	750  eV	Exp
	e + Kr	Angular Scattering	750  eV	Exp
	e + Ar	Ionization	750  eV	Exp
	e + Kr	Ionization	750  eV	Exp
823. S. Jones, D. H. Madison, J. H. Macek

Single and double ionization of helium by the impact of fast charged particles. Nucl. Instrum. Methods Phys. Res. B 241, 73 (2005)

e + He	Angular Scattering	6  keV; 100  MeV/amu	$\mathrm{Th}$
e + He	Ionization	6  keV; 100  MeV/amu	$\mathrm{Th}$

824. S. J. Buckman, J. P. Sullivan

Benchmark measurements and theory for electron(positron)-molecule(atom) scattering.

Nucl. Instrum. Methods Phys. Res. B 247, 5 (2006)

Elastic Scattering	1.5-20  eV	E/T
Elastic Scattering	1.5-20  eV	E/T
Elastic Scattering	1.5-20  eV	E/T
Angular Scattering	1.5-20  eV	E/T
Angular Scattering	1.5-20  eV	E/T
Angular Scattering	1.5-20  eV	E/T
Excitation	1.5-20  eV	E/T
Excitation	1.5-20  eV	E/T
	Elastic Scattering Elastic Scattering Angular Scattering Angular Scattering Angular Scattering Excitation Excitation	Elastic Scattering1.5-20 eVElastic Scattering1.5-20 eVElastic Scattering1.5-20 eVAngular Scattering1.5-20 eVAngular Scattering1.5-20 eVAngular Scattering1.5-20 eVExcitation1.5-20 eVExcitation1.5-20 eVExcitation1.5-20 eV

825. F. Arretche, R. F. da Costa, S. d'A. Sanchez, A.N.S. Hisi, E. M. de Oliveira, M. T. do N. Varella, M.A.P. Lima

Similarities and differences in  $e^{\pm}$ -molecule scattering: Applications of the Schwinger multichannel method.

Nucl. Instrum. Methods Phys. Res. B 247, 13 (2006)

$\mathbf{e} + \mathbf{H}_2$	Elastic Scattering	0.1-20  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{H}_2$	Angular Scattering	0.1-20  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{N}_2$	Angular Scattering	0.1-20  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{H}_2$	Excitation	0.1-20  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{N}_2$	Excitation	0.1-20  eV	Th

826. Z. An, Y. Wu, M. T. Liu, Y. M. Duan, C. H. Tang

## Thick-target method in the measurement of inner-shell ionization cross-sections by low-energy electron impact.

Nucl. Instrum. Methods Phys. Res. B 246, 281 (2006)

e + Ti	Ionization	10-120  keV	Exp
e + Ni	Ionization	10-120  keV	Exp
e + Cu	Ionization	10-120  keV	Exp
e + Ag	Ionization	10-120  keV	Exp
e + Au	Ionization	10-120  keV	Exp

827. S. Mondal, R. Shanker

Total ionization cross-sections of  $CH_4$  and  $C_3H_8$  molecules for impact of 10-28 keV electrons.

Nucl. Instrum. Methods Phys. Res. B 246, 297 (2006)

$\mathbf{e} + \mathbf{C}\mathbf{H}_4$	Ionization	10-28  keV	Exp
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$	Ionization	10-28  keV	Exp

828. M. A. Uddin, A.K.F. Haque, K. R. Karim, A. K. Basak Empirical model for the ionization cross sections of H- and He-like ions. Phys. Scr. 72, 389 (2005)

$\mathbf{e} + \mathbf{B}^{4+}$	Ionization	$10 - 10^4 \text{ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{C}^{4+}$	Ionization	$10 - 10^4 \text{ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{N}^{6+}$	Ionization	$10 - 10^4 \text{ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{O}^{7+}$	Ionization	$10 - 10^4 \text{ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{N}\mathbf{e}^{8+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Mo}^{41+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{D} \mathbf{y}^{65+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{u}^{78+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{B} \mathbf{i}^{82+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{U}^{90+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$
$e + U^{91+}$	Ionization	$10 - 10^4 {\rm eV}$	$\mathrm{Th}$

829. U. I. Safronova, Yu. Ralchenko, I. Murakami, T. Kato, D. Kato Atomic data for dielectronic recombination into C-like oxygen. Phys. Scr. 73, 143 (2006)

e +	- <b>O</b> <sup>6+</sup>	Recombination	0.1 -1260  eV	Th
			0.5 5 5 5 5 1	

830. M. A. Khakoo, M.A.P. Lima, J. Tennyson

Advances and challenges in electron-molecule scattering physics – A report of the 14th International Symposium on Electron-Molecule Collisions and Swarms. Phys. Scr. 74, C7 (2006)

$\mathbf{e} + \mathbf{N}_2$	Elastic Scattering	0-6 eV	E/T
$e + CF_4$	Elastic Scattering	0-6 eV	E/T
$\mathbf{e} + \mathbf{N}_2$	Angular Scattering	0-6 eV	E/T
$\mathbf{e} + \mathbf{CF}_4$	Angular Scattering	0-6 eV	É/T
$\mathbf{e} + \mathbf{N}_2$	Excitation	0-6 eV	E/T
$\mathbf{e} + \mathbf{CF}_4$	Excitation	0-6 eV	E/T
$\mathbf{e} + \mathbf{N}_2$	Electron Collisions	0-6 eV	E/T
$\mathbf{e} + \mathbf{CF}_4$	Electron Collisions	$0-6  \mathrm{eV}$	E/T

831. S. Bellm, J. Lower, K. Bartschat

Electron-impact ionization and excitation of helium to the n = 1-4 ionic states. Phys. Rev. Lett. 96, 223201 (2006)

e + He	Excitation	$112-319 {\rm ~eV}$	E/T
e + He	Ionization	112-319  eV	E/T

832. D. S. Milne-Brownlie, M. Foster, J. Gao, B. Lohmann, D. H. Madison Young-type interference in (e,2e) ionization of H<sub>2</sub>.
Phys. Rev. Lett. 96, 233201 (2006)

$\mathbf{e} + \mathbf{H}_2$	Dissociation	250  eV	E/T
$\mathbf{e} + \mathbf{H}_2$	Angular Scattering	250  eV	E/T
$\mathbf{e} + \mathbf{H}_2$	Ionization	250  eV	E/T

833. H. Chen, M. F. Gu, P. Beiersdorfer, K. R. Boyce, G. V. Brown, S. M. Kahn, R. L. Kelley, C. A. Kilbourne, F. S. Porter, J. H. Scofield Electron impact excitation cross section measurement for n = 3 to n = 2 line emission in  $Fe^{17+}$  to  $Fe^{23+}$ . Astrophys. J. 646, 653 (2006)

$e + Fe^{17 + 23 + 23}$	Excitation	0-3.0  keV	E/T
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834. A. K. Bhatia  $Electron - He^+$  P-wave elastic scattering and photoabsorption in two-electron systems.

Phys. Rev. A 73, 012705 (2006)

e + H	Attachment	0.9-51  eV; 1000-25,000  K	Th
$e + He^+$	Recombination	0.9-51  eV; 1000-25,000  K	$\mathrm{Th}$

835. A.K.F. Haque, M. A. Uddin, A. K. Basak, K. R. Karim, B. C. Saha Empirical model for the electron-impact K-shell-ionization cross sections. Phys. Rev. A 73, 012708 (2006)

e + H	Ionization	$0.015 - 10^6 {\rm ~keV}$	$\mathrm{Th}$
e + He	Ionization	$0.015 - 10^6 { m ~keV}$	$\mathrm{Th}$
e + C	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + Al	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + Ar	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + V	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + Ni	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + Cu	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + Se	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + Ag	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + Sn	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + Au	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + Pb	Ionization	$0.015 - 10^6 \text{ keV}$	$\mathrm{Th}$
e + Bi	Ionization	$0.015 - 10^6 { m keV}$	$\mathrm{Th}$

836. C. Winstead, V. McKoy

Elastic electron scattering by fullerene,  $C_{60}$ .

Phys. Rev. A 73, 012711 (2006)

$\mathbf{e} + \mathbf{C}_{60}$	Elastic Scattering	0-50  eV	Th
$\mathbf{e} + \mathbf{C}_{60}$	Angular Scattering	0-50  eV	$\mathrm{Th}$

# 837. M. M. Fujimoto, S. E. Michelin, I. Iga, M.-T. Lee Spin-exchange effects in elastic electron-radical collisions. Phys. Rev. A 73, 012714 (2006)

$\mathbf{e} + \mathbf{C}_2 \mathbf{O}$	Elastic Scattering	1-10 eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{C}_2 \mathbf{O}$	Angular Scattering	1-10  eV	$\mathrm{Th}$

838. C. Champion, C. Dal Cappello, S. Houamer, A. Mansouri
Single ionization of the water molecule by electron impact: Angular distributions at low incident energy.
Phys. Rev. A 73, 012717 (2006)

$e + H_2O$	Angular Scattering	250  eV	E/T
$e + H_2O$	Ionization	250  eV	E/T

839. M. S. Pindzola, S. D. Loch, C. P. Ballance, D. C. Griffin
Electron-impact excitation cross sections for Fe<sup>16+</sup> in the configuration-average distorted-wave approximation.
Phys. Rev. A 73, 012718 (2006)

$\mathbf{e} + \mathbf{F} \mathbf{e}^{16+}$ Excitation 700-1200 eV	Tł
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840. M. A. Stevenson, B. Lohmann Triple-differential cross-section measurements of electron-impact ionization of argon 3s in the backward scattering direction. Phys. Rev. A 73, 020701 (2006)

e + Ar	Angular Scattering	113.5  eV	$\mathrm{Th}$
e + Ar	Ionization	113.5  eV	Th

841.	<ol> <li>N. Nakamura, H. Tobiyama, H. Nohara, D. Kato, H. Watanabe, F. J. Currell, S. Ohtani Observation of resonant-excitation double autoionization in <i>electron</i> – I<sup>50+</sup> colli- sions. Phys. Rev. A 73, 020705 (2006)</li> </ol>			
	$\begin{array}{l} \mathbf{e} + \mathbf{I}^{50+} \\ \mathbf{e} + \mathbf{I}^{50+} \end{array}$	Excitation Ionization	$\begin{array}{l} 29.5\text{-}32 \ \mathrm{keV} \\ 29.5\text{-}32 \ \mathrm{keV} \end{array}$	$\begin{array}{c} Exp\\ Exp \end{array}$
842.	J. Shertzer, S. J. Wa Binding energy ar tial. Phys. Rev. A 73, 02	and structure of $e^+Li$ and $e^-$ . 2504 (2006)	Li using a parametric model poten-	
	e + Li	Excitation		Th
843.	J. Horacek, M. Cizel Dissociative electric electrons: Calcula Vibrational excita Phys. Rev. A 73, 02	k, K. Houfek, P. Kolorenc, W. I con attachment and vibration ations based on an improv- tion. 2701 (2006)	Domcke onal excitation of $H_2$ by low-energy red nonlocal resonance model. II.	
	$\mathbf{e} + \mathbf{H}_2$ $\mathbf{e} + \mathbf{H}_2$	Attachment	0-10 eV	Th Th
844.	C. G. Ning, X. G. R <b>Turn-up effects at</b> <b>oxygen at various</b> Phys. Rev. A 73, 02	en, J. K. Deng, G. L. Su, S. F. low momentum for the hi impact energies by electro 2704 (2006)	Zhang, G. Q. Li ghest occupied molecular orbital of n momentum spectroscopy.	
	e + O	Ionization	400-2400  eV	Exp
845.	S. Popovic, S. Willia <b>Electron-impact</b> d Phys. Rev. A 73, 02	ams, L. Vuskovic lissociative ionization of eth 2711 (2006)	ıylene.	
	$\begin{array}{l} \mathbf{e} + \mathbf{C}_2 \mathbf{H}_4 \\ \mathbf{e} + \mathbf{C}_2 \mathbf{H}_4 \end{array}$	Dissociation Ionization	10-200 keV 10-200 keV	${ m Th}$ ${ m Th}$
846.	O. Heber, K. Seierse Dissociative recom Phys. Rev. A 73, 02	n, H. Bluhme, A. Svendsen, L. <b>abination of small carbon c</b> 712 (2006)	H. Andersen, L. Maunoury luster cations.	
	$e + C_3^+$ $e + C_5^+$ $e + C_4^+$ $e + C_7^+$ $e + C_6^+$ $e + C_3^+$ $e + C_5^+$ $e + C_4^+$ $e + C_7^+$ $e + C_6^+$	Dissociation Dissociation Dissociation Dissociation Dissociation Recombination Recombination Recombination Recombination		Exp Exp Exp Exp Exp Exp Exp Exp Exp

# 847. R. W. van Boeyen, N. Watanabe, J. W. Cooper, J. P. Doering, J. H. Moore, M. A. Coplan Two-step single-ionization mechanisms. Phys. Rev. A 73, 032703 (2006)

	$egin{array}{llllllllllllllllllllllllllllllllllll$	Angular Scattering Ionization	400-3000 eV 400-3000 eV	$\begin{array}{c} \text{Exp} \\ \text{Exp} \end{array}$
848.	A. Daw, L. D. Gardner, Absolute cross section Phys. Rev. A 73, 032709	P. H. Janzen, J. L. Kohl <b>a for</b> $C^{2+}$ (2s2p ${}^{3}P^{0}$ -; $2p^{2}$ ${}^{3}$ $\partial$ (2006)	P) electron-impact excitation	
	$\mathbf{e} + \mathbf{C}^{2+}$	Excitation	10-28  eV	Exp
849.	V. Ngassam, A. E. Orel <b>Dissociative recombin</b> Phys. Rev. A 73, 032720	nation of $Ne_2^+$ molecular io ) (2006)	ns.	
	$\mathbf{e} + \mathbf{N}\mathbf{e}_2^+ \\ \mathbf{e} + \mathbf{N}\mathbf{e}_2^+$	Dissociation Recombination	$10^{-4} - 1 \text{ eV}$ $10^{-4} - 1 \text{ eV}$	${ m Th}$ Th
850.	S. Wang, P. V. Johnson, Transmission effects in loss spectra. Phys. Rev. A 73, 034702	C. P. Malone, I. Kanik, M. A. n unfolding electronic-vibra 2 (2006)	Khakoo tional electron-molecule energ	gy-
	$egin{array}{lll} {f e} + {f N}_2 \ {f e} + {f N}_2 \end{array} \end{array}$	Angular Scattering Excitation	15 eV 15 eV	$\begin{array}{c} \mathrm{Exp} \\ \mathrm{Exp} \end{array}$
851.	S.W.J. Scully, J. A. Wye Autodissociation of d Phys. Rev. A 73, 040702	er, V. Senthil, M. B. Shah, E. C oubly charged water molec l (2006)	C. Montenegro ules.	
	$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$ $\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Dissociation Ionization	45-1500 eV 45-1500 eV	$\begin{array}{c} \mathrm{Exp} \\ \mathrm{Exp} \end{array}$
852.	M. Gupta, K. L. Baluja Low-energy elastic an matrix method. Phys. Rev. A 73, 042702	nd inelastic scattering of el 2 (2006)	lectrons from $SO_2$ using the $2$	R-
	$\mathbf{e} + \mathbf{SO}_2$	Dissociation	1-15  eV	$\mathrm{Th}$
	$e + SO_2$	Elastic Scattering	1-15 eV	Th
	$\mathbf{e} + \mathbf{SO}_2$ $\mathbf{e} + \mathbf{SO}_2$	Excitation	1-15 eV 1-15 eV	Th Th
853.	LF. Zhu, HD. Cheng, Generalized oscillator Phys. Rev. A 73, 042703	ZS. Yuan, XJ. Liu, JM. Su strengths for the valence-s 3 (2006)	m, KZ. Xu shell excitations of argon.	
	e + Ar e + Ar	Angular Scattering Excitation	$2500 { m ~eV}$ $2500 { m ~eV}$	E/T E/T
854.	J. Royal, A. E. Orel <b>Dissociative recombin</b> Phys. Rev. A 73, 042706	nation of $Ar_2^+$ . 6 (2006)		
	$\mathbf{e} + \mathbf{Ar}_2^+ \\ \mathbf{e} + \mathbf{Ar}_2^+$	Dissociation Recombination	$3x10^{-3} - 0.5 \text{ eV}$ $3x10^{-3} - 0.5 \text{ eV}$	${ m Th}$ Th
855.	J. P. Colgan, M. S. Pind Low-energy electron- Phys. Rev. A 73, 042710	zola, G. Childers, M. A. Khako impact single ionization of (2006)	oo helium.	

	e + He e + He	Angular Scattering Ionization	32-45  eV 32-45  eV	${ m Th}$ ${ m Th}$
856.	X. G. Ren, C. G. Ni (e,2e) study on di processes of xeno Phys. Rev. A 73, 04	ing, J. K. Deng, G. L. Su, S. F. Zha storted-wave and relativistic eff n $4d_{5/2}$ and $4d_{3/2}$ . 42714 (2006)	ng, Y. R. Huang fects in the inner-shell ionizatio	on
	e + Xe e + Xe	Angular Scattering Ionization	$\begin{array}{c} 1200\text{-}2400 \text{ eV} \\ 1200\text{-}2400 \text{ eV} \end{array}$	${ m Th}$ ${ m Th}$
857.	A. A. Borovik Jr., A Near-threshold el state in potassium Phys. Rev. A 72, 06	A. A. Borovik, O. Zatsarinny, K. Ba ectron-impact excitation of the n. 52701 (2006)	rtschat e $(3p^54s4p)$ $^4S_{3/2}$ quasimetastab	le
	e + K	Excitation	20-23  eV	$\mathrm{E}/\mathrm{T}$
858.	J. Colgan, C. J. For <b>Inner-shell electro</b> Phys. Rev. A 73, 06	ntes, H. L. Zhang on–impact ionization of neutral 32711 (2006)	l atoms.	
	e + Mn e + Fe e + Ni e + Cu e + W	Ionization Ionization Ionization Ionization	6-30 keV 6-30 keV 6-30 keV 6-30 keV 6-30 keV	$\begin{array}{c} Th\\ Th\\ Th\\ Th\\ Th\\ Th\end{array}$
859.	G. B. Poparic, D. S. <b>Resonant vibratio</b> Phys. Rev. A 73, 06	Belic, M. D. Vicic <b>Dal excitation of CO by low-er</b> 52713 (2006)	ergy electrons.	
	e + CO	Excitation	0-4  eV	Exp
860.	S. N. Nahar, A. K. I Dielectronic satel combination meth Phys. Rev. A 73, 06	Pradhan llite spectra of heliumlike iron hod. 52718 (2006)	and nickel from the unified re	e-
	$\mathbf{e} + \mathbf{F}\mathbf{e}^{24+}$ $\mathbf{e} + \mathbf{N}\mathbf{i}^{26+}$	Recombination Recombination	$\begin{array}{c} 4550\text{-}5500 \text{ eV} \\ 4550\text{-}5500 \text{ eV} \end{array}$	${ m Th}$
861.	C. Merlet, X. Llovet Absolute K-shell sections of Ga an Phys. Rev. A 73, 06	t, J. M. Fernandez-Varea ionization cross sections and <i>Lo</i> d As by 1.5-39-keV electrons. 52719 (2006)	$a$ and $Leta_1$ x-ray production cross	ss
	e + Ga	Fluorescence	1.5-39 keV	Exp
	e + As	Fluorescence	1.5-39 keV	Exp
	e + Ga e + As	Ionization Ionization	1.5-39 keV 1.5-39 keV	$\operatorname{Exp}$
862.	D. J. Haxton, C. W	. McCurdy, T. N. Rescigno		

Angular dependence of dissociative electron attachment to polyatomic molecules: Application to the  ${}^{2}B_{1}$  metastable state of the  $H_{2}O$  and  $H_{2}S$  anions. Phys. Rev. A 73, 062724 (2006)

	$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Attachment	$5-7  \mathrm{eV}$	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{H}_2 \mathbf{S}$	Attachment	5-7  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Dissociation	5-7  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{H}_2 \mathbf{S}$	Dissociation	5-7  eV	$\mathrm{Th}$
863.	M. Lu, M. F. Gharaibeh, C S. Schlachter, A. Mueller, S <b>Photoionization and ele</b> Phys. Rev. A 74, 012703 (2	G. Alna'washi, R. A. Phaneuf, A.J. S. Schippers, J. Jacobi, S.W.J. Scu ctron-impact ionization of Kr 2006)	L.D. Kilcoyne, E. Levenson, A. Illy, C. Cisneros <sup>5+</sup> .	
	$\mathbf{e} + \mathbf{K} \mathbf{r}^{5+}$	Ionization	$74-175 { m eV}$	E/T
864.	P. Mozejko, E. Ptasinska-D Absolute total cross-sec drofuran. Phys. Rev. A 74, 012708 (2	enga, A. Domaracka, C. Szmytko etion measurements for electr 2006)	wski con collisions with tetrahy-	
	$a \perp C_{4}H_{2}O$	Elastic Scattering	$1_{-}370 \text{ eV}$	Evn
	$e + C_4 H_8 O$	Excitation	1-370 eV	Exp
865.	J. Colgan, M. S. Pindzola Double- and triple-diffe ionization of hydrogen. Phys. Rev. A 74, 012713 (2	rential cross sections for the 2006)	low-energy electron-impact	
	e + H	Angular Scattering	15.6-17.6  eV	$\mathrm{Th}$
	e + H	Ionization	15.6-17.6  eV	$\mathrm{Th}$
866.	R. Srivastava, A. D. Stauffe Excitation of the metass Phys. Rev. A 74, 012715 (2 $e + Ne^{*}$ $e + Ne^{*}$ e + Ar $e + Ar^{*}$ e + Kr $e + Kr^{*}$ $e + Kr^{*}$	er, L. Sarma table states of the noble gases 2006) Excitation Excitation Excitation Excitation Excitation Excitation Excitation Excitation	<ul> <li>2-400 eV</li> </ul>	Th Th Th Th Th Th Th
	$\mathbf{e} + \mathbf{X}\mathbf{e}^*$	Excitation	2-400  eV	$\mathrm{Th}$
867.	F. Fremont, A. Hajaji, JY K-shell ionization cross Phys. Rev. A 74, 012717 (2	7. Chesnel, P. Leprince, F. Poree, sections following 0.6-4-keV (2006)	B. Gervais, D. Hennecart $e^- + H_2O$ collisions.	
	$\mathbf{e} + \mathbf{H}_2 \mathbf{O} \\ \mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Angular Scattering Ionization	0.4-4  keV 0.4-4  keV	E/T $E/T$
868.	C. P. Ballance, D. C. Griffi <b>Collisional-radiative cale</b> Phys. Rev. A 74, 012719 (2	n, S. D. Loch, R. F. Boivin, M. S. culations of He line emission in 2006)	. Pindzola n <b>low-temperature plasmas.</b>	
	$\mathrm{e} + \mathrm{He} \ \mathrm{e} + \mathrm{He}^*$	Excitation Excitation	0-40 eV; $2x10^4 - 2x10^5$ K 0-40 eV; $2x10^4 - 2x10^5$ K	Th Th
869.	O. Chuluunbaatar, I. V. P Cappello <b>Role of the cusp condit</b> Phys. Rev. A 74, 014703 (2	uzynin, P. S. Vinitsky, Yu. V. P ions in electron-helium double 2006)	opov, K. A. Kouzakov, C. Dal e ionization.	

	e + He e + He	Angular Scattering Ionization	5.6  m ~keV 5.6  m ~keV	Th Th
870.	S. E. Michelin, A. S. L. Oliveira, M. M. Fu Comparative study Phys. Rev. A 74, 022	Falck, K. T. Mazon, J. J. Piacenti jimoto, I. Iga, MT. Lee 7 for elastic electron collisions 702 (2006)	ni, M. A. Scopel, L.S.S. da Silva, H. on $C_2N_2$ isomers.	
	$\mathbf{e} + \mathbf{C}_2 \mathbf{N}_2$	Elastic Scattering	1-100  eV	Th
871.	M. Tashiro, K. Morok <b>R-matrix calculations with ground</b> - Phys. Rev. A 74, 022	tuma, J. Tennyson on of differential cross section state and electronically excite 706 (2006)	as for low-energy electron colli- ed-state $O_2$ molecules.	
	$\mathbf{e} + \mathbf{O}_2 \\ \mathbf{e} + \mathbf{O}_2$	Angular Scattering Excitation	$5-15  { m eV}$ $5-15  { m eV}$	${ m Th}$ Th
872.	M.H.F. Bettega, C. W Low-energy electro Phys. Rev. A 74, 022	Vinstead, V. McKoy on scattering by $N_2O$ . (711 (2006)		
	$\mathbf{e} + \mathbf{N}_2 \mathbf{O} \\ \mathbf{e} + \mathbf{N}_2 \mathbf{O}$	Elastic Scattering Angular Scattering	$0-15 {\rm eV}$ $0-15 {\rm eV}$	Th Th
873.	D. L. Robbins, P. Be Reed, A. J. Smith, K. <b>Polarization measu</b> $Ar^{17+}$ and $Fe^{25+}$ at Phys. Rev. A 74, 022	iersdorfer, A. Ya. Faenov, T. A. T. R. Boyce, G. V. Brown, R. L. Kerments of the $Lyman - \alpha_1$ x-rational structure in the second structure in the se	Pikuz, D. B. Thorn, H. Chen, K. J. elley, C. A. Kilbourne, F. S. Porter ay emission lines of hydrogenlike s.	
	$\mathbf{e} + \mathbf{Ar}^{17+}$ $\mathbf{e} + \mathbf{Fe}^{25+}$	Excitation Excitation	5-150 keV 5-150 keV	Exp
874.	P. L. Bartlett, J. F. W Differential and in states of atomic hy Phys. Rev. A 74, 022	Villiams, I. Bray, A. G. Mikosza, A tegrated cross sections for ex drogen by electron impact be 714 (2006)	A. T. Stelbovics excitation to the 3s, 3p, and 3d slow the $n=4$ threshold.	
	e + H	Excitation	12.24  eV	Th
875.	I. Linert, B. Mielewsk Elastic electron sca Phys. Rev. A 74, 042	a, G. C. King, M. Zubek <b>ttering in neon in the 100</b> deg 701 (2006)	- 180 deg scattering angle range.	
	e + Ne e + Ne	Elastic Scattering Angular Scattering	7-15 eV 7-15 eV	Exp Exp
876.	C. Makochekanwa, K. Experimental obser pact in the thresho Phys. Rev. A 74, 042	. Oguri, R. Suzuki, T. Ishihara, M rvation of neutral radical form old region. 704 (2006)	. Hoshino, M. Kimura, H. Tanaka nation from $CH_4$ by electron im-	
	$\mathbf{e} + \mathbf{CH}_4$	Dissociation	$5-13 \mathrm{~eV}$	Exp
877.	G. X. Chen, R. K. Sn Fully relativistic R Phys. Rev. A 74, 042	nith, K. Kirby, N. S. Brickhouse, H -matrix calculation of electron (709 (2006)	3. J. Wargelin n impact excitation of Ne IX.	

	$\mathbf{e} + \mathbf{N}\mathbf{e}^{8+}$	Excitation	66.5-90 Ry	$\mathrm{Th}$
878.	C. S. Trevisan, A. E. Orel, <b>Low-energy electron sc</b> Phys. Rev. A 74, 042716 (	T. N. Rescigno attering by formic acid. 2006)		
	e + HCOOH e + HCOOH e + HCOOH	Elastic Scattering Angular Scattering Total Scattering	0.1-15 eV 0.1-15 eV 0.1-15 eV	Th Th Th
879.	S. D. Loch, M. S. Pindzola <b>The effects of radiative</b> J. Phys. B 39, 85 (2006)	, C. P. Ballance, D. C. Griffi cascades on the x-ray dia	n agnostic lines of $Fe^{16+}$ .	
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{16+}$	Excitation	$700\text{-}1200\;\mathrm{eV}$	$\mathrm{Th}$
880.	S. Marienfeld, I. I. Fabrika <b>High resolution low-end</b> J. Phys. B 39, 105 (2006)	nt, M. Braun, MW. Ruf, H. ergy electron attachment	Hotop to $CF_3I$ .	
	$\mathbf{e} + \mathbf{C}\mathbf{F}_{3}\mathbf{I}$	Attachment	$0.5\text{-}500~\mathrm{meV}$	$\mathrm{E}/\mathrm{T}$
881.	H. Deutsch, K. B. MacAda Calculated cross section Rydberg atoms. J. Phys. B 39, 343 (2006)	am, K. Becker, H. Zhang, T. as for the electron-impact	D. Maerk ionization of Na(ns) and Na(nd)	
	e + Na	Ionization	0-2.5  eV	$\mathrm{Th}$
882.	M. P. Scott, C. A. Ramsbo On the role of 'two-part J. Phys. B 39, 387 (2006)	ottom, C. J. Noble, V. M. Bu ticle-one-hole' resonances	rke, P. G. Burke in electron collisions with Ni V.	
	$\mathbf{e} + \mathbf{N}\mathbf{i}^{4+}$	Excitation	0-6 Ry	$\mathrm{Th}$
883.	E. L. Foley, F. M. Levintor A collisional-radiative r radiation. J. Phys. B 39, 443 (2006)	n nodel including sublevel p	parameters (CRISP) for H-alpha	
	e + H	Excitation		$\mathrm{Th}$
884.	<ul> <li>P. W. Zetner, P. V. Johnse</li> <li>Differential cross section</li> <li>state of barium.</li> <li>J. Phys. B 39, 455 (2006)</li> </ul>	on ons for electron impact e	xcitation out of the (6s6p ${}^1P_1$ )	
	e + Ba e + Ba e + Ba e + Ba	Elastic Scattering Angular Scattering Total Scattering Excitation	20 eV 20 eV 20 eV 20 eV	Exp Exp Exp Exp
885.	S. Kawazoe, T. Kai, R. Ku Excitation of the $4^1P^0$ s J. Phys. B 39, 493 (2006)	umar Chauhan, R. Srivastava state of calcium by electro	, S. Nakazaki on impact.	
	e + Ca e + Ca	Angular Scattering Excitation	$10-25 \ eV$ $10-25 \ eV$	${ m Th}$ Th

886.	Y. Khajuria, P. C. Des Xe(4d) triple different imation in electron- J. Phys. B 39, 569 (200	hmukh ential cross section: Modified atom collision. 06)	d semiclassical exchange approx-	
	e + Xe	Ionization	1000  eV	$\mathrm{Th}$
887.	<ul> <li>A. Kupliauskiene, P. B.</li> <li>K. Bartschat</li> <li>The role of cascade pautoionizing levels in</li> <li>J. Phys. B 39, 591 (200)</li> </ul>	ogdanovich, A. A. Borovik, O. I. processes in electron-impact n potassium. 06)	Zatsarinny, A. N. Grum-Grzhimailo, excitation of the $(3p^54s^2)^2P_{3/2,1/2}$	
	e + K	Excitation	20-28  eV	$\mathrm{E}/\mathrm{T}$
888.	A. R. Milosavljevic, S. <b>Experimental deter</b> electron-atom (mole J. Phys. B 39, 609 (200	Madzunkov, D. Sevic, I. Cadez, mination of the differential ecule) scattering. 06)	B. P. Marinkovic cross-section surface for elastic	
	e + Ar	Elastic Scattering	40-200 eV 40-200 eV	Exp
	e + Kr	Angular Scattering	40-200 eV 40-200 eV	Exp Evp
	e + Kr	Angular Scattering	40-200 eV 40-200 eV	Exp
	Differential cross se hydrogen by electro J. Phys. B 39, 719 (200 e + H e + H	ctions for excitation to the n impact at energies from 1 06) Angular Scattering Excitation	<b>3s, 3p and 3d states of atomic</b> <b>6.5 to 54 eV</b> . 16.5-54 eV 16.5-54 eV	${ m E/T} { m E/T}$
890.	A. Ehlerding, A. A. Vi H. Montaigne, M. Kan Mitchell, J. L. LeGarro Ghazaly, L. H. Anderse <b>The dissociative rec</b> J. Phys. B 39, 805 (200 $e + CF_3^+$	ggiano, F. Hellberg, R. D. Thom ninska, F. Osterdahl, M. af Ugg ec, A. I. Florescu-Mitchell, C. R en ombination of fluorocarbon 06) Dissociation	has, V. Zhaunerchyk, W. D. Geppert, glas, M. Larsson, O. Novotny, J.B.A. bebrion-Rowe, A. Svendsen, M. A. El ions III: $CF_2^+$ and $CF_3^+$ . $2x10^{-4} - 2x10^1 \text{ eV}$	Exp
	$\mathbf{e} + \mathbf{CF}_2^+$	Dissociation	$2x10^{-4} - 2x10^{1} \text{ eV}$	Exp
	$\mathbf{e} + \mathbf{C}\mathbf{F}_3^+$ $\mathbf{e} + \mathbf{C}\mathbf{F}_3^+$	Recombination	$2x10^{-4} - 2x10^{1} \text{ eV}$ $2x10^{-4} - 2x10^{1} \text{ eV}$	Exp Exp
891.	J. Liu, Y. Wang, Y. Zh Coupled-channels of J. Phys. B 39, 861 (200	ou otical calculation of electron 06)	-carbon scattering.	шţ
	e + C e + C	Excitation Ionization	0-200 eV 0-200 eV	Th Th
892.	R. Dey, A. C. Roy, C. J. Double ionization of J. Phys. B 39, 955 (200	Dal Cappello f <b>helium by electron and pos</b> 06)	sitron impact.	
	e + He e + He	Angular Scattering Ionization	$\begin{array}{c} 601 \ \mathrm{eV} \\ 601 \ \mathrm{eV} \end{array}$	Th Th

893.	M. S. Pindzola, F. Robich Electron-impact double J. Phys. B 39, L127 (2006	eaux, J. Colgan e ionization of $H^-$ .		
	$e + H^-$	Ionization	40-60 eV	$\mathrm{Th}$
894.	M. Allan, K. Franz, H. Ho Absolute angle-different atoms from threshold to J. Phys. B 39, L139 (2006)	top, O. Zatsarinny, K. Bartsc atial cross sections for elec to 19.5 eV.	hat etron-impact excitation of neon	
	e + Ne e + Ne	Angular Scattering Excitation	$\begin{array}{c} 16.6\text{-}19.5 \ \mathrm{eV} \\ 16.6\text{-}19.5 \ \mathrm{eV} \end{array}$	${ m E/T} { m E/T}$
895.	J. Gao, D. H. Madison, J. Theoretical calculation ization of hydrogen mo J. Phys. B 39, 1275 (2006)	L. Peacher of fully differential cross s lecules.	ections for electron-impact ion-	
	$\begin{array}{l} \mathbf{e} + \mathbf{H}_2 \\ \mathbf{e} + \mathbf{H}_2 \end{array}$	Angular Scattering Ionization	$\begin{array}{c} 35.3\text{-}4168 \text{ eV} \\ 35.3\text{-}4168 \text{ eV} \end{array}$	$_{\mathrm{Th}}$
896.	A. Yu. Elizarov, I. I. Tupi Electron-impact ionizat J. Phys. B 39, 1395 (2006)	tsyn tion of Li, $Be^+$ , $B^{2+}$ , $C^{3+}$ ,	$N^{4+}$ and $O^{5+}$ .	
	$\mathbf{e} + \mathbf{Li}$ $\mathbf{e} + \mathbf{Be}^{+-5+}$	Ionization Ionization	5-1000 eV 5-1000 eV	Th Th
897.	V. P. Shevelko, H. Tawara Salzborn <b>Double ionization of he</b> <b>and fitting parameters</b> J. Phys. B 39, 1499 (2006)	a, I. Yu. Tolstikhina, F. Scher eavy positive ions by elect for ionization cross sectio	uermann, B. Fabian, A. Mueller, E. Fron impact: Empirical formula ns.	
	$ e + Ti^{+-6+}   e + Fe^{+-6+}   e + Ni^{+-6+}   e + Ga^{+-6+}   e + Kr^{+-4+}   e + Mo^{+-6+}   e + Pr^{+-4+}   e + Sm^{+-6+}   e + W^{6+}   e + Pb^{6+}   e + Bi^{+-12+} $	Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization	$\begin{array}{c} 100\text{-}10,000 \ \text{eV} \\ 100\text{-}10,000 \ \text{eV} \\$	$Th \\ Th \\$
898.	M. Stepanovic, M. Minic, T. K. Bartschat Integral cross sections He near threshold. J. Phys. B 39, 1547 (2006)	D. Cvejanovic, J. Jureta, J. K for electron-impact excitat	urepa, S. Cvejanovic, O. Zatsarinny, Sion of the $3^3S$ and $3^1S$ states of	
	e + He	Excitation	22.6-24.2  eV	$\mathrm{E}/\mathrm{T}$
899.	M. Ivkovic, R. Zikic, S. Jo On simultaneous deter	vicevic, N. Konjevic mination of electron imp	act width, ion-broadening and	

On simultaneous determination of electron impact width, ion-broadening and ion-dynamic parameter from the shape of plasma broadened non-hydrogenic atom line.

J. Phys. B 39, 1773 (2006)

	e + Kr	Line Broadening		E/T
900.	M. Montenegro, W. H Relativistic and co transitions of OII. J. Phys. B 39, 1863 (	Eissner, S. N. Nahar, A. K. Pradha orrelation effects in electron (2006)	an impact excitation of forb	idden
	$\mathbf{e} + \mathbf{O}^+$	Excitation	1 Ry	$\mathrm{Th}$
901.	J.K.G. Watson Electron-impact bi different $\Delta$ n. J. Phys. B 39, 1889 (	roadening of radio recombinat	ion lines of atomic hydrogo	en for
	e + H	Line Broadening		Th
902.	M. Piwinski, D. Dzicz Coincidence study J. Phys. B 39, 1945 (	zek, L. Klosowski, R. Srivastava, S of excitation of cadmium ato (2006)	5. Chwirot ms by electron impact.	
	e + Cd	Excitation	60-80  eV	Exp
903.	C. S. Trevisan, A. E. Elastic scattering of J. Phys. B 39, L255 (	Orel, T. N. Rescigno of low-energy electrons by tet (2006)	rahydrofuran.	
	$\mathbf{e} + \mathbf{C}_4 \mathbf{H}_8 \mathbf{O}$	Elastic Scattering	1-20 eV	Th
904.	F. Catoire, E. M. Staid Bennani Investigation of th close to minimum	cu-Casagrande, M. Nekkab, C. Dal le (e, 2e) single ionization of momentum transfer.	Cappello, K. Bartschat, A. Lah He and Ar at large energ	umam- y loss
	J. Phys. B 39, 2827 (	(2006)		
	e + He e + Ar e + He e + Ar	Angular Scattering Angular Scattering Ionization Ionization	721-729.6 eV 721-729.6 eV 721-729.6 eV 721-729.6 eV	Exp Exp Exp Exp
905.	G. Halmova, J. D. Go Low-energy electro J. Phys. B 39, 2849 (	prfinkiel, J. Tennyson on collisions with $C_2$ using the (2006)	R-matrix method.	
	$\mathbf{e} + \mathbf{C}_2$	Excitation	0-10  eV	$\mathrm{Th}$
906.	L. G. Ferreira, A. R. A geometrical opti J. Phys. B 39, 1045 (	Lopes, M.A.P. Lima, M.H.F. Bett ics model for electron-molecul (2006)	ega le collisions.	
	$\begin{array}{l} \mathbf{e} + \mathbf{C}_{60} \\ \mathbf{e} + \mathbf{C}_{6} \mathbf{H}_{6} \\ \mathbf{e} + \mathbf{C}_{6} \mathbf{F}_{6} \\ \mathbf{e} + \mathbf{C}_{8} \mathbf{H}_{8} \end{array}$	Elastic Scattering Elastic Scattering Elastic Scattering Elastic Scattering	15-40 eV 15-40 eV 15-40 eV 15-40 eV	E/T E/T E/T E/T
907.	O. Zatsarinny, K. Bar Low-energy elastic	rtschat, S. S. Tayal electron scattering by atomic	c oxygen.	

J. Phys. B 39, 1237 (2006)

	e + O	Elastic Scattering	0-10  eV	E/T
908.	G. Aussendorf, F. Jue Bartschat, D. V. Furs $(\mathbf{e}, e\gamma) - coincidence$ <b>185 nm emission li</b> J. Phys. B 39, 2403 (2007)	ettemann, K. Muktavat, L. Sharn a, I. Bray, G. F. Hanne studies to determine spin-res ne in mercury. 2006)	na, R. Srivastava, A. D. Stauffer, F	К. Ie
	$\mathrm{e}+\mathrm{Hg}$ $\mathrm{e}+\mathrm{Hg}$	Fluorescence Excitation	15-100 eV 15-100 eV	${ m E/T} { m E/T}$
909.	C. Dal Cappello, A. M Second-order effect J. Phys. B 39, 2431 (2010)	Mansouri, S. Houamer, B. Joulaki ts in (e, 2e) ionization-excitat 2006)	an ion of $H_2$ .	
	$\mathbf{e} + \mathbf{H}_2 \\ \mathbf{e} + \mathbf{H}_2$	Excitation Ionization	$\begin{array}{c} 1200\text{-}2000 \ \mathrm{eV} \\ 1200\text{-}2000 \ \mathrm{eV} \end{array}$	E/T E/T
910.	J. Wu, J. Yuan The resonance stru barium atoms: A f J. Phys. B 39, 2493 (2010)	actures in the cross sections of ally relativistic R-matrix stud 2006)	of slow electron interaction wit ly.	h
	e + Ba	Elastic Scattering	0-10  ev; 0-2.5  eV	E/T
911.	O. Novotny, R. Plasil <b>The recombination</b> <b>plasma.</b> J. Phys. B 39, 2561 (2010)	, A. Pysanenko, I. Korolov, J. Gla a of $D_3^+$ and $D_5^+$ ions with electron	osik ectrons in deuterium containin	g
	$\mathbf{e} + \mathbf{H}_3^+$	Recombination	130-300 K	Exp
	$\mathbf{e} + \mathbf{D}_3^+$	Recombination	130-300 K	Exp
	$\mathbf{e} + \mathbf{H}_5{}^+$	Recombination	130-300 K	Exp
	$\mathbf{e} + \mathbf{D}_5^+$	Recombination	130-300 K	Exp
912.	D. M. Filipovic, B. P Stauffer <b>Electron scattering</b> J. Phys. B 39, 2583 (2010)	redojevic, V. Pejcev, D. Sevic, B. <b>5 by magnesium: Excitation o</b> 2006)	P. Marinkovic, R. Srivastava, A. I f the $3s3p$ $^1P_1$ state.	).
	m e + Mg m e + Mg m e	Angular Scattering Excitation	10-100 eV 10-100 eV	E/T E/T
913.	S. Palaniyappan, A. D B. C. Walker Multielectron ultra i 9, l ; 12) at inten J. Phys. B 39, S357 (	PiChiara, I. Ghebregziabher, E. L. 1 astrong laser field ionization o sities from $10^{15}$ W $cm^{-2}$ to $10$ 2006)	Huskins, A. Falkowski, D. Pajerowsk f $Ar^{n+}$ , $Kr^{m+}$ and $Xe^{l+}$ (n ; 9, n <sup>18</sup> W $cm^{-2}$ .	i, <b>n</b>
	$a \perp \Lambda n^{3+-7+}$	Ionization	$30 - 3 r 10^4 $ oV	$\mathbf{T}\mathbf{b}$
	$e + Kr^{+-7+}$	Ionization	$30 - 3x 10^{-6} V$ $30 - 3x 10^{4} eV$	1 11 Th
	$e + Xe^{4+-11+}$	Ionization	$30 - 3x10^4 \text{ eV}$	Th
			55 5010 01	111

914. V. S. Prabhudesai, D. Nandi, E. Krishnakumar On the presence of the  ${}^{4}\Sigma_{u}{}^{-}$  resonance in dissociative electron attachment to  $O_{2}$ . J. Phys. B 39, L277 (2006)

	$\mathbf{e} + \mathbf{O}_2 \\ \mathbf{e} + \mathbf{O}_2$	Attachment Ionization	5-9.3  eV 5-9.3  eV	$\operatorname{Exp}$ Exp
915.	I. Murakami, T. Kato, D. Large-scale calculation J. Phys. B 39, 2917 (2006	Kato, U. I. Safronova, T. E. ( of dielectronic recombina )	Cowan, Yu. Ralchenko tion parameters for Mg-like Fe.	
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{14+}$	Recombination	0.1-1600  eV	Th
916.	M. Allan Study of resonances in electrons. J. Phys. B 39, 2939 (2006	n formic acid by means of $5$	f vibrational excitation by slow	
	e + HCOOH	Excitation	1-5 eV	Exp
917.	<ul> <li>T. T. Gien</li> <li>Doubly excited <sup>1</sup>P<sup>0</sup> state</li> <li>J. Phys. B 39, 2969 (2006)</li> </ul>	ates of He at energies belo	w the N = 2 threshold of $He^+$ .	
	$egin{array}{lll} { m e} + { m He}^+ \ { m e} + { m He}^+ \end{array}$	Elastic Scattering Excitation	$3x10^1 - 5x10^7$ Ry $3x10^1 - 5x10^7$ Ry	Th Th
918.	Y. Wang, Y. Zhou The effects of discrete of atomic oxygen by e J. Phys. B 39, 3009 (2006	and continuum states on t lectron impact.	he $2p^4 \ ^3P$ -; $2p^3 3s \ ^3S^0$ transition	
	e + O	Excitation	15-100 $eV$	$\mathrm{Th}$
919.	H. Munjal, K. L. Baluja Elastic and excitation method. J. Phys. B 39, 3185 (2006	processes of electron $im_{j}$	pact on $C_3$ using the R-matrix	
	$\mathbf{e} + \mathbf{C}_3$	Elastic Scattering	1-10 eV	Exp
	$\mathbf{e} + \mathbf{C}_3 \ \mathbf{e} + \mathbf{C}_3$	Angular Scattering Excitation	1-10 eV 1-10 eV	Exp Exp
920.	J. Lecointre, D. S. Belic, A crossed-beam exper molecular ions: Its ap J. Phys. B 39, 3275 (2006	H. Cherkani-Hassani, J. J. Jur iment for electron impact plication to $CO^+$ .	eta, P. Defrance t ionization and dissociation of	
	$\mathbf{e} + \mathbf{CO}^+$ $\mathbf{e} + \mathbf{CO}^+$	Dissociation Ionization	5-2500 eV 5-2500 eV	Exp Exp
921.	H. M. Boechat-Roberty, A Cross sections for elas J. Phys. B 39, 3361 (2006	A. M. Ferreira-Rodrigues, C. C tic and inelastic electron s 5)	2. Turci, G.G.B. de Souza cattering from carbon disulfide.	-
	$\mathbf{e} + \mathbf{CS}_2$	Elastic Scattering	1000  eV	Exp
	$\mathbf{e} + \mathbf{CS}_2 \ \mathbf{e} + \mathbf{CS}_2$	Angular Scattering Excitation	$\begin{array}{c} 1000  \mathrm{eV} \\ 1000  \mathrm{eV} \end{array}$	Exp Exp
922.	F. Delahaye, A. K. Pradh Electron impact excita ation damping. J. Phys. B 39, 3465 (2006	an, C. J. Zeippen ation of helium-like ions up	to $n = 4$ levels including radi-	

	$\mathbf{e} + \mathbf{N}^{5+}$ $\mathbf{e} + \mathbf{N}^{8+}$	Excitation Excitation	0-4X E(4 ${}^{1}P_{1}$ ) Ry 0-4X E(4 ${}^{1}P_{1}$ ) Ry	$_{\mathrm{Th}}$
	$\mathbf{e} + \mathbf{M} \mathbf{g}^{10+}$	Excitation	$0.4X E(4 {}^{1}P_{1}) Rv$	Th
	$\mathbf{e} + \mathbf{Al}^{11+}$	Excitation	$0-4X \to (4 \ ^{1}P_{1}) \text{ Ry}$	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{Si}^{12+}$	Excitation	$0-4X \to (4 \ ^{1}P_{1}) \text{ Ry}$	Th
	$\mathbf{e} + \mathbf{S}^{14+}$	Excitation	$0-4X \to (4 \ ^{1}P_{1}) \text{ Ry}$	Th
	$\mathbf{e} + \mathbf{C}\mathbf{a}^{18+}$	Excitation	0-4X E(4 ${}^{1}P_{1}$ ) Ry	$\mathrm{Th}$
923.	C. P. Ballance, D. C. <b>Relativistic radiati</b> <b>citation of</b> $W^{46+}$ . J. Phys. B 39, 3617 (	Griffin <b>vely damped R-matrix calcula</b> 2006)	ation of the electron-impact ex-	
	$\mathbf{e} + \mathbf{W}^{46+}$	Excitation	1500-4000 $\mathrm{eV}$	Th
924.	H. Cho, R. P. McEach Tanaka, A. D. Stauffe <b>Absorption effects</b> J. Phys. B 39, 3781 (	hran, S. J. Buckman, D. M. Filipo r, E. C. Jung <b>in intermediate energy elastic</b> 2006)	ovic, V. Pejcev, B. P. Marinkovic, H. electron scattering from xenon.	
	-   <b>V</b> -		10,100 - 10	F /T
	e + Ae	Angular Scattering	10-100 eV	亡/ 1 〒/丁
	e + Ae	Angular Scattering	10-100 8 V	Ľ/ 1
925.	K. A. Berrington <b>The high partial w</b> J. Phys. B 39, 3873 (	<b>ave phenomenon of spin chan</b> 2006)	ging atomic transitions.	
	$\mathbf{e} + \mathbf{L}\mathbf{i}^+$ $\mathbf{e} + \mathbf{F}\mathbf{e}^{24+}$	Excitation Excitation	15-2500 Ry 15-2500 Ry	${ m Th}$ Th
926.	J. Fedor, P. Cicman, Farizon, N. J. Mason, <b>Fragmentation of t</b> by $H_2O/D_2O$ . J. Phys. B 39, 3935 (	<ul> <li>B. Coupier, S. Feil, M. Winkler,</li> <li>P. Scheier, T. D. Maerk</li> <li>cransient water anions followi</li> <li>2006)</li> </ul>	K. Gluch, J. Husarik, D. Jaksch, B.	
	$e + H_2O$	Attachment	5-20 eV	Exp
	$e + D_2O$	Attachment	5-20 eV	Exp
	$e + H_2O$	Dissociation	5-20 eV	Exp
	$\mathbf{e} + \mathbf{D}_2 \mathbf{O}$	Dissociation	5-20  eV	Exp
927.	A. J. Murray, M. J. H. (e, 2e) ionization r son between exper polarization and in J. Phys. B 39, 3945 (	Iussey, J. Gao, D. H. Madison neasurements from the $3\sigma_g$ as iment and theoretical predict terference. 2006)	nd $2\sigma_u^*$ states of $N_2$ – compari- tions of the effects of exchange,	
	e + Ar	Elastic Scattering	$75.6-78.7 { m eV}$	$\mathrm{Th}$
	e + Ar	Angular Scattering	75.6-78.7  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{N}_2$	Angular Scattering	75.6-78.7  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{N}_2$	Ionization	$75.6-78.7 { m eV}$	$\mathrm{Th}$
928.	Z. Felfli, A. Z. Msezar Near-threshold bel Regge pole analysi J. Phys. B 39, L353 (	ne, D. Sokolovski naviour of electron elastic sca s. 2006)	ttering cross sections for Fr: A	
	$\mathbf{e} + \mathbf{Fr}$	Elastic Scattering	0-3.4  eV	$\mathrm{Th}$

# 929. P. L. Bartlett

A complete numerical approach to electron-hydrogen collisions. J. Phys. B 39, R379 (2006)

	e + H	Elastic Scattering	0-1000  eV	$\mathrm{Th}$
	$e + H^*$	Elastic Scattering	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$e + He^+$	Elastic Scattering	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{L}\mathbf{i}^{2+}$	Elastic Scattering	0-1000  eV	$\mathrm{Th}$
	$e + Be^{3+}$	Elastic Scattering	0-1000  eV	$\mathrm{Th}$
	e + H	Angular Scattering	0-1000  eV	$\mathrm{Th}$
	$e + H^*$	Angular Scattering	0-1000  eV	$\mathrm{Th}$
	$e + He^+$	Angular Scattering	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{L}\mathbf{i}^{2+}$	Angular Scattering	0-1000  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{B}\mathbf{e}^{3+}$	Angular Scattering	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	e + H	Excitation	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$e + H^*$	Excitation	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$e + He^+$	Excitation	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{L}\mathbf{i}^{2+}$	Excitation	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$e + Be^{3+}$	Excitation	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	e + H	Ionization	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$e + H^*$	Ionization	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$e + He^+$	Ionization	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{L}\mathbf{i}^{2+}$	Ionization	0-1000  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{B}\mathbf{e}^{3+}$	Ionization	0-1000  eV	$\mathrm{Th}$
	e + H	Electron Collisions	0-1000  eV	$\mathrm{Th}$
	$e + H^*$	Electron Collisions	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$e + He^+$	Electron Collisions	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$e + Li^{2+}$	Electron Collisions	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	$e + Be^{3+}$	Electron Collisions	$0-1000 {\rm ~eV}$	$\mathrm{Th}$
	J. Phys. B 39, 4733 $e + K^+$	(2006) Excitation	20-400 eV	Th
	$e + K^+$	Ionization	20-400  eV	$\mathrm{Th}$
931.	S. Belim, J. Lower, <b>Spin asymmetries</b> J. Phys. B 39, 4759	M. Kampp, C. T. Whelan s in the electron-impact ionizat (2006)	ion of $Ar(2p)$ .	
	e + Ar	Angular Scattering	910  eV	E/T
	e + Ar	Ionization	910  eV	E/T
932.	N. R. Badnell <b>Dielectronic reco</b> J. Phys. B 39, 4825	mbination of $Fe^{13+}$ : Benchmarl (2006)	king the M-shell.	
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{13+}$	Recombination	0-230  eV	E/T
933.	J. W. Maseberg, T. Fluorescence pola electron impact. J. Phys. B 39, 4861	J. Gay arization of helium negative-ion (2006)	resonances excited by po	larized
	e + He	Fluorescence	55-60  eV	$\mathbf{F}/\mathbf{T}$
	e + He	Excitation	55-60  eV	E/T

934.	<ol> <li>S. Elazzouzi, F. Catoire, C. Dal Cappello, A. Lahmam-Bennani, I. Charpentier Double ionization of argon by electron impact: Use of the approximate 6C model. J. Phys. B 39, 4961 (2006)</li> </ol>			el.
	$\mathbf{e} + \mathbf{Ar}$	Ionization	$466\text{-}956~\mathrm{eV}$	E/T
935.	ZS. Yuan, Y. Saka Ohtani, LF. Zhu, H Autoionization st. J. Phys. B 39, 5097	i, N. Umeda, Y. Fujita, T. Taka KZ. Xu ates in xenon investigated by (2006)	ayanagi, C. Yamada, N. Nakamura, S	S.
	e + Xe e + Xe	Excitation Ionization	30-500 eV 30-500 eV	Exp Exp
936.	H. Cherkani-Hassani Absolute cross see J. Phys. B 39, 5105	i, D. S. Belic, J. J. Jureta, P. Def ctions for electron impact ion (2006)	Trance nization and dissociation of $O_2^+$ .	
	$\mathbf{e} + \mathbf{O}_2^+$	Dissociation	4-2500  eV	Exp
	$\mathbf{e} + \mathbf{O}_2^+$	Ionization	4-2500  eV	Exp
201.	Determination of Mg-like Si III. Astron. Astrophys.	the recombination rate coef 459, 291 (2006)	ficients for Na-like Si IV formin	lg
	$\mathbf{e} + \mathbf{Si}^{3+}$	Recombination	0-20  eV	E/T
938.	N. J. Wilson, K. L. Erratum: Effective Astron. Astrophys.	Bell, C. E. Hudson <b>re collision strengths for elect</b> 461, 765 (2007)	ron impact excitation of C II.	
	$e + C^+$	Excitation	$3.0-4.5 \log T(K)$	$\mathrm{Th}$
939.	P. S. Barklem Electron-impact e Astron. Astrophys.	excitation of neutral oxygen. 462, 781 (2007)		
	e + O	Excitation	0-40  eV	$\mathrm{Th}$
940.	M. A. Bautista, N. I Dielectronic recon helium isoelectron Astron. Astrophys.	R. Badnell mbination data for dynamic nic sequence. 466, 755 (2007)	finite-density plasmas. XII. Th	le
	$\mathbf{e} + \mathbf{L}\mathbf{i}^+$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{B}\mathbf{e}^{2+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{B}^{3+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{C}^{4+}$	Recombination	$10 - 10^{7}$ K	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{N}^{\mathbf{b}+}$	Recombination	$10 - 10^{7} \text{ K}$	Th
	$e + O^{o+}$	Recombination	10 - 10'  K	Th
	e + F''	Recombination	10 - 10'  K 10 - 107 V	Th
	$e + 1 N e^{9+}$	Recombination	$10 - 10^{\circ}$ K 10 $10^{7}$ V	In ጥኑ
	$e + Ind^+$ $e \perp Mc^{10+}$	Recombination	10 - 10 K $10 - 10^7$ K	111 Th
	$e + Al^{11+}$	Recombination	$10 - 10^7 \text{ K}$	Th Th
	$\ddot{\mathbf{e}} + \mathbf{Si}^{12+}$	Recombination	$10 - 10^7 \text{ K}$	Th
	$e + P^{13+}$	Recombination	$10 - 10^7 \text{ K}$	Th

$\mathbf{e} + \mathbf{S}^{14+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Cl}^{15+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{r}^{16+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{K}^{17+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$e + Ca^{18+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{S} \mathbf{c}^{19+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{T} \mathbf{i}^{20+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{V}^{21+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$e + Cr^{22+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$e + Mn^{23+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{F} \mathbf{e}^{24+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$e + Co^{25+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{N}\mathbf{i}^{26+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$e + Zn^{27+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{K} \mathbf{r}^{28+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Mo}^{29+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{X} \mathbf{e}^{30+}$	Recombination	$10 - 10^7 { m K}$	$\mathrm{Th}$

941. M. C. Witthoeft, G. Del Zanna, N. R. Badnell

Atomic data from the IRON project. LXIII. Electron-impact excitation of  $Fe^{19+}$  up to n = 4.

Astron. Astrophys. 466, 763 (2007)

$\mathbf{e} + \mathbf{F} \mathbf{e}^{19+}$	Excitation	$5-9 \log(K)$	$\mathrm{Th}$
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942. K. P. Dere

Ionization rate coefficients for the elements hydrogen through zinc.

Astron. Astrophys. 466, 771 (2007)

e + H	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
e + He	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$e + He^+$	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
e + Li	Ionization	$0-10^5~{ m eV}$	$\mathrm{Th}$
$e + Li^+$	Ionization	$0-10^5~{ m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Ionization	$0-10^5~{ m eV}$	$\mathrm{Th}$
e + Be	Ionization	$0-10^5~{ m eV}$	$\mathrm{Th}$
$e + Be^{+-3+}$	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
e + B	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$e + B^{+-4+}$	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
e + C	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
$e + C^{+-5+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
e + N	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
$e + N^{+_{-6+}}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
e + O	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
$e + O^{+_{7+}}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
e + F	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$e + F^{+-8+}$	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
e + Ne	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{N}\mathbf{e}^{+-9+}$	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
e + Na	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$e + Na^{+-10+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
e + Mg	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
$e + Mg^{+-11+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
e + Al	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{l}^{+-12+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
e + Si	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$e + Si^{+-13+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$

e + P	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$e + P^{+_{-14+}}$	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{S}$	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$e + S^{2+_{15+}}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$
e + Cl	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Cl}^{+-16+}$	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
e + Ar	Ionization	$0-10^5 { m eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A}\mathbf{r}^{+-17+}$	Ionization	$0-10^5 {\rm ~eV}$	$\mathrm{Th}$
e + K	Ionization	$0-10^5 { m eV}$	Th
$e + K^{+-18+}$	Ionization	$0 - 10^5 { m eV}$	Th
e + Ca	Ionization	$0 - 10^5 { m eV}$	Th
$e + Ca^{+-19+}$	Ionization	$0 - 10^5 { m eV}$	Th
e + Sc	Ionization	$0 - 10^5 { m eV}$	Th
$\mathbf{e} + \mathbf{S}\mathbf{c}^{+-20+}$	Ionization	$0 - 10^5 { m eV}$	Th
e + Ti	Ionization	$0 - 10^5 { m eV}$	Th
$\mathbf{e} + \mathbf{T}\mathbf{i}^{+-21+}$	Ionization	$0 - 10^5 { m eV}$	Th
e + V	Ionization	$0 - 10^5 { m eV}$	Th
$e + V^{+-22+}$	Ionization	$0-10^5 { m eV}$	Th
e + Cr	Ionization	$0-10^5 { m eV}$	Th
$e + Cr^{+-23+}$	Ionization	$0-10^5 { m eV}$	Th
e + Mn	Ionization	$0-10^5 { m eV}$	Th
$e + Mn^{+-24+}$	Ionization	$0 - 10^5 { m eV}$	Th
e + Fe	Ionization	$0 - 10^5 { m eV}$	Th
$e + Fe^{+-25+}$	Ionization	$0 - 10^5 { m eV}$	Th
e + Co	Ionization	$0 - 10^5 { m eV}$	Th
$e + Co^{+-26+}$	Ionization	$0 - 10^5 { m eV}$	Th
e + Ni	Ionization	$0 - 10^5 { m eV}$	Th
$\mathbf{e} + \mathbf{N}\mathbf{i}^{+-27+}$	Ionization	$0 - 10^5 { m eV}$	Th
e + Cu	Ionization	$0 - 10^5 { m eV}$	Th
$e + Cu^{+28+}$	Ionization	$0 - 10^5 { m eV}$	Th
e + Zn	Ionization	$0 - 10^5 { m eV}$	Th
$e + Zn^{+-29+}$	Ionization	$0 - 10^5 { m eV}$	$\mathrm{Th}$

943. E. Takacs, B. Blagojevic, K. Makonyi, E.-O. Le Bigot, C.I. Szabo, Y.-K. Kim, J. D. Gillaspy **Direct observation of the**  ${}^{2}D_{3/2}$  -  ${}^{2}D_{5/2}$  ground-state splitting in  $Xe^{9+}$ . Phys. Rev. A 73, 052505 (2006)

$\mathbf{e} + \mathbf{X} \mathbf{e}^{9+}$	Fluorescence	100-600  eV	Exp
$\mathbf{e} + \mathbf{X} \mathbf{e}^{9+}$	Excitation	100-600  eV	Exp

944. R. Panajotovic, J. Lower, E. Weigold, A. Prideaux, D. H. Madison
(e,2e) measurements on xenon: Reexamination of the fine-structure effect. Phys. Rev. A 73, 052701 (2006)

$\mathbf{e} + \mathbf{X}\mathbf{e}$	Angular Scattering	147.8  eV	E/T
e + Xe	Ionization	$147.8~{\rm eV}$	E/T

945. R. S. Schappe, E. Urban

Cross sections for OH transitions due to electron impact on water molecules. Phys. Rev. A 73, 052702 (2006)

$e + H_2O$	Dissociation	9-700  eV	Exp
$e + H_2O$	Fluorescence	9-700  eV	Exp

946. A.K.F. Haque, M. A. Uddin, A. K. Basak, K. R. Karim, B. C. Saha, F. B. Malik Electron-impact ionization of L-shell atomic species. Phys. Rev. A 73, 052703 (2006)

	e + Li	Ionization	$10^1 - 10^5 \text{ eV}$	E/T
	$e + Be^+$	Ionization	$10^1 - 10^5 \text{ eV}$	E/T
	$e + B^+$	Ionization	$10^1 - 10^5 \text{ eV}$	E/T
	$\mathbf{e} + \mathbf{B}^{2+}$	Ionization	$10^1 - 10^5 \text{ eV}$	E/T
	$e + C^+$	Ionization	$10^1 - 10^5 \text{ eV}$	E/T
	$e + C^{2+}$	Ionization	$10^1 - 10^5 \text{ eV}$	E/T
	$e + N^{2+}$	Ionization	$10^1 - 10^5 \text{ eV}$	_/ - Е/Т
	$e + N^{3+}$	Ionization	$10^1 - 10^5 \text{ eV}$	_/ - Е/Т
	$e + O^{3+}$	Ionization	$10^{1} - 10^{5} \text{ eV}$	E/T
	$e + O^{4+}$	Ionization	$10^1 - 10^5 \text{ eV}$	E/T
	$e + O^{5+}$	Ionization	$10^1 - 10^5 \text{ eV}$	E/T
	$e + Ne^{5+}$	Ionization	$10^1 - 10^5 \text{ eV}$	_/ - Е/Т
	$\mathbf{e} + \mathbf{N}\mathbf{e}^{6+}$	Ionization	$10^1 - 10^5 \text{ eV}$	_/ - Е/Т
	$e + Ne^{7+}$	Ionization	$10^1 - 10^5 \text{ eV}$	_/ - Е/Т
	$e + U^{88+}$	Ionization	$10^1 - 10^5 \text{ eV}$	_/ - Е/Т
	$e + U^{89+}$	Ionization	$10^1 - 10^5 \text{ eV}$	$\dot{E/T}$
947.	M. S. Pindzola, F. R Electron-impact ic Phys. Rev. A 73, 05	tobicheaux, S. D. Loch, J. P. Colganization of $H_2$ using a time-de 2706 (2006)	an ependent close-coupling metl	nod.
	$\mathbf{e} + \mathbf{H}_2$	Ionization	15-100 eV	E/T
948.	M. Tashiro, K. Morc <b>R-matrix calculati</b> Phys. Rev. A 73, 05	okuma, J. Tennyson <b>on of electron collisions with e</b> 2707 (2006)	lectronically excited $O_2$ molec	ules.
	$\mathbf{e} + \mathbf{O}_2$	Elastic Scattering	0-15  eV	E/T
	$\mathbf{e} + \mathbf{O}_2^*$	Elastic Scattering	0-15  eV	E/T
	$\mathbf{e} + \mathbf{O}_2$	Excitation	0-15  eV	E/T
	$\mathbf{e} + \mathbf{O}_2^*$	Excitation	0-15  eV	E/T
949.	G. X. Chen, K. Kirb <b>Dirac R-matrix ca</b> Phys. Rev. A 73, 05	y, N. S. Brickhouse alculation of electron-impact e 2708 (2006)	excitation of Ni XIX.	
	$\mathbf{e} + \mathbf{N}\mathbf{i}^{18+}$	Excitation	0-180 Ry	E/T
950.	A. J. Gonzalez Mart Lapierre, V. Mironov Harman, U. D. Jents <b>Benchmarking hig</b> to $Hg^{78+}$ ions. I. J. Phys. Rev. A 73, 05	inez, J. R. Crespo Lopez-Urrutia, v, R. Soria Orts, H. Tawara, M. Tr schura, C. H. Keitel, J. H. Scofield <b>h-field few-electron correlation</b> <b>Experiment.</b> 2710 (2006)	J. Braun, G. Brenner, H. Bruhns inczek, J. Ullrich, A. N. Artemye , I. I. Tupitsyn a and QED contributions in H	5, A. v, Z. $g^{75+}$
	$\mathbf{e} + \mathbf{H}\mathbf{\sigma}^{75+}$	Becombination	45-54  keV	Evp
	$e + Hg^{76+}$	Recombination	45-54  keV	Exp
	$\mathbf{e} + \mathbf{H}\mathbf{g}^{77+}$	Recombination	45-54  keV	Exp
	$\mathbf{e} + \mathbf{H} \mathbf{g}^{78+}$	Recombination	45-54  keV	Exp
951.	Z. Harman, I. I. Tu Lopez-Urrutia, A. J. Benchmarking hig to $Hg^{78+}$ ions. II. Phys. Rev. A 73, 05	pitsyn, A. N. Artemyev, U. D. Je Gonzalez Martinez, H. Tawara, J <b>h-field few-electron correlation</b> <b>Theory.</b> 2711 (2006)	ntschura, C. H. Keitel, J. R. Cr . Ullrich n and QED contributions in H	espo $g^{75+}$
	$e + Hg^{75+}$	Recombination	45-54  keV	Th
	$\mathbf{e} + \mathbf{H}\mathbf{g}^{76+}$	Recombination	45-54  keV	Th
	$\mathbf{e} + \mathbf{H}\mathbf{g}^{77+}$	Recombination	45-54  keV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{H}\mathbf{g}^{78+}$	Recombination	45-54  keV	$\mathrm{Th}$

2	n	1
J	υ	T

952.	J. Shertzer, A. Temkir Direct calculation o Inclusion of correlat Phys. Rev. A 74, 0527	f the scattering amplitude wi tion effects. 701 (2006)	thout partial-wave analysis. III.	
	e + H e + H	Elastic Scattering Angular Scattering	0.1-0.8 Ry 0.1-0.8 Ry	${ m Th}$ ${ m Th}$
953.	F. Fremont, A. Hajaji, <b>K-shell and total io</b> <b>An empirical scaling</b> Phys. Rev. A 74, 0527	, JY. Chesnel nization cross sections follow g law. '07 (2006)	ing electron-molecule collisions:	
	e + C e + N e + O e + Ne $e + H_2O$ $e + CH_4$ $e + N_2$ $e + C_3H_4$	Ionization Ionization Ionization Ionization Ionization Ionization Ionization	$\begin{array}{c} 350\text{-}4000 \text{ eV} \\ 350\text{-}4000 \text{ eV} \end{array}$	$\begin{array}{c} \mathrm{E/T}\\ \mathrm{E/T}\\ \mathrm{E/T}\\ \mathrm{E/T}\\ \mathrm{E/T}\\ \mathrm{E/T}\\ \mathrm{E/T}\\ \mathrm{E/T}\\ \mathrm{E/T}\end{array}$
954.	O. Zatsarinny, K. Bart Low-energy electron Phys. Rev. A 74, 0527	sschat, S. Gedeon, V. Gedeon, V. n scattering from Ca atoms a 708 (2006)	Lazur and photodetachment of $Ca^-$ .	
	e + Ca e + Ca	Elastic Scattering Angular Scattering	0-4 eV 0-4 eV	${ m E/T} { m E/T}$
955.	M. Hoerndl, S. Yoshid Classical dynamics of rings. Phys. Rev. A 74, 0527	a, A. Wolf, G. Gwinner, M. Selig of enhanced low-energy electr 712 (2006)	er, J. Burgdorfer <b>con-ion recombination in storage</b>	
	$\mathbf{e} + \mathbf{C}^{6+}$	Recombination	$10^{-5} - 10^0 \text{ eV}$	$\mathrm{E}/\mathrm{T}$
956.	W. Dai, W. G. Sun, H Studies on vibration scattering from $N_2$ : Eur. Phys. J. D 39, 38	. Feng, L. Shen nal excitation differential cros molecule. 35 (2006)	s-sections of low-energy electron	
	$\mathbf{e} + \mathbf{N}_2 \\ \mathbf{e} + \mathbf{N}_2$	Angular Scattering Excitation	1.6-2.1  eV 1.6-2.1  eV	$_{\mathrm{Th}}$
957.	R. Riahi, Ph. Teulet, Z Cross-section and ra isation and dissocia Eur. Phys. J. D 40, 22	Z. Ben Lakhdar, A. Gleizes ate coefficient calculation for tion of $H_2$ and OH molecules 23 (2006)	electron impact excitation, ion-	
	$e + H_2$ e + OH $e + H_2$ e + OH $e + H_2$ e + OH	Dissociation Dissociation Excitation Excitation Ionization Ionization	$\begin{array}{c} 1500\text{-}15,000 \ \mathrm{deg} \ \mathrm{K} \\ \end{array}$	$Th \\ Th \\$

958. S. Y. Yousif Al-Mulla

Low-energy electron scattering from copper. Eur. Phys. J. D 42, 11  $\left(2007\right)$ 

	e + Cu e + Cu	Angular Scattering Excitation	20-100 eV 20-100 eV	${ m Th}$ ${ m Th}$
959.	N. Verma, A.K.S. Jha Electron collisional method – Breit-Pa $Ni^{10+}$ . Eur. Phys. J. D 42, 2	a, M. Mohan excitation of argon-like Ni XI auli R-matrix calculation for 35 (2007)	l using the Breit-Pauli R-matr electron impact excitation	ix of
	$\mathbf{e} + \mathbf{N}\mathbf{i}^{10+}$	Excitation	10-75 Ry	$\mathrm{Th}$
960.	YK. Kim Scaled Born cross s J. Chem. Phys. 126,	sections for excitations of $H_2$ 064305 (2007)	by electron impact.	
	$\mathbf{e} + \mathbf{H}_2$	Excitation	0.0-10,000  eV	$\mathrm{Th}$
961.	P. A. Thorn, M. J. Bru W. R. Newell, H. Kat Cross sections and ${}^{1}B_{1}$ electronic state J. Chem. Phys. 126, 0	unger, P.J.O. Teubner, N. Diakomio, o, M. Hoshino, H. Tanaka, H. Cho oscillator strengths for elect e of water. 064306 (2007)	chalis, T. Maddern, M. A. Bolorizad o, YK. Kim cron-impact excitation of the	leh, $\tilde{A}$
	$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Excitation	20-200  eV	Exp
962.	H. Kato, H. Kawahar, Cross sections for electronic state of J. Chem. Phys. 126,	a, M. Hoshino, H. Tanaka, M. J. I electron impact excitation of carbon monoxide. 064307 (2007)	Brunger, YK. Kim the vibrationally resolved A <sup>1</sup>	Π
	e + CO	Excitation	20-200  eV	Exp
963.	C. Makochekanwa, H Tanaka <b>Electron and posit</b> J. Chem. Phys. 126,	I. Kato, M. Hoshino, M.H.F. Be ron scattering from 1, $1 - C_2 E$ 164307 (2007)	ttega, M.A.P. Lima, O. Sueoka, l $I_2F_2.$	H.
	$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2 \mathbf{F}_2$	Excitation	0-1000  eV	$\mathrm{E/T}$
964.	M.H.F. Bettega, M.A Electron collisions J. Chem. Phys. 126,	.P. Lima <b>with furan.</b> 194317 (2007)		
	$\mathbf{e} + \mathbf{C}_4 \mathbf{H}_4 \mathbf{O}$	Elastic Scattering	0-15  eV	Th
965.	V. Zhaunerchyk, W. I Thomas, M. Kaminsk <b>Dissociative recom</b> <b>measurements.</b> J. Chem. Phys. 127, 0	D. Geppert, E. Vigren, M. Hamber a, F. Osterdahl <b>bination study of</b> $N_3^+$ : <b>Cross</b> 014305 (2007)	rg, M. Danielsson, M. Larsson, R. I section and branching fraction	D. on
	$\mathbf{e} + \mathbf{N}_3{}^+$	Dissociation	$10^{-6} - 10^{-1} \text{ eV}$	Exp
966.	A. Jablonski, F. Salva Solid state effect in	at a simulations of electron elast	ic backscattering.	

Nucl. Instrum. Methods Phys. Res. B 251, 371 (2006)

	e + Al e + Cu e + Ag e + Au	Elastic Scattering Elastic Scattering Elastic Scattering Elastic Scattering	200-1000 eV 200-1000 eV 200-1000 eV 200-1000 eV	${f Th}\ {f Th}\ {f Th}\ {f Th}$
967.	J. R. Goetz, M. Walter, Cross-sections for (e, J. Phys. B 39, 4365 (200	J. S. Briggs <b>3e) collisions on helium:</b> 7 06)	The DS6C wavefunction.	
	e + He	Ionization	640  eV	$\mathrm{Th}$
968.	S. Taioli, J. Tennyson A wave packet metho J. Phys. B 39, 4379 (200	od for treating nuclear dyn 96)	amics on complex potentials	
	$e + H_2O$	Dissociation	3.5-10  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Excitation	3.5-10  eV	Th
969.	S. S. Tayal Electron impact excit J. Phys. B 39, 4393 (200	ation of forbidden and allo 06)	owed transitions in O II.	
	$e + O^+$	Excitation	$0.1-40 \mathrm{~eV}$	$\mathrm{Th}$
970.	<ul> <li>G. Aussendori, F. Juetto Bartschat, D. V. Fursa, J.</li> <li>Total polarization of impact.</li> <li>J. Phys. B 39, 4435 (200)</li> </ul>	I. Bray, G. F. Hanne the 185 nm emission line	of mercury excited by elect	tron
	e + Hg	Excitation	15-100  eV	E/T
971.	M. Mattioli, G. Mazzitel Updating of atomic of and molybdenum. J. Phys. B 39, 4457 (200	lli, K. B. Fournier, M. Finkentl data needed for ionization 06)	nal, L. Carraro balance evaluations of kryp	oton
	e + Kr	Recombination	0-5000  eV	E/T
	$\mathbf{e} + \mathbf{K} \mathbf{r}^{+-35+}$	Recombination	0-5000  eV	E/T
	e + Mo	Recombination	0-5000  eV	E/T
	$e + Mo^{+-41+}$	Recombination	0-5000  eV	E/T
	e + Kr	Ionization	0-5000 eV	E/T
	$e + Kr^{-0}$		0-5000 eV	E/T E/T
	e + Mo	Ionization	0-5000 eV	E/1 E/T
	$e + Mo^{41+}$	Ionization	0-5000 eV	E/T
972.	M. Lu, G. Alna'washi, Levenson, A. S. Schlacht <b>Photoionization and</b> Phys. Rev. A 74, 062701	M. Habibi, M. F. Gharaibeh, ser, C. Cisneros, G. Hinojosa electron-impact ionization 1 (2006)	R. A. Phaneuf, A.L.D. Kilcoyne of $Kr^{3+}$ .	-, E.
	$e + Kr^{3+}$	Ionization	39-179  eV	Exp

973. P. Kolorenc, J. Horacek

**Dissociative electron attachment and vibrational excitation of the chlorine molecule.** Phys. Rev. A 74, 062703 (2006)

$\mathbf{e} + \mathbf{Cl}_2$	Attachment	0-1.5  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Cl}_2$	Dissociation	0-1.5  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Cl}_2$	Excitation	0-1.5  eV	$\mathrm{Th}$

974. T. Topcu, M. S. Pindzola, C. P. Ballance, D. C. Griffin, F. Robicheaux Electron-impact of highly excited hydrogenlike ions in a collinear s-wave model. Phys. Rev. A 74, 062708 (2006)

e + H	Ionization	0-3.4  keV	$\mathrm{Th}$
$e + He^+$	Ionization	0-3.4  keV	$\mathrm{Th}$
$e + Li^{2+}$	Ionization	0-3.4  keV	$\mathrm{Th}$
$e + Be^{3+}$	Ionization	0-3.4  keV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{B}^{4+}$	Ionization	0-3.4  keV	$\mathrm{Th}$
$e + C^{5+}$	Ionization	0-3.4  keV	$\mathrm{Th}$

975. X.-Y. Han, J.-M. Li High-energy electron-impact excitation process: The generalized oscillator strengths of helium. Phys. Rev. A 74, 062711 (2006)
e + He Excitation 0-4 a.u. Th
976. M. Duerr, C. Dimopoulou, B. Najjari, A. Dorn, J. Ullrich Three-dimensional images for electron-impact single ionization of He: Complete and comprehensive (e,2e) benchmark data. Phys. Rev. Lett. 96, 243202 (2006)

e + He	Angular Scattering	102-1000  eV	Exp
e + He	Ionization	102-1000  eV	Exp

977. M. Duerr, A. Dorn, J. Ullrich, S. P. Cao, A. Czasch, A. S. Kheifets, J. R. Goetz, J. S. Briggs (e,3e) on helium at low impact energy: The strongly correlated three-electron continuum.

Phys. Rev. Lett. 98, 193201 (2007)

e + He	Angular Scattering	106  eV	Exp
e + He	Ionization	106  eV	Exp

# 978. A.K.F. Haque, M. Alfaz Uddin, A. K. Basak, K. R. Karim, B. C. Saha, F. B. Malik Electron impact ionization of M-shell atoms. Phys. Scr. 74, 377 (2006)

$\mathbf{e} + \mathbf{Si}^{3+}$	Ionization	$10 - 10^9 {\rm eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{S}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{S}^{4+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Cl}^{2+}$	Ionization	$10 - 10^9  \mathrm{eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Cl}^{4+}$	Ionization	$10 - 10^9  \mathrm{eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Cl}^{5+}$	Ionization	$10 - 10^9  \mathrm{eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Ar}$	Ionization	$10 - 10^9  \mathrm{eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A}\mathbf{r}^{3+}$	Ionization	$10 - 10^9  \mathrm{eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A}\mathbf{r}^{5+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A}\mathbf{r}^{6+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$
$e + K^+$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{T} \mathbf{i}^{5+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{C} \mathbf{r}^{6+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$
$e + Cr^{7+}$	Ionization	$10 - 10^9 \text{ eV}$	$\mathrm{Th}$
$e + Cr^{8+}$	Ionization	$10 - 10^9 {\rm eV}$	$\mathrm{Th}$

$\mathbf{e} + \mathbf{C} \mathbf{r}^{10+}$	Ionization	$10 - 10^9 {\rm ~eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{F} \mathbf{e}^{6+}$	Ionization	$10 - 10^9 {\rm \ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{F} \mathbf{e}^{9+}$	Ionization	$10 - 10^9 {\rm \ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{F} \mathbf{e}^{11+}$	Ionization	$10 - 10^9 {\rm \ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{N} \mathbf{i}^{12+}$	Ionization	$10 - 10^9 {\rm eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{N}\mathbf{i}^{14+}$	Ionization	$10 - 10^9 {\rm eV}$	$\mathrm{Th}$
e + Pb	Ionization	$10 - 10^9 {\rm ~eV}$	$\mathrm{Th}$
e + Bi	Ionization	$10 - 10^9 {\rm ~eV}$	$\mathrm{Th}$
e + U	Ionization	$10 - 10^9 {\rm ~eV}$	$\mathrm{Th}$

979. D. Borodin, I. Beigman, L. Vainshtein, A. Pospieszczyk

Close coupling approach for heavy particle collisions with an excited atom: Transitions between n=3 states in He.

Phys. Scr. 74, 464 (2006)

e + He	Ionization	$10 - 10^5$ ; $10 - 10^3 \text{ eV}$	Th
$\mathbf{e} + \mathbf{H}\mathbf{e}^*$	Ionization	$10 - 10^5$ ; $10 - 10^3 \text{ eV}$	Th

### 980. V. I. Fisher, V. A. Bernshtam, I. R. Almiev

Direct inner-shell ionization of atomic ions by electron impact. Phys. Scr. 74, 614 (2006)

$\mathbf{e} + \mathbf{A} \mathbf{g}^{11+}$	Excitation	0.6-30  keV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{g}^{19+}$	Excitation	0.6-30  keV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{g}^{29+}$	Excitation	0.6-30  keV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{g}^{37+}$	Excitation	0.6-30  keV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{g}^{43+}$	Excitation	0.6-30  keV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{g}^{11+}$	Ionization	0.6-30  keV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{g}^{19+}$	Ionization	0.6-30  keV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{g}^{29+}$	Ionization	0.6-30  keV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{g}^{37+}$	Ionization	$0.6-30 \mathrm{keV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A} \mathbf{g}^{43+}$	Ionization	$0.6-30 \mathrm{keV}$	$\mathrm{Th}$

981. C. L. Cocke

Momentum imaging in atomic collisions.

Phys. Scr. T110, 9 (2004)

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e + He Ionization
```

3.6-8 MeV/u; 1-100 eV; 2 keV E/T

982. H. Hotop, M.-W. Rul, I. I. Fabrikant

Reso	onan	ce and	threshold phenomena in low-energy electron collisions with molecules
and	clust	ters.	
DI	C	<b>TT110</b>	<u>99 (9004)</u>

Phys. Scr. T110, 22 (2004)

$\mathbf{e} + \mathbf{CO}_2$	Attachment	0-1000  MeV	Exp
$\mathbf{e} + \mathbf{N}_2 \mathbf{O}$	Attachment	0-1000  MeV	Exp
$\mathbf{e} + \mathbf{CO}_2$	Excitation	0-1000  MeV	$\operatorname{Exp}$
$\mathbf{e} + \mathbf{N}_2 \mathbf{O}$	Excitation	0-1000  MeV	Exp

### 983. M. Allan

Threshold phenomena in electron-molecule scattering.

Phys. Scr. T110, 161 (2004)

$\mathbf{e} + \mathbf{CO}_2$	Elastic Scattering	0-5  eV	Exp
$\mathbf{e} + \mathbf{N}_2 \mathbf{O}$	Elastic Scattering	$0-5 \mathrm{eV}$	Exp
$\mathbf{e} + \mathbf{CS}_2$	Elastic Scattering	0-5  eV	Exp
$e + CO_2$	Excitation	0-5  eV	Exp
$\mathbf{e} + \mathbf{N}_2 \mathbf{O}$	Excitation	0-5  eV	Exp
$\mathbf{e} + \mathbf{CS}_2$	Excitation	0-5  eV	Exp

984. S. J. Buckman, R. Panajotovic, M. Jelisavcic Low energy electron-molecule collision cross sections. Phys. Scr. T110, 166 (2004)

e + NO	Elastic Scattering	0-2.5  eV	Exp
e + NO	Angular Scattering	0-2.5  eV	Exp
e + NO	Excitation	0-2.5  eV	Exp

985. A. I. Florescu, A. Suzor-Weiner, T. Leininger, F. X. Gadea Non-adiabatic mechanisms in dissociative recombination. Phys. Scr. T110, 172 (2004)

$\mathbf{e} + \mathbf{H}_2^+ \\ \mathbf{e} + \mathbf{H}\mathbf{e}\mathbf{H}^+$	Dissociation Dissociation	$\frac{10^{-4} - 10^{-1}}{10^{-4} - 10^{-1}} eV$	Th Th
$ m e + LiH^+$	Dissociation	$10^{-4} - 10^{-1} \text{ eV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{H}_2^+$	Recombination	$10^{-4} - 10^{-1} \text{ eV}$	$\mathrm{Th}$
$e + HeH^+$	Recombination	$10^{-4} - 10^{-1} \text{ eV}$	$\mathrm{Th}$
$e + LiH^+$	Recombination	$10^{-4} - 10^{-1} \text{ eV}$	$\mathrm{Th}$

986. C. H. Greene, V. Kokoouline

**Dissociative recombination of polyatomic molecules: A new mechanism.** Phys. Scr. T110, 178 (2004)

$\mathbf{e} + \mathbf{H}_3^+$	Dissociation	$10^{-4} - 10^{+1} \text{ eV}$	Th
$\mathbf{e} + \mathbf{H}_3^+$	Recombination	$10^{-4} - 10^{+1} \text{ eV}$	Th

#### 987. T. Odagiri, N. Kouchi

Doubly excited molecules in electron collisions as studied by coincident electronenergy-loss spectroscopy.

Phys. Scr. T110, 183 (2004)

Elastic Scattering	80-150  eV	Exp
Elastic Scattering	80-150  eV	$\operatorname{Exp}$
Elastic Scattering	80-150  eV	$\operatorname{Exp}$
Excitation	80-150  eV	$\operatorname{Exp}$
Excitation	80-150  eV	Exp
Excitation	80-150  eV	$\operatorname{Exp}$
Ionization	80-150  eV	$\operatorname{Exp}$
Ionization	80-150  eV	$\operatorname{Exp}$
Ionization	80-150  eV	Exp
	Elastic Scattering Elastic Scattering Elastic Scattering Excitation Excitation Excitation Ionization Ionization Ionization	Elastic Scattering80-150 eVElastic Scattering80-150 eVElastic Scattering80-150 eVExcitation80-150 eVExcitation80-150 eVExcitation80-150 eVIonization80-150 eVIonization80-150 eVIonization80-150 eVIonization80-150 eVIonization80-150 eV

#### 988. R. Thomas

Branching between different decay channels in the dissociative recombination of poly-atomic molecules.

Phys. Scr. T110, 188 (2004)

$e + H_2O^+$	Dissociation	$0-3  \mathrm{eV}$	Exd
$\mathbf{e} + \mathbf{C}\mathbf{H}_2^+$	Dissociation	$0-3  \mathrm{eV}$	Exp
$e + NH_2^+$	Dissociation	$0-3  \mathrm{eV}$	Exp
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}^+$	Recombination	$0-3  \mathrm{eV}$	Exp
$\mathbf{e} + \mathbf{C} \mathbf{H}_2^+$	Recombination	$0-3  \mathrm{eV}$	Exp
$\mathbf{e} + \mathbf{N} \mathbf{H}_2^+$	Recombination	$0-3  \mathrm{eV}$	Exp

989. A. Wolf, L. Lammich, D. Strasser, S. Altevogt, V. Andrianarijaona, H. Buhr, O. Heber, H. Kreckel, H. B. Pedersen, D. Schwalm, D. Zajfman Storage ring experiments with cold molecular ions: The H<sub>3</sub><sup>+</sup> puzzle. Phys. Scr. T110, 193 (2004)

	$\mathbf{e} + \mathbf{H}_3^+ \\ \mathbf{e} + \mathbf{H}_3^+$	Dissociation Recombination	$\frac{10^{-4} - 50 \text{ eV}}{10^{-4} - 50 \text{ eV}}$	$\begin{array}{c} \text{Exp} \\ \text{Exp} \end{array}$
990.	I. Bray, K. Bartscha Box-based conver cross sections. Phys. Scr. T110, 20	at, A. T. Stelbovics <b>gent close-coupling calculations</b> 00 (2004)	of electron-hydrogen ionis	ation
	e + H e + H	Angular Scattering Ionization	$15.6 \ {\rm eV}$ $15.6 \ {\rm eV}$	${ m Th}$ Th
991.	A. Chutjian <b>Ion collisions in t</b> Phys. Scr. T110, 20	he highly charged universe. 03 (2004)		
	$\mathbf{e} + \mathbf{H}_{2}^{+}$	Dissociation	0-42  eV	E/T
	$e + Si^{11+}$	Recombination	0.42  eV	E/T
	$e + H_3^+$	Recombination	0-42  eV	E/T
	$e + He^+$	Excitation	0-42  eV	É/T
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{9+}$	Excitation	0-42  eV	É/T
992.	P. Glans, M. Fogle, Badnell, E. Lindroth <b>Dielectronic reco</b> <b>charged ions.</b> Phys. Scr. T110, 21	S. Madzunkov, M. Tokman, D. Niko h, R. Schuch <b>mbination used as a tool for</b> 2 (2004)	olic, T. Mohamed, N. Ekloew, spectroscopic studies of h	N. R. ighly
	$\mathbf{e} + \mathbf{N}^{4+}$	Recombination	0-1.6  eV	E/T
993.	J. Lower, R. Panajo Recent progress i Phys. Scr. T110, 21	otovic, E. Weigold in quantum-state resolved ioniz .6 (2004)	ation experiments.	
	$e + He^+$	Angular Scattering	150-273 eV	Exp
	e + Xe	Angular Scattering	150-273  eV	Exp
	$e + He^+$	Excitation	150-273  eV	Exp
	e + Xe	Excitation	$150-273 { m eV}$	Exp
	$e + He^+$	Ionization	$150-273 {\rm ~eV}$	Exp
	$\mathbf{e} + \mathbf{X}\mathbf{e}$	Ionization	$150-273 {\rm ~eV}$	Exp
994.	M. A. Khakoo, J. G Measurements of impact elastic sca Phys. Scr. T110, 22	A. Childers A differential and doubly-differential attering, excitation, and ionization (2004)	ntial cross-sections for election of atomic hydrogen.	ctron
	e + H	Elastic Scattering	$14.6-40 { m eV}$	Exp
	e + H	Angular Scattering	$14.6-40 {\rm ~eV}$	Exp
	e + H	Excitation	$14.6-40 {\rm \ eV}$	Exp
	e + H	Ionization	$14.6-40 {\rm \ eV}$	Exp
995.	F. Catoire, A. Lahn Coincidence angu in electron impac Phys. Scr. T110, 22	nam-Bennani, A. Duguet llar correlations between scatter et double ionization. 28 (2004)	red, ejected and Auger elect	trons
	e + Ar	Angular Scattering	466-956 eV	Exp
	e + Ar	Ionization	466-956  eV	Exp
				p

996. C. J. Noble

Benchmark calculations for electron collisions with atoms, ions and molecules. Phys. Scr. T110, 233 (2004)

	e + H e + He	Angular Scattering Angular Scattering	10-100 eV 10-100 eV	Th Th
	e + Li $e + B^+$ $a + Si^{2+}$	Angular Scattering Excitation	10-100 eV 10-100 eV 10 100 eV	Th Th Th
	e + SI $e + Fe^+$ e + Kr	Excitation Excitation Excitation	10-100 eV 10-100 eV 10-100 eV	Th Th Th
	$e + CO_2$ e + H e + He	Excitation Ionization Ionization	10-100 eV 10-100 eV 10-100 eV	Th Th Th
	e + Li	Ionization	10-100 eV	Th
997.	R. Srivastava, K. Muktava Electron impact excita mation. Phys. Scr. T110, 241 (200	t, A. D. Stauffer tion of atoms in the rel 4)	ativistic distorted wave approxi-	
	e + Hg	Excitation	8-40 eV	Th
998.	A. T. Stelbovics, P. L. Bar <b>Three body coulomb so</b> Phys. Scr. T110, 247 (200	ctlett, I. Bray, A. S. Kadyro cattering above the ioniz 4)	v ation threshold.	
	e + H	Ionization	$55 \ \mathrm{eV}$	Th
999.	M. Kitajima, R. Suzuki, Dunning Detection of non-emiss of $CH_4$ by electron imp Phys. Scr. T110, 420 (200	E. Persson, J. Burgdorfer, sive $CH_3$ and $CH_2$ radica pact. 4)	B. E. Tannian, C. L. Stokely, F. B.	
	$\mathbf{e} + \mathbf{C}\mathbf{H}_4$	Dissociation	7-15 eV	Exp
1000.	M. Melendez, M. A. Bauti Atomic data from the collision strengths for ( Astron. Astrophys. 469, 1	sta, N. R. Badnell IRON project. LXIV Ca II. 203 (2007)	. Radiative transition rates and	
	$e + Ca^+$	Excitation	0.0-1.0 Ry	Th
1001.	D. V. Lukic, M. Schnell, I S. Schippers, M. Lestinsky Dielectronic recombina and theoretical calculat Astrophys. J., Part 1 664,	D. W. Savin, C. Brandau, F. F. Sprenger, A. Wolf, N. H tion of Fe XV forming Fe tions. 1244 (2007)	2. W. Schmidt, S. Boehm, A. Mueller, R. Badnell e <b>XIV: Laboratory measurements</b>	
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{14+}$	Recombination	0-45  eV	$\mathrm{E}/\mathrm{T}$
1002.	I. Linert, M. Zubek Differential cross section oxygen in the angular of J. Phys. B 39, 4087 (2006)	ns for electron impact v range 10 deg to 180 deg.	ibrational excitation of molecular	
	$\mathbf{e} + \mathbf{O}_2$	Excitation	$10  \mathrm{eV}$	Exp

1003.	M. Durr, C. Dimopoulou, A. Dorn, B. Najjari, I. Bray, D. V. Fursa, Z. Chen, D. H. Madison, K. Bartschat, J. Ullrich Single ionization of helium by 102 eV electron impact: Three-dimensional images for electron emission. J. Phys. B 39, 4097 (2006)				
	e + He	Ionization	102  eV	Exp	
1004.	J. F. Williams, A. G. Mikos Atomic hydrogen revisit J. Phys. B 39, 4113 (2006)	za zed: Electron impact excitatio	on to $H(2p)$ at 54 eV.		
	e + H	Excitation	$54.4 \mathrm{~eV}$	Exp	
1005.	M. Lange, J. Matsumoto, J. Lower, S. Buckman, O. Zatsarinny, K. Bartschat, I. Bray, D. Fursa Benchmark experiment and theory for near-threshold excitation of helium by electron impact. J. Phys. B 39, 4179 (2006)				
	e + He	Excitation	20.30-23.48  eV	$\mathrm{E/T}$	
1006.	<ul> <li>A. Faure, V. Kokoouline, C. H. Greene, J. Tennyson</li> <li>Near-threshold rotational excitation of molecular ions by electron impact.</li> <li>J. Phys. B 39, 4261 (2006)</li> </ul>				
	$\mathbf{e} + \mathbf{H}_3^+$	Excitation	$0.02\text{-}0.3\;\mathrm{eV}$	Th	
1007.	. A. Domaracka, P. Mozejko, E. Ptasinska-Denga, C. Szmytkowski <b>Electron collision with</b> $B(CD_3)_3$ <b>molecules.</b> J. Phys. B 39, 4289 (2006)				
	$\mathbf{e} + \mathbf{B}(\mathbf{CD}_3)_3$ $\mathbf{e} + \mathbf{B}(\mathbf{CH}_3)_3$	Elastic Scattering Elastic Scattering	0.4-370 eV 0.4-370 eV	Exp Exp	
1008.	<ol> <li>M. Allan, O. Zatsarinny, K. Bartschat Near-threshold absolute angle-differential cross sections for electron-impact ex- citation of argon and xenon. Phys. Rev. A 74, 030701 (2006)</li> </ol>				
	$\mathbf{e} + \mathbf{Ar}$	Angular Scattering	8-17 eV	E/T	
	e + Xe o + Ar	Angular Scattering Excitation	8-17 eV 8-17 eV	Е/Т Е/Т	
	e + Ar e + Xe	Excitation	8-17 eV	E/T	
1009.	. I. A. Mikhailov, V. Kokoouline, A. Larson, S. Tonzani, C. H. Greene <b>Renner-Teller effects in</b> $HCO^+$ <b>dissociative recombination.</b> Phys. Rev. A 74, 032707 (2006)				
	$e + HCO^+$ $e + HCO^+$	Dissociation Recombination	$\begin{array}{c} 0.0010.2 \ \mathrm{eV} \\ 0.0010.2 \ \mathrm{eV} \end{array}$	${ m Th}$ Th	
1010.	M. Lukomski, S. Sutton, W A. T. Stelbovics, J. W. Mc Electron-impact ionizat states of cesium. Phys. Rev. A 74, 032708 (2	. Kedzierski, T. J. Reddish, K. Ba Conkey ion cross sections out of the 2006)	artschat, P. L. Bartlett, I. Bray, a ground and 6 $^2P$ excited		

	$egin{array}{c} \mathbf{e} + \mathbf{Cs} \ \mathbf{e} + \mathbf{Cs}^* \end{array}$	Ionization Ionization	7-400 eV 7-400 eV	E/T E/T
1011.	H. Munjal, K. L. Balu Low-energy electro method. Phys. Rev. A 74, 032	ija on scattering with polar mo 712 (2006)	lecule $NH_3$ using the R-matri	х
	$egin{array}{lll} \mathbf{e} + \mathbf{N}\mathbf{H}_3 \ \mathbf{e} + \mathbf{N}\mathbf{H}_3 \ \mathbf{e} + \mathbf{N}\mathbf{H}_3 \end{array}$	Elastic Scattering Angular Scattering Excitation	$\begin{array}{c} 0.0225\text{-}20 \ \mathrm{eV} \\ 0.0225\text{-}20 \ \mathrm{eV} \\ 0.0225\text{-}20 \ \mathrm{eV} \end{array}$	Th Th Th
1012.	B. A. deHarak, J. G. <b>Ejected electron sp</b> Phys. Rev. A 74, 032	Childers, N.L.S. Martin ectrum of He below the N=2 714 (2006)	2 threshold.	
	e + He	Ionization	75-550  eV	Exp
1013.	I. Bray, D. V. Fursa, A Electron-impact ion Phys. Rev. A 74, 034	A. T. Stelbovics nization of helium with large 702 (2006)	energy transfer.	
	e + He e + He	Angular Scattering Ionization	730 eV 730 eV	${ m Th}$ Th
1014.	K. L. Bell, C. A. Ram Effective collision s At. Data Nucl. Data	sbottom trengths for electron-impact Tables 76, 176 (2000)	excitation of S X.	
	$\mathbf{e} + \mathbf{S}^{9+}$	Excitation	$10^4 - 10^7 {\rm K}$	Th
1015.	S. S. Tayal Effective collision s At. Data Nucl. Data	trengths for electron impact Tables 76, 191 (2000)	excitation of N I.	
	$\mathbf{e} + \mathbf{N}$	Excitation	$10^3 - 6x10^5 { m K}$	Th
1016.	M. Liu, Z. An, C. Tan Experimental electr At. Data Nucl. Data	ng, Z. Luo, X. Peng, X. Long <b>ron-impact K-shell ionization</b> Tables 76, 213 (2000)	a cross sections.	
	e + H	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp
	e + He	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + C	Ionization	$10^{-2} - 10^{5} \text{ keV}$	$\operatorname{Exp}$
	$\mathbf{e} + \mathbf{N}$	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + O	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + Ne	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + Na	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + Mg		$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + AI	Ionization	$10^{-7} - 10^{\circ} \text{ KeV}$ $10^{-2} - 10^{5} \ln 3V$	Exp F
	e + 5i	Ionization	$10 - 10^{\circ} \text{ KeV}$ $10^{-2} - 10^{5} \log V$	Exp Free
	e + 0	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp Evr
	c + K	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp Evr
	e + Ce	Ionization	$10^{-2} - 10^5 \text{ keV}$	Evp
	e + Ti	Ionization	$10^{-2} - 10^5 \text{ keV}$	Evp
	$\tilde{e} + V$	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp
	• •			P

	e + Cr	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp
	e + Mn	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Fe	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Co	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Ni	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Cu	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Zn	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Ge	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + As	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Se	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	$\mathrm{e}+\mathrm{Br}$	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Kr	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp
	e + Rb	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp
	e + Sr	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp
	$\mathbf{e} + \mathbf{Y}$	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp
	e + Zr	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Nb	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Mo	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	e + Pd	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	$\mathbf{e} + \mathbf{A}\mathbf{g}$	Ionization	$10^{-2} - 10^5 \text{ keV}$	$\operatorname{Exp}$
	$\mathrm{e}+\mathrm{Cd}$	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp
	e + In	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + Sn	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + Sb	Ionization	$10^{-2} - 10^{3}$ keV	Exp
	e + Te	Ionization	$10^{-2} - 10^{3}$ keV	Exp
	e + Xe	Ionization	$10^{-2} - 10^{3}$ keV	Exp
	e + Ba	Ionization	$10^{-2} - 10^{3}$ keV	Exp
	e + La	Ionization	$10^{-2} - 10^{3}$ keV	Exp
	e + Ce	Ionization	$10^{-2} - 10^{3}$ keV	Exp
	e + Pr	Ionization	$10^{-2} - 10^{3}$ keV	Exp
	$\mathbf{e} + \mathbf{N}\mathbf{d}$	Ionization	$10^{-2} - 10^{3}$ keV	Exp
	e + Sm	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + Eu	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + Ga	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + Ho		$10^{-2} - 10^{5} \text{ keV}$	Exp E
	e + Er	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp E-m
	e + 1m	Ionization	$10 - 10^{\circ}$ keV $10^{-2} - 10^{5}$ keV	Exp E-m
	e + Ib	Ionization	10 - 10 keV $10^{-2}$ $10^5$ keV	Exp
	e + 1a	Ionization	10 - 10 keV $10^{-2}$ $10^{5}$ keV	Exp
	e + w o + Pt	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + 1t	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + Au $a \perp Ph$	Ionization	$10^{-2} - 10^{5} \text{ keV}$	Exp
	e + Bi	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp
	e + U	Ionization	$10^{-2} - 10^5 \text{ keV}$	Exp
1017.	A. K. Bhatia, W. E Atomic data and	Lissner <b>spectral line intensities for</b> ta Tables 76, 270 (2000)	Fe VIII.	-
	no. Dava Nuci. Da	10 100100 10, 210 (2000)		
	$e + Fe^{7+}$	Excitation	10-70 Ry	$\mathrm{Th}$
1018.	1018. C. A. Ramsbottom, K. L. Bell, F. P. Keenan Effective collision strengths for electron impact excitation of Cl III.			

Effective collision strengths for electron At. Data Nucl. Data Tables 77, 57 (2001)

$\mathbf{e} + \mathbf{Cl}^{2+}$	Excitation	$7500-200,000 { m K}$	Th
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1019.	A. M. Samson, K. A. Berrington				
	Electron impact excitation cross sections and rates from the ground state of				
	atomic calcium.				
	At. Data Nucl. Data Tables 77, 87 (2001)				

$\mathbf{e} + \mathbf{Ca}$ Excitation 1000-10,000 K	Th
---	----

1020. R. Celiberto, R. K. Janev, A. Laricchiuta, M. Capitelli, J. M. Wadehra, D. E. Atems Cross section data for electron-impact inelastic processes of vibrationally excited molecules of hydrogen and its isotopes. At. Data Nucl. Data Tables 77, 161 (2001)

0-200 eVE/T $\mathbf{e} + \mathbf{H}_2$ Attachment  $\mathbf{e} + \mathbf{H}_2^*$ Attachment 0-200 eVE/Te + HDE/TAttachment 0-200 eVE/T $e + HD^*$ Attachment 0-200 eVe + HTAttachment 0-200 eVE/Te + HTAttachment 0-200 eVE/T $e + D_2$ E/TAttachment 0-200 eV $e + D_2^*$ E/TAttachment 0-200 eVe + DTE/TAttachment 0-200 eV $e + DT^*$ Attachment 0-200 eVE/T $\mathbf{e} + \mathbf{T}_2$ E/TAttachment 0-200 eV $\mathbf{e} + \mathbf{T}_2^*$ E/TAttachment 0-200 eV $e + H_2$ Dissociation 0-200 eVE/T $e + H_2^*$ E/TDissociation 0-200 eVE/T $e + D_2$ Dissociation 0-200 eV $e + D_2^*$ Dissociation 0-200 eVE/Te + DTE/TDissociation 0-200 eV $e + DT^*$ E/TDissociation 0-200 eV $\mathbf{e} + \mathbf{T}_2$ E/TDissociation 0-200 eV0-200 eV $e + T_2^*$ Dissociation E/T $e + H_2$ 0-200 eVE/TExcitation  $e + H_2^*$ E/T0-200 eVExcitation  $e + D_2$ E/T Excitation 0-200 eV $e + D_2^*$ 0-200 eVE/TExcitation e + DTE/TExcitation 0-200 eV $e + DT^*$ E/T Excitation 0-200 eV $\mathbf{e} + \mathbf{T}_2$ E/T Excitation 0-200 eV $e + T_2^*$ E/TExcitation 0-200 eVE/T $e + H_2$ Ionization 0-200 eVE/T $e + H_2^*$ Ionization 0-200 eV $e + D_2$ Ionization 0-200 eVE/T $e + D_2^*$ E/TIonization 0-200 eV

1021. C. Y. Chen, J. B. Qi, Y. S. Wang, F. J. Yang, X. J. Xu, Y. S. Sun Electron-ion collisional ionization cross sections and rates for the Na isoelectronic sequence. At. Data Nucl. Data Tables 79, 65 (2001)

$e + Ar^{7+}$	Ionization	$10^2 - 10^7 {\rm K}$	Th
$\mathbf{e} + \mathbf{Ar}^{7+*}$	Ionization	$10^2 - 10^7 { m K}$	Th
$\mathbf{e} + \mathbf{T} \mathbf{i}^{11+}$	Ionization	$10^2 - 10^7 { m K}$	Th
$\mathbf{e} + \mathbf{T} \mathbf{i}^{11+*}$	Ionization	$10^2 - 10^7 { m K}$	Th
$\mathbf{e} + \mathbf{C} \mathbf{r}^{13+}$	Ionization	$10^2 - 10^7 { m K}$	Th
$\mathbf{e} + \mathbf{C} \mathbf{r}^{13+*}$	Ionization	$10^2 - 10^7 { m K}$	Th
$\mathbf{e} + \mathbf{F} \mathbf{e}^{15+}$	Ionization	$10^2 - 10^7 { m K}$	Th

$\mathbf{e} + \mathbf{F} \mathbf{e}^{15+*}$	Ionization	$10^2 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{19+}$	Ionization	$10^2 - 10^7 {\rm K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Z} \mathbf{n}^{19+*}$	Ionization	$10^2 - 10^7 {\rm K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{G}\mathbf{e}^{21+}$	Ionization	$10^2 - 10^7 {\rm K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{G} \mathbf{e}^{21+*}$	Ionization	$10^2 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{S}\mathbf{e}^{23+}$	Ionization	$10^2 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{S} \mathbf{e}^{23+*}$	Ionization	$10^2 - 10^7 { m K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Y}^{28+}$	Ionization	$10^2 - 10^7 {\rm K}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Y}^{28+*}$	Ionization	$10^2 - 10^7 { m K}$	$\mathrm{Th}$

# 1022. T. Shirai, T. Tabata, H. Tawara

Analytic cross sections for electron collisions with CO,  $CO_2$ , and  $H_2O$  relevant to edge plasma impurities.

At. Data Nucl. Data Tables 79, 143 (2001)

$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Dissociation	1-10,000  eV	E/T
e + CO	Dissociation	1-10,000  eV	E/T
$\mathbf{e} + \mathbf{CO}_2$	Dissociation	1-10,000  eV	E/T
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Elastic Scattering	1-10,000  eV	E/T
e + CO	Elastic Scattering	1-10,000  eV	E/T
$\mathbf{e} + \mathbf{CO}_2$	Elastic Scattering	1-10,000  eV	E/T
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Total Scattering	1-10,000  eV	E/T
e + CO	Total Scattering	1-10,000  eV	E/T
$\mathbf{e} + \mathbf{CO}_2$	Total Scattering	1-10,000  eV	E/T
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Excitation	1-10,000  eV	E/T
e + CO	Excitation	1-10,000  eV	E/T
$e + CO_2$	Excitation	1-10,000  eV	E/T
$\mathbf{e} + \mathbf{H}_2 \mathbf{O}$	Ionization	1-10,000  eV	E/T
e + CO	Ionization	1-10,000  eV	E/T
$\mathbf{e} + \mathbf{CO}_2$	Ionization	1-10,000  eV	E/T

#### 1023. A. Ichihara, J. Eichler

Angle-differential cross sections for radiative recombination and the photoelectric effect in the K, L, and M shells of one-electron systems calculated within an exact relativistic description.

At. Data Nucl. Data Tables 79, 187 (2001)

$\mathbf{e} + \mathbf{A} \mathbf{r}^{18+}$	Recombination	$0.001\text{-}1.5 \mathrm{MeV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{K} \mathbf{r}^{36+}$	Recombination	$0.001\text{-}1.5 \mathrm{MeV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{X} \mathbf{e}^{54+}$	Recombination	$0.001\text{-}1.5 \mathrm{MeV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{D} \mathbf{y}^{66+}$	Recombination	$0.001\text{-}1.5 \mathrm{MeV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{A}\mathbf{u}^{79+}$	Recombination	$0.001\text{-}1.5 \mathrm{MeV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{P} \mathbf{b}^{82+}$	Recombination	$0.001\text{-}1.5 \mathrm{MeV}$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{U}^{92+}$	Recombination	$0.001\text{-}1.5 \mathrm{MeV}$	$\mathrm{Th}$

# 1024. T. Shirai, T. Tabata, H. Tawara, Y. Itikawa

Analytic cross	sections for	electron	collisions	$\mathbf{with}$	hydrocarbons:	$CH_4,$	$C_2H_6,$
$C_2H_4, C_2H_2, C_3H_3$	$H_8$ , and $C_3H_6$	6•					

At. Data Nucl. Data Tables 80, 147 (2002)

$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_4 \mathbf{H}_8$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C} \mathbf{H}_4$ Dissociation $\mathbf{E}/$	$\mathbf{e} + \mathbf{CH}_4$	Attachment	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C} \mathbf{H}_4$ Dissociation $\mathbf{E}/$	$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$	Attachment	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C} \mathbf{H}_4$ Dissociation $\mathbf{E}/$	$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Attachment	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C} \mathbf{H}_4$ Dissociation $\mathbf{E}/$	$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$	Attachment	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$ Attachment $\mathbf{E}/$ $\mathbf{e} + \mathbf{C} \mathbf{H}_4$ Dissociation $\mathbf{E}/$	$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$	Attachment	E/T
$e + CH_4$ Dissociation $E/$	$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$	Attachment	E/T
	$\mathbf{e} + \mathbf{C}\mathbf{H}_4$	Dissociation	E/T

$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$	Dissociation	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Dissociation	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$	Dissociation	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$	Dissociation	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$	Dissociation	E/T
$\mathbf{e} + \mathbf{CH}_4$	Elastic Scattering	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$	Elastic Scattering	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Elastic Scattering	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$	Elastic Scattering	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$	Elastic Scattering	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$	Elastic Scattering	E/T
$\mathbf{e} + \mathbf{CH}_4$	Total Scattering	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$	Total Scattering	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Total Scattering	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$	Total Scattering	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$	Total Scattering	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$	Total Scattering	E/T
$\mathbf{e} + \mathbf{CH}_4$	Excitation	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$	Excitation	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Excitation	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$	Excitation	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$	Excitation	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$	Excitation	E/T
$\mathbf{e} + \mathbf{CH}_4$	Ionization	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_2$	Ionization	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_4$	Ionization	E/T
$\mathbf{e} + \mathbf{C}_2 \mathbf{H}_6$	Ionization	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_6$	Ionization	E/T
$\mathbf{e} + \mathbf{C}_3 \mathbf{H}_8$	Ionization	E/T

1025. A. K. Bhatia, G. A. Doschek, W. Eissner Atomic data and spectral line intensities for Fe XI. At. Data Nucl. Data Tables 82, 211 (2002)

	$\mathbf{e} + \mathbf{F} \mathbf{e}^{10+}$	Excitation	1-75 Ry	Th	
1026.	<ul> <li>26. G. Mazzitelli, M. Mattioli</li> <li>Ionization balance for optically thin plasmas: Rate coefficients for Cu, Zn, Ga, and Ge ions.</li> <li>At. Data Nucl. Data Tables 82, 313 (2002)</li> </ul>				
	$e + Cu^{+-29+}$	Recombination	0-10,000 K	$^{\mathrm{Th}}$	
	$\mathbf{e} + \mathbf{Z}\mathbf{n}^{+-30+}$	Recombination	0-10,000 K	Th	
	$\mathbf{e} + \mathbf{G}\mathbf{a}^{+-31+}$	Recombination	0-10,000 K	Th	
	$e + Ge^{+-32+}$	Recombination	0-10,000 K	Th	
	$\mathbf{e} + \mathbf{C} \mathbf{u}^{4+\underline{28}+}$	Ionization	0-10,000 K	Th	
	$e + Zn^{5+-29+}$	Ionization	0-10,000 K	Th	
	$\mathbf{e} + \mathbf{G}\mathbf{a}^{6+-30+}$	Ionization	0-10,000 K	$\mathrm{Th}$	

1027. H. L. Zhang, D. H. Sampson

 $e + Ge^{7+-31+}$ 

Relativistic distorted-wave collision strengths and oscillator strengths for the  $45\Delta=0$  transitions with n=2 in the 79 O-like ions with 14;Z;92. At. Data Nucl. Data Tables 82, 357 (2002)

Ionization

$\mathbf{h} u + \mathbf{Si}^{6+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + P^{7+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$

 $0-10,000 {
m K}$ 

Th

$h\nu + S^{8+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Cl^{9+}$	Excitation	0-10,000 Ry	Th
$\mathbf{h} u$ + $\mathbf{A}\mathbf{r}^{10+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{K}^{11+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u$ + $\mathbf{Ca}^{12+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Sc^{13+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Ti^{14+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{V}^{15+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Cr^{16+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u$ + $\mathbf{Mn}^{17+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{F}\mathbf{e}^{18+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Co^{19+}$	Excitation	$0-10,000 { m Ry}$	Th
$\mathbf{h} u$ + $\mathbf{Ni}^{20+}$	Excitation	$0-10,000 { m Ry}$	Th
$h\nu + Cu^{21+}$	Excitation	$0-10,000 { m Ry}$	Th
$h\nu + Zn^{22+}$	Excitation	$0-10,000 { m Ry}$	Th
$h\nu + Ga^{23+}$	Excitation	$0-10,000 { m Ry}$	Th
$h u + Ge^{24+}$	Excitation	$0-10,000 { m Ry}$	Th
$\mathbf{h}\nu + \mathbf{As}^{25+}$	Excitation	$0-10,000 { m Ry}$	Th
$\mathbf{h} u + \mathbf{Se}^{26+}$	Excitation	$0-10,000 { m Ry}$	Th
$h\nu + Br^{27+}$	Excitation	$0-10,000 { m Ry}$	Th
$h\nu + Kr^{28+}$	Excitation	$0-10,000 { m Ry}$	Th
$h\nu + Rb^{29+}$	Excitation	$0-10,000 { m Ry}$	Th
$h\nu + Sr^{30+}$	Excitation	$0-10,000 { m Ry}$	Th
$h\nu + Y^{31+}$	Excitation	$0-10,000 { m Ry}$	Th
$h\nu + Zr^{32+}$	Excitation	$0-10,000 { m Ry}$	Th
$h\nu + Nb^{33+}$	Excitation	0-10,000 Ry	Th
$h\nu + Mo^{34+}$	Excitation	0-10,000 Ry	Th
$h\nu + Tc^{35+}$	Excitation	0-10,000 Ry	Th
$h\nu + Ru^{36+}$	Excitation	0-10,000 Ry	Th
$h\nu + Rh^{37+}$	Excitation	0-10,000 Ry	Th
$h\nu + Pd^{36+}$	Excitation	0-10,000 Ry	Th
$h\nu + Ag^{39+}$	Excitation	0-10,000 Ry	Th
$h\nu + Cd^{40+}$	Excitation	0-10,000 Ry	Th
$h\nu + \ln^{\pm\pm\pm}$	Excitation	0-10,000 Ry	Th
$\mathbf{n}\nu + \mathbf{Sn}^{+2+}$	Excitation	0-10,000 Ry	Th
$h\nu + Sb^{40+}$	Excitation	0-10,000 Ry	Th
$n\nu + 1e^{-2}$		0-10,000 Ry	
$n\nu + 1^{-5}$		0-10,000 Ry	
$\mathbf{n}\nu + \mathbf{A}\mathbf{e}^{47+}$	Excitation	0-10,000 Ry	111 Th
$h\nu + Cs$	Excitation	0.10,000 Ry	111 Th
$\mathbf{h}\nu + \mathbf{D}\mathbf{a}^{49+}$	Excitation	0.10,000 Ry	тп Тh
$h\nu + La$ $h\nu + Ce^{50+}$	Excitation	0-10,000 Ry	Th
$h\nu + Oe$ $h\nu + Pr^{51+}$	Excitation	0-10,000 Ry	Th
$h\nu + Nd^{52+}$	Excitation	0-10,000 Ry	Th
$h\nu + Pm^{53+}$	Excitation	0-10,000 Ry	Th
$h\nu + Sm^{54+}$	Excitation	0-10,000 Ry	Th
$h\nu + Eu^{55+}$	Excitation	0-10,000 Ry	Th
$h\nu + Gd^{56+}$	Excitation	0-10,000 Ry	Th
$h\nu + Tb^{57+}$	Excitation	0-10.000 Ry	Th
$h\nu + Dv^{58+}$	Excitation	0-10.000 Ry	Th
$h\nu + Ho^{59+}$	Excitation	0-10.000 Ry	Th
$h\nu + Er^{60+}$	Excitation	0-10,000 Ry	Th
$h\nu + Tm^{61+}$	Excitation	0-10,000 Ry	Th
$h\nu + Yb^{62+}$	Excitation	0-10,000 Ry	Th
$h\nu + Lu^{63+}$	Excitation	0-10,000 Ry	Th
$h\nu + Hf^{64+}$	Excitation	0-10,000 Ry	Th

h u + Ta <sup>65+</sup>	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{W}^{66+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Re^{67+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Os^{68+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$h\nu + Ir^{69+}$	Excitation	0-10,000 Ry	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Pt}^{70+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Au^{71+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Hg^{72+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Tl^{73+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Pb^{74+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Bi^{75+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Po^{76+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + At^{77+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Rn^{78+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$h\nu + Fr^{79+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{Ra}^{80+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{A}\mathbf{c}^{81+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{T}\mathbf{h}^{82+}$	Excitation	$0-10,000 { m ~Ry}$	$\mathrm{Th}$
$\mathbf{h}\nu + \mathbf{Pa}^{81+}$	Excitation	$0\text{-}10,000 \mathrm{~Ry}$	$\mathrm{Th}$
$\mathbf{h} u + \mathbf{U}^{82+}$	Excitation	$0\text{-}10,000 \mathrm{~Ry}$	$\mathrm{Th}$

1028. H. Merabet, R. Bruch, J. Hanni, M. Bailey, A. L. Godunov, J. H. McGuire, D. V. Fursa, I. Bray, K. Bartschat, H. C. Tseng, C. D. Lin
Scattering angle-integrated (total) and magnetic sublevel cross-sections and degree of linear polarization for electron and proton induced excitation [Hel (1snp) <sup>1</sup>P<sup>0</sup> (n=2-5)] of helium.
At. Data Nucl. Data Tables 83, 45 (2003)

	e + He	Excitation	$3x10^{-5} - 1.4 \text{ MeV}$	$\mathrm{E/T}$		
1029.	A. K. Bhatia, E. Landi, H. H Atomic data and spectra At. Data Nucl. Data Tables	E. Mason I line intensities for Ni XXI. 83, 71 (2003)				
	$\mathbf{e} + \mathbf{N}\mathbf{i}^{20+}$	Excitation	85-425 Ry	Th		
1030.	A. K. Bhatia, R. J. Thomas, <b>Atomic data and spectra</b> At. Data Nucl. Data Tables	, E. Landi I <b>line intensities for Ne III.</b> 83, 113 (2003)				
	$\mathbf{e} + \mathbf{N}\mathbf{e}^{2+}$	Excitation	5-45 Ry	Th		
1031.	A. K. Bhatia, G. A. Doschek Atomic data and spectra At. Data Nucl. Data Tables	l line intensities for Fe XVII. 85, 1 (2003)				
	$\mathbf{e} + \mathbf{F} \mathbf{e}^{16+}$	Excitation	$58.5\text{-}425 \mathrm{\ Ry}$	Th		
1032.	<ol> <li>C. A. Ramsbottom, K. L. Bell, F. P. Keenan, A. Matthews Effective collision strengths for electron impact excitation of Si VIII. At. Data Nucl. Data Tables 85, 69 (2003)</li> </ol>					
	$e + Si^{7+}$	Excitation	$10^4 - 10^7 {\rm K}$	Th		
1033.	A. K. Bhatia, E. Landi Atomic data and spectra	l line intensities for S IX.				

At. Data Nucl. Data Tables 85, 169 (2003)
	$\mathbf{e} + \mathbf{S}^{8+}$	Excitation	25-125 Ry	$\mathrm{Th}$
1034.	N. J. Wilson, K. L. Bell Effective collision streng	ths for electron impact excit	ation of Cl II.	
	At. Data Nuci. Data Table	8 85, 255 (2003)		
	$e + Cl^+$	Excitation	1000-1,000,000 K	Th
1035.	M. S. Dimitrijevic, S. Sahal <b>Stark broadening of Ag</b> At. Data Nucl. Data Table	-Brechot <b>I spectral lines.</b> s 85, 269 (2003)		
	e + Ag	Line Broadening	$2500-50,000 {\rm K}$	Th
1036.	A. K. Bhatia, E. Landi Atomic data and spectra At. Data Nucl. Data Table	al line intensities for Si VIII. s 85, 317 (2003)		
	$\mathbf{e} + \mathbf{Si}^{7+}$	Excitation	20-80 Ry	Th
1037.	P. L. Bartlett, A. T. Stelbo <b>Electron-impact ionizati</b> At. Data Nucl. Data Table	vics on cross sections for elements s 86, 235 (2004)	s Z=1 to Z-54.	
	e + H	Ionization	5-10.000  eV	Th
	$\mathbf{e} + \mathbf{H}\mathbf{e}$	Ionization	5-10,000  eV	Th
	e + Li	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{B}\mathbf{e}$	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{B}$	Ionization	5-10,000  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{C}$	Ionization	5-10,000  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{N}$	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{O}$	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{F}$	Ionization	5-10,000  eV	Th
	e + Ne	Ionization	5-10,000  eV	Th
	e + Na	Ionization	5-10,000  eV	Th
	e + Mg	Ionization	5-10,000  eV	Th
	e + Al	Ionization	5-10.000  eV	Th
	$\mathbf{e} + \mathbf{Si}$	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{P}$	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{S}$	Ionization	5-10,000  eV	Th
	e + Cl	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{A}\mathbf{r}$	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Ca	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Sc	Ionization	5-10,000  eV	Th
	e + Ti	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + V	Ionization	5-10,000  eV	Th
	e + Cr	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Mn	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Fe	Ionization	5-10,000  eV	Th
	e + Co	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Ni	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Cu	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Zn	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Ga	Ionization	5-10,000  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{G}\mathbf{e}$	Ionization	5-10,000  eV	$\mathrm{Th}$
	$\mathbf{e} + \mathbf{As}$	Ionization	5-10,000  eV	Th
	e + Se	Ionization	5-10,000  eV	$\mathrm{Th}$

	e + Br	Ionization	5-10.000  eV	Th
	e + Kr	Ionization	5-10.000  eV	Th
	e + Rb	Ionization	5-10.000  eV	Th
	e + Sr	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{Y}$	Ionization	5-10,000  eV	Th
	e + Zr	Ionization	5-10,000  eV	Th
	e + Nb	Ionization	5-10,000  eV	Th
	e + Mo	Ionization	5-10,000  eV	Th
	e + Tc	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{R}\mathbf{u}$	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{R}\mathbf{h}$	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Pd	Ionization	5-10,000  eV	Th
	$\mathbf{e} + \mathbf{A}\mathbf{g}$	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Cd	Ionization	5-10,000  eV	Th
	e + In	Ionization	5-10,000  eV	$\mathrm{Th}$
	e + Sn	Ionization	5-10,000  eV	Th
	e + Sb	Ionization	5-10,000  eV	Th
	e + Te	Ionization	5-10,000  eV	Th
	e + I	Ionization	5-10,000  eV	Th
	e + Xe	Ionization	5-10,000  eV	Th
1038.	G. Liang, G. Dong, J. Zeng Atomic data and spectra At. Data Nucl. Data Tables	al line intensities for Ar XIII. 88, 83 (2004)		
	$\mathbf{e} + \mathbf{A}\mathbf{r}^{12+}$	Excitation	$10^5 - 10^7 \text{ K}$	Th
	Energy levels, transition ble X-ray line emissions At. Data Nucl. Data Tables	of Ni-like tantalum ions. 89, 101 (2005)	ipact excitations for possi-	
	$\mathbf{e} + \mathbf{T} \mathbf{a}^{45+}$	Excitation	4-600 Ry	Th
1040.	W. Eissner, E. Landi, A. K. Atomic data and spectra At. Data Nucl. Data Tables	Bhatia al line intensities for Ar XII. 89, 139 (2005)		
	$\mathbf{e} + \mathbf{Ar}^{11+}$	Excitation	35-175 Ry	Th
1041.	E. Landi, A. K. Bhatia Atomic data and spectra At. Data Nucl. Data Tables	d line intensities for Ne III. 89, 195 (2005)		
	$\mathbf{e} + \mathbf{N}\mathbf{e}^{2+}$	Excitation	5.2-25 Ry	$\mathrm{Th}$
1042.	I. Murakami, U. I. Safronova Excitation energies, radia and dielectronic recombined At. Data Nucl. Data Tables	a, A. A. Vasilyev, T. Kato ative and autoionization rates, ination rates to excited states 90, 1 (2005)	dielectronic satellite lines, for B-like oxygen.	
	$e + O^{3+}$	Recombination	0.1-120  eV	Th
1043.	E. Landi, A. K. Bhatia Atomic data and spectra At. Data Nucl. Data Tables	al line intensities for Ca XIV. 90, 177 (2005)		
	$e + Ca^{13+}$	Excitation	45-255 Rv	$^{\mathrm{Th}}$

1044. J. Zeng, J. Zhong, G. Zhao, J. Yuan Electron impact collision strengths and oscillator strengths for Ni-like Nd, Sm, Eu, Gd, Ta, and W ions.

At. Data Nucl. Data Tables 90, 259 (2005)

$\mathbf{e} + \mathbf{N} \mathbf{d}^{32+}$	Excitation	5-20,000  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Sm}^{34+}$	Excitation	5-20,000  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{E} \mathbf{u}^{35+}$	Excitation	5-20,000  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{G} \mathbf{d}^{36+}$	Excitation	5-20,000  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{T} \mathbf{a}^{45+}$	Excitation	5-20,000  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{W}^{46+}$	Excitation	5-20,000  eV	$\mathrm{Th}$

1045. M. Adibzadeh, C. E. Theodosiou

#### Elastic electron scattering from inert-gas atoms.

At. Data Nucl. Data Tables 91, 8 (2005)

e + He	Elastic Scattering	1-1000  eV	$\mathrm{Th}$
e + Ne	Elastic Scattering	1-1000  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Ar}$	Elastic Scattering	1-1000  eV	$\mathrm{Th}$
e + Kr	Elastic Scattering	1-1000  eV	$\mathrm{Th}$
e + Xe	Elastic Scattering	1-1000  eV	$\mathrm{Th}$
e + He	Angular Scattering	1-1000  eV	$\mathrm{Th}$
e + Ne	Angular Scattering	1-1000  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{Ar}$	Angular Scattering	1-1000  eV	$\mathrm{Th}$
e + Kr	Angular Scattering	1-1000  eV	$\mathrm{Th}$
e + Xe	Angular Scattering	1-1000  eV	$\mathrm{Th}$
e + He	Total Scattering	1-1000  eV	$\mathrm{Th}$
e + Ne	Total Scattering	1-1000  eV	$\mathrm{Th}$
e + Ar	Total Scattering	1-1000  eV	$\mathrm{Th}$
e + Kr	Total Scattering	1-1000  eV	$\mathrm{Th}$
e + Xe	Total Scattering	1-1000  eV	$\mathrm{Th}$

#### 1046. A. K. Bhatia, E. Landi, W. Eissner

#### Atomic data and spectral line intensities for Mg V.

At. Data Nucl. Data Tables 92, 105 (2006)

$\mathbf{e} + \mathbf{M} \mathbf{g}^{4+}$	Excitation	$10-50 \mathrm{~Ry}$	$\mathrm{Th}$

# 1047. E. Landi, A. K. Bhatia

Atomic data and spectral line intensities for Ar XI.

At. Data Nucl. Data Tables 92, 305 (2006)

$\mathbf{e} + \mathbf{A}\mathbf{r}^{10+}$	Excitation	$30-150 \mathrm{Ry}$	$\mathrm{Th}$
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1048. T. Tabata, T. Shirai, M. Sataka, H. Kubo

Analytic cross sections for electron impact collisions with nitrogen molecules. At. Data Nucl. Data Tables 92, 375 (2006)

$\mathbf{e} + \mathbf{N}_2$	Dissociation	$10^{-2} - 10^4 \text{ eV}$	E/T
$\mathbf{e} + \mathbf{N}_2^+$	Dissociation	$10^{-2} - 10^4 \text{ eV}$	E/T
$\mathbf{e} + \mathbf{N}_2$	Elastic Scattering	$10^{-2} - 10^4 \text{ eV}$	E/T
$\mathbf{e} + \mathbf{N}_2$	Total Scattering	$10^{-2} - 10^4 \text{ eV}$	E/T
$\mathbf{e} + \mathbf{N}_2$	Excitation	$10^{-2} - 10^4 \text{ eV}$	E/T
$\mathbf{e} + \mathbf{N}_2^+$	Excitation	$10^{-2} - 10^4 \text{ eV}$	E/T
$\mathbf{e} + \mathbf{N}_2$	Ionization	$10^{-2} - 10^4 \text{ eV}$	E/T
$\mathbf{e} + \mathbf{N}_2^+$	Ionization	$10^{-2} - 10^4 \text{ eV}$	E/T

1049. H. Suno, T. Kato

Cross section database for carbon atoms and ions: Electron-impact ionization, excitation, and charge exchange in collisions with hydrogen atoms.

At. Data Nucl. Data Tables 92, 407 (2006)

e + C	Excitation	$10^{-1} - 10^7 \text{ eV}$	E/T
$e + C^{+-5+}$	Excitation	$10^{-1} - 10^7 \text{ eV}$	E/T
e + C	Ionization	$10^{-1} - 10^7 \text{ eV}$	E/T
$e + C^{+-5+}$	Ionization	$10^{-1} - 10^7 \text{ eV}$	E/T

1050. J. Y. Zhong, G. Zhao, J. Zhang

Energy levels, transition probabilities, and electron impact excitations for La XXX.

At. Data Nucl. Data Tables 92, 481 (2006)

$e + La^{-1}$ Excitation 10-10,000 eV	Th
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1051. S. D. Loch, J. Colgan, M. C. Witthoeft, M. S. Pindzola, C. P. Ballance, D. M. Mitnik, D. C. Griffin, M. G. O'Mullane, N. R. Badnell, H. P. Summers

Generalised collisional-radiative model for light elements. A: Data for the Li isonuclear sequence.

At. Data Nucl. Data Tables 92, 813 (2006)

$e + Li^+$	Recombination	$0.1-10,000 \ eV$	$\mathrm{Th}$
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Recombination	0.110,000  eV	$\mathrm{Th}$
e + Li	Excitation	0.1-10,000  eV	$\mathrm{Th}$
$e + Li^+$	Excitation	0.110,000  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Excitation	0.110,000  eV	$\mathrm{Th}$
e + Li	Ionization	0.1-10,000  eV	$\mathrm{Th}$
$e + Li^+$	Ionization	0.1-10,000  eV	$\mathrm{Th}$
$\mathbf{e} + \mathbf{L} \mathbf{i}^{2+}$	Ionization	0.1  10,000  eV	$\mathrm{Th}$

1052. E. Landi, A. K. Bhatia

Atomic data and spectral line intensities for Mg VI. At. Data Nucl. Data Tables 93, 1 (2007)

$\mathbf{e} + \mathbf{M} \mathbf{g}^{\text{s}}$ Excitation 12-60 Ky		Tr
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1053. B. M. McLaughlin, M. P. Scott, A. G. Sunderland, C. J. Noble, V. M. Burke, C. A. Ramsbottom, R.H.G. Reid, A. Hibbert, K. L. Bell, P. G. Burke
Electron collisions with Fe-peak elements: Forbidden transitions between the low
lying valence states 3d<sup>6</sup>, 3d<sup>5</sup>4s, and 3d<sup>5</sup>4p of Fe III.
At. Data Nucl. Data Tables 93, 55 (2007)

	$e + Fe^{2+}$	Excitation	$2000 - 10^{6} \text{ K}$	Th
1054.	J. Zeng, G. Zhao, J. Yuan Electron impact collision Cu-, Ni-, and Co-like Au At. Data Nucl. Data Tables	n strengths and 1 ions. s 93, 199 (2007)	oscillator strengths for Ge-, Ga-, Zn-,	
	$\mathbf{e} + \mathbf{A} \mathbf{u}^{47+-52+}$	Excitation	5-40,000  eV	Th

1055. A. K. Bhatia, E. Landi	
Atomic data and spectral line intensities for Si XI.	
At. Data Nucl. Data Tables 93, 275 (2007)	

$\mathbf{e} + \mathbf{Si}^{10+}$	Excitation	$35-175 \mathrm{~Ry}$	Th
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1056.	G. Liang, G. Zhao, J. Zen, Electron impact collision At. Data Nucl. Data Tabl	g on strengths in Si IX, Si X, a es 93, 375 (2007)	and Si XI.	
	$e + Si^{8+-10+}$	Excitation	10-2000  eV	$\mathrm{Th}$
1057.	A. K. Bhatia, E. Landi Atomic data and spect At. Data Nucl. Data Tabl	ral line intensities for Mg IX es 93, 742 (2007)		
	$\mathbf{e} + \mathbf{M} \mathbf{g}^{8+}$	Excitation	25-125 Ry	Th
	3.2.3 Heavy Partie	cles Collisions		
1058.	S. Hossain, A. L. Landers, Interference phenomen $H^+$ impact. Phys. Rev. A 72, 010701	N. Stolterfoht, J. A. Tanis a associated with electron-en (2005)	nission from $H_2$ by (1-5)-MeV	
	$\mathrm{H^{+}}+\mathrm{H_{2}}$	Ionization	$1-5 { m MeV}$	Exp
1059.	T. Kirchner, A.C.F. Santo Montenegro Charge-state-correlate in $C^{3+}$ -Ne collisions. Phys. Rev. A 72, 012707	os, H. Luna, M. M. Sant'Anna, V d cross sections for electron (2005)	W. S. Melo, G. M. Sigaud, E. C. loss, capture, and ionization	
	$egin{array}{lll} {f C}^{3+} + {f Ne} \ {f C}^{3+} + {f Ne} \end{array}$	Charge Transfer Ionization	1-5 MeV 1-5 MeV	${ m E/T} { m E/T}$
1060.	J. C. Holtgrave, P. J. Wol Pressure broadening at $5s5p \ {}^{3}P_{0,1,2}$ -; $5s6s \ {}^{3}S_{1}$ Phys. Rev. A 72, 012711	f nd line shifting of atomic stro absorption transitions induc (2005)	ntium $5s^2 {}^1S_0$ -; 5s5p ${}^3P_1$ and ced by noble-gas collisions.	
	$\mathbf{Sr} + \mathbf{He}$ $\mathbf{Sr} + \mathbf{Ne}$ $\mathbf{Sr} + \mathbf{Ar}$ $\mathbf{Sr} + \mathbf{Kr}$ $\mathbf{Sr} + \mathbf{Xe}$ $\mathbf{Sr} + \mathbf{He}$ $\mathbf{Sr} + \mathbf{He}$ $\mathbf{Sr} + \mathbf{Ne}$ $\mathbf{Sr} + \mathbf{Kr}$ $\mathbf{Sr} + \mathbf{Kr}$ $\mathbf{Sr} + \mathbf{Kr}$	Line Broadening Line Broadening Line Broadening Line Broadening Line Broadening Interaction Potentials Interaction Potentials Interaction Potentials Interaction Potentials Interaction Potentials	660-1390 K 660-1390 K 660-1390 K 660-1390 K 660-1390 K 660-1390 K 660-1390 K 660-1390 K 660-1390 K	Exp Exp Exp Exp Exp Exp Exp Exp
1061.	H. T. Schmidt, J. Jensen, L. Bagge, H. Danared, A. <b>Recoil-ion momentum</b> <b>lisions.</b> Phys. Rev. A 72, 012713	P. Reinhed, R. Schuch, K. Stochl Kaellberg, H. Schmidt-Boecking distributions for transfer ion (2005)	kel, H. Zettergren, H. Cederquist, , C. L. Cocke <b>ization in fast proton-He col-</b>	
	$egin{array}{ll} \mathrm{H}^+ + \mathrm{He} \ \mathrm{H}^+ + \mathrm{He} \end{array}$	Charge Transfer Ionization	1.4-5.8 MeV 1.4-5.8 MeV	E/T E/T
1000		<b></b>		

1062. C.-N. Liu, S.-C. Cheng, A.-T. Le, C. D. Lin
 Charge transfer in slow collisions of C<sup>6+</sup> with H below 1 keV/amu.
 Phys. Rev. A 72, 012717 (2005)

	$C^{6+} + H$	Charge Transfer	1-1000  eV	Th
1063.	Y. Ning, B. He, C. L. Liu, J Importance of the electro collisions of $He^{2+}$ with C Phys. Rev. A 72, 022702 (2)	. Yan, J. G. Wang on capture to the continuum m $s^{5+}(1s)$ . 005)	nechanism in heavy-particle	
	${f He^{2+}+C^{5+}\over He^{2+}+C^{5+}}$	Charge Transfer Ionization	30-10,000  keV/u 30-10,000  keV/u	$_{\mathrm{Th}}$
1064.	S. C. Cheng, B. D. Esry Lattice approach for alph Phys. Rev. A 72, 022704 (2)	ha + $H^{2+}$ collisions. 005)		
	$\mathbf{H}\mathbf{e}^{2+} + \mathbf{H}_{2}^{+}$	Charge Transfer	6  keV/u	$\mathrm{Th}$
1065.	D. J. Haxton, T. N. Rescign Topology of the adiabat the water anion. Phys. Rev. A 72, 022705 (2)	o, C. W. McCurdy <b>ic potential energy surfaces f</b> 005)	for the resonance states of	
	$egin{array}{ll} \mathbf{H} + \mathbf{OH} \ \mathbf{O} + \mathbf{H} + \mathbf{H} \ \mathbf{O} + \mathbf{H}_2 \end{array}$	Interaction Potentials Interaction Potentials Interaction Potentials		Th Th Th
1066.	E. R. Custidiano, M. M. Jal Classical-trajectory Mon section for keV protons a Phys. Rev. A 72, 022708 (200	$\mathbf{k}$ that $\mathbf{k}$ is the two terms of the terms of terms	e electronic stopping cross n hydrogen atoms.	
	$egin{array}{lll} \mathbf{H}^+ \ + \ \mathbf{H} \ \mathbf{H}^+ \ + \ \mathbf{H} \end{array}$	Charge Transfer Ionization	1-1000 eV 1-1000 eV	Th Th
1067.	B. Seredyuk, R. W. McCulle One-electron capture m molecules of astrophysic Phys. Rev. A 72, 022710 (2	ough, H. B. Gilbody <b>echanisms in collisions of H</b> <b>al interest.</b> 005)	e-like O and C ions with	
	$\mathbf{C}^{4+} + \mathbf{C}\mathbf{H}_4$	Charge Transfer	200-1500  eV/u	Exp
	$\mathbf{O}_{a+}^{6+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	200-1500  eV/u	Exp
	$egin{array}{lll} \mathbf{O}^{6+} + \mathbf{C}\mathbf{H}_4 \ \mathbf{O}^{6+} + \mathbf{C}\mathbf{O}_2 \end{array}$	Charge Transfer Charge Transfer	200-1500 eV/u 200-1500 eV/u	$\operatorname{Exp}$
1068.	Lj. M. Ignjatovic, A. A. Mil Rate coefficient for the o lisions. Phys. Rev. A 72, 022715 (2	hajlov chemi-ionization in slow Li*(r 005)	n)+Li and Na*(n)+Na col-	
	Li + Li Na + Na Li + Li Na + Na	Association Association Ionization Ionization	600-1200 K 600-1200 K 600-1200 K 600-1200 K	Th Th Th Th
1069.	S. Otranto, R. E. Olson Autoionization of He ato Phys. Rev. A 72, 022716 (2	oms by partially stripped ion 005)	impact.	

$\mathrm{H^{+}+He}$	Excitation	25  keV/u	$\mathrm{Th}$
$\mathrm{He^{+} + He}$	Excitation	25  keV/u	$\mathrm{Th}$
$\mathrm{H^{+} + He}$	Ionization	25  keV/u	$\mathrm{Th}$
$\mathrm{He^{+} + He}$	Ionization	25  keV/u	$\mathrm{Th}$

1070. D. J. Phalen, M. S. Pindzola, F. Robicheaux
Alignment effects in charge transfer and excitation for H<sup>+</sup> and He<sup>2+</sup> collisions with H<sub>2</sub><sup>+</sup>.
Phys. Rev. A 72, 022720 (2005)

$\mathbf{H}^+ + \mathbf{H}_2^+$	Charge Transfer	4-25  keV/u	$\mathrm{Th}$
$\mathbf{H}\mathbf{e}^{2+} + \mathbf{H}_2^+$	Charge Transfer	4-25  keV/u	$\mathrm{Th}$
$\mathbf{H}^+ + \mathbf{H}_2^+$	Excitation	4-25  keV/u	$\mathrm{Th}$
$\mathrm{He}^{2+} + \mathrm{H}_2^+$	Excitation	4-25  keV/u	$\mathrm{Th}$

1071. E. Wells, V. Krishnamurthi, K. D. Carnes, N. G. Johnson, H. D. Baxter, D. Moore, K. M. Bloom, B. M. Barnes, H. Tawara, I. Ben-Itzhak Proton-carbon monoxide collisions from 10 keV and 14 MeV. Phys. Rev. A 72, 022726 (2005)

$\mathrm{H^{+}+CO}$	Dissociation	$10-14,000 { m ~keV}$	$\operatorname{Exp}$
$\mathrm{H^{+}+CO}$	Charge Transfer	$10-14,000 { m ~keV}$	Exp
$\mathrm{H^{+}}+\mathrm{CO}$	Ionization	$10-14,000 { m ~keV}$	Exp

1072. D. Wang, E. E. Eyler, P. L. Gould, W. C. Stwalley
State-selective detection of near-dissociation ultracold KRb X <sup>1</sup>Σ<sup>+</sup> and α <sup>3</sup>Σ<sup>+</sup>
molecules.
Phys. Rev. A 72, 035202 (2005)

K + Rb	Association	Ultracold	Exp
K + Rb	Interaction Potentials	Ultracold	Exp

#### 1073. D. A. Mazziotti

Variational two-electron reduced density matrix theory for many-electron atoms and molecules: Implementation of the spin- and symmetry-adapted  $T_2$  condition through first-order semidefinite programming.

Phys. Rev. A 72, 032510 (2005)

H + F	Interaction Potentials	Th
$Be + H_2$	Interaction Potentials	Th
B + H	Interaction Potentials	Th
$\mathbf{C} + \mathbf{H}_2$	Interaction Potentials	Th
N + N	Interaction Potentials	Th
$\mathbf{N} + \mathbf{H}_3$	Interaction Potentials	Th
$H_2 + O$	Interaction Potentials	Th
$CH + H_3$	Interaction Potentials	Th

1074. A. Larson, A. E. Orel

Wave-packet study of the products formed in dissociative recombination of  $HeH^+$ . Phys. Rev. A 72, 032701 (2005)

$H^+ + He$	Interaction Potentials	0-2  eV	Th
		0 - 0 1	

# 1075. X. Chu, A. Dalgarno, G. C. Groenenboom Polarizabilities of Sc and Ti atoms and dispersion coefficients for their interaction with helium atoms. Phys. Rev. A 72, 032703 (2005)

Sc + He	Interaction Potentials	Th
Ti + He	Interaction Potentials	Th

1076. F. Mezdari, K. Wohrer-Beroff, M. Chabot, G. Martinet, S. Della Negra, P. Desequelles, H. Hamrita, A. LePadellec

Ionization cross sections of small cationic carbon clusters in high-energy collisions with helium atoms and stability of multiply charged species. Phys. Rev. A 72, 032707 (2005)

$C_3^+ + He$	Ionization	v=2.6 a.u.	Exp
$\mathbf{C}_5{}^+ + \mathbf{He}$	Ionization	v=2.6 a.u.	Exp
${f C_8}^++{f He}$	Ionization	v=2.6 a.u.	Exp
$\mathbf{C}_{10}{}^+ + \mathbf{He}$	Ionization	v=2.6 a.u.	Exp
$\mathbf{C}_4{}^+ + \mathbf{He}$	Ionization	v=2.6 a.u.	$\operatorname{Exp}$
${ m C_7}^+ + { m He}$	Ionization	v=2.6 a.u.	$\operatorname{Exp}$
$\mathbf{C}_9^+ + \mathbf{He}$	Ionization	v=2.6 a.u.	Exp
$\mathbf{C}_6{}^+ + \mathbf{He}$	Ionization	v=2.6 a.u.	Exp

1077. A.L.F. de Barros, S. Martinez, F. Zappa, S. Suarez, G. Bernardi, G. Jalbert, L.F.S. Coelho, N. V. de Castro Faria

 $H_2$  and  $N_2$  ionization and dissociative ionization by  $C^-$  and  $O^-$  ions at intermediate velocities: Direct and electron loss channels. Phys. Rev. A 72, 032708 (2005)

$\mathbf{C}^- + \mathbf{H}_2$	Dissociation	v = 1.07 - 2.14 a.u.	Exp
$\mathbf{O}^- + \mathbf{H}_2$	Dissociation	v = 1.07 - 2.14 a.u.	$\operatorname{Exp}$
$\mathbf{O}^- + \mathbf{N}_2$	Dissociation	v = 1.07 - 2.14 a.u.	$\operatorname{Exp}$
$\mathbf{C}^- + \mathbf{H}_2$	Ionization	v = 1.07 - 2.14 a.u.	Exp
$O^- + H_2$	Ionization	v = 1.07 - 2.14 a.u.	Exp
$O^- + N_2$	Ionization	v = 1.07 - 2.14 a.u.	Exp

1078. L. B. Zhao, P. C. Stancil, J.-P. Gu, G. Hirsch, R. J. Buenker, T. W. Imai, M. Kimura Charge transfer between  $S^{2+}$  and He: A comparative study of quantal and semiclassical approaches.

Phys. Rev. A 72, 032719 (2005)

$S^{2+} + He$	Charge Transfer	1-10,000  eV	Th
$S^{2+} + He$	Interaction Potentials	1-10,000  eV	$\mathrm{Th}$

1079. P. Beiersdorfer, M. Bitter, M. Marion, R. E. Olson Charge-exchange-produced K-shell x-ray emission from Ar<sup>16+</sup> in a tokamak plasma with neutral-beam injection. Phys. Rev. A 72, 032725 (2005)

$Ar^{17+} + H$	Charge Transfer	80  keV	E/T
$Ar^{17+} + D$	Charge Transfer	80  keV	E/T

1080. O. Abu-Haija, E. Y. Kamber, S. M. Ferguson, N. Stolterfoht
Single-electron capture processes in slow collisions of He<sup>2+</sup> ions with O<sub>2</sub>, NH<sub>3</sub>, N<sub>2</sub>, and CO<sub>2</sub>.
Phys. Rev. A 72, 042701 (2005)

$\mathrm{He}^{2+} + \mathrm{CO}_2$	Charge Transfer	25-400  eV/amu	Exp
$He^{2+} + N_2$	Charge Transfer	25-400  eV/amu	Exp
$He^{2+} + NH_3$	Charge Transfer	25-400  eV/amu	Exp
$\mathrm{He}^{2+} + \mathrm{O}_2$	Charge Transfer	25-400  eV/amu	Exp

1081.	T. Stoecklin, A. Voronin Strong isotope effect i study of virtual-state s Phys. Rev. A 72, 042714	n ultracold collision of $N_2^-$ scattering. (2005)	$^{\scriptscriptstyle +}$ (v=1, j=0) with He: A case	
	$\mathbf{N}_2^+ + \mathbf{He}$	De-excitation	$10^{-6} - 2000 \ cm^{-1}$	Th
1082.	M. Buser, L. Frommhold <b>Collision-induced roto</b> Phys. Rev. A 72, 042715	translational absorption in (2005)	compressed methane gas.	
	$\mathbf{CH}_4 + \mathbf{CH}_4 \\ \mathbf{CH}_4 + \mathbf{CH}_4$	Interchange reaction Energy Transfer	163-297 K 163-297 K	Th Th
1083.	<ul> <li>K. Stochkel, O. Eidem, H</li> <li>S. B. Levin, V. N. Ostrova</li> <li>Two-center interference</li> <li>cesses.</li> <li>Phys. Rev. A 72, 050703</li> </ul>	I. Cederquist, H. Zettergren, P. sky, A. Kaelberg, A. Simonsson <b>ce in fast</b> $proton - H_2 - electr$ (2005)	. Reinhed, R. Schuch, C. L. Cocke, n, J. Jensen, H. T. Schmidt on transfer and excitation pro-	
	$egin{array}{lll} \mathbf{H}^+ + \mathbf{H}_2 \ \mathbf{H}^+ + \mathbf{H}_2 \end{array}$	Charge Transfer Excitation	1-1.3 MeV 1-1.3 MeV	E/T $E/T$
1084.	F. Fremont, A. Hajaji, C. Fast oscillating struct (q=1,2) at low project Phys. Rev. A 72, 050704	Leclercq, J. Soret, J. A. Tanis ures in electron spectra fo ile energies. (2005)	, B. Sulik, JY. Chesnel blowing $He^{q+}$ + He collisions	
	$egin{array}{ll} { m He}^+ + { m He} \ { m He}^{2+} + { m He} \end{array}$	Ionization Ionization	20-40 keV 20-40 keV	$\begin{array}{c} Exp\\ Exp \end{array}$
1085.	N. G. Johnson, R. N. Me Itzhak, E. Wells Single ionization of h molecular alignment. Phys. Rev. A 72, 052711	llo, M. E. Lundy, J. Kapplinge ydrogen molecules by fast (2005)	er, E. Parke, K. D. Carnes, I. Ben- protons as a function of the	
	$\mathrm{H^{+}}+\mathrm{H_{2}}$	Ionization	$4 { m MeV}$	Exp
1086.	C. M. Dutta, J. P. Gu, G. Charge-transfer process process at low-keV end Phys. Rev. A 72, 052715	Hirsch, R. J. Beunker, P. Norsesses in $F^{2+}$ + H -; $F^+$ + ergies. (2005)	dlander, M. Kimura $H^+$ collisions and the reverse	
	$egin{array}{lll} {f F}^{2+} + {f H} \ {f F}^{2+} + {f H} \end{array} \ {f F}^{2+} + {f H} \end{array}$	Charge Transfer Excitation	0.02-10  keV/u 0.02-10  keV/u	Th Th
1087.	Y. Kurokawa, H. Nakashi Free iterative-complem Phys. Rev. A 72, 062502	ma, H. Nakatsuji nent-interaction calculation (2005)	s of the hydrogen molecule.	
	H + H	Interaction Potentials	0-4 a.u.	Th
1088.	A. Pashov, O. Docenko, M Potentials for modelin Phys. Rev. A 72, 062505	4. Tamanis, R. Ferber, H. Knoo g cold collisions between N (2005)	eckel, E. Tiemann a (3S) and Rb (5S) atoms.	
	Na + Rb	Interaction Potentials	2-14 Å	Exp

1089.	<ul> <li>U. Galster, F. Baumgartner, U. Mueller, H. Helm, M. Jungen</li> <li>Experimental and quantum-chemical studies on the three-particle fragmentation of neutral triatomic hydrogen.</li> <li>Phys. Rev. A 72, 062506 (2005)</li> </ul>				
	$\mathbf{H} + \mathbf{H}_2$	Interaction Potentials	2-8 $a_0$	$\mathrm{E}/\mathrm{T}$	
1090.	M. S. Pindzola, T. G. L Excitation and charg Phys. Rev. A 72, 06270	ee, T. Minami, D. R. Schultz ge transfer in p+H(2s) collisio 3 (2005)	ons.		
	$egin{array}{l} \mathrm{H}^+ + \mathrm{H} \ \mathrm{H}^+ + \mathrm{H} \end{array}$	Charge Transfer Excitation	1-100 keV 1-100 keV	Th Th	
1091.	M. Kavcic, K. Toekesi <b>Double 1s shell ioniz</b> Phys. Rev. A 72, 06270	ation of Si induced in collisio 4 (2005)	ns with 1-3-MeV protons.		
	$H^+ + Si$	Ionization	$1-3 { m MeV}$	Exp	
1092.	A. B. Voitkiv <b>Eikonal model for pr</b> Phys. Rev. A 72, 06270	ojectile-electron excitation as 5 (2005)	nd loss in relativistic collisions.		
	${f O^{7+}} + {f He} \ {f Kr}^{35+} + {f H} \ {f O^{7+}} + {f He} \ {f Vr}^{7+} + {f He} \ {f Kr}^{35+} + {f H}$	Excitation Excitation Ionization Ionization	0.1-100 GeV/u 0.1-100 GeV/u 0.1-100 GeV/u 0.1-100 GeV/u	Th Th Th Th	
1093.	M. Foster, J. L. Peacher <b>Precollision and post</b> <b>energy proton-impac</b> Phys. Rev. A 72, 06270	r, M. Schulz, A. Hasan, D. H. Ma collision electron-electron cor at ionization of helium. 8 (2005)	dison relation effects for intermediate	:-	
	$egin{array}{ll} \mathrm{H}^+ &+ \mathrm{He} \ \mathrm{H}^+ &+ \mathrm{He} \end{array}$	Total Scattering Ionization	75 keV 75 keV	Th Th	
1094.	T. Ferger, D. Fischer, M Mutual ionization in Phys. Rev. A 72, 06270	1. Schulz, R. Moshammer, A. B. <b>200-keV</b> $H^-$ + He collisions 9 (2005)	Voitkiv, B. Najjari, J. Ullrich		
	$\mathrm{H^-} + \mathrm{He} \ \mathrm{H^-} + \mathrm{He}$	Detachment Ionization	200 keV 200 keV	Exp Exp	
1095.	<ul> <li>D. Ohsawa, Y. Sato, Y.</li> <li>6.0-10.0-MeV/u He<sup>2-</sup></li> <li>Phys. Rev. A 72, 06271</li> </ul>	Okada, V. P. Shevelko, F. Soga + - ion - induced electron emit 0 (2005)	ssion from water vapor.		
	$He^{2+} + H_2O$	Ionization	$6-10 \ {\rm MeV/u}$	Exp	
1096.	R. T. Pedlow, S.F.C. O <b>Fully differential cros</b> Phys. Rev. A 72, 06271	?Rourke, D.S.F. Crothers ss sections for 3.6 MeV $u^{-1}$ A 9 (2005)	$Au^{Zp+} + He$ collisions.		
	${f Au^{24+}} + {f He} \ {f Au^{53+}} + {f He} \ {f Au^{24+}} + {f He} \ {f Au^{24+}} + {f He} \ {f Au^{53+}} + {f Au^{53+}} + {f Au^{53+}} \ {f Au^{53+}} + {f Au^{53+}} \ {f Au^{53+}} \ {f Au^{53+}} + {f Au^{53+}} \ {f Au$	Total Scattering Total Scattering Ionization Ionization	3.6 MeV/u 3.6 MeV/u 3.6 MeV/u 3.6 MeV/u	Th Th Th Th	

1097.	S. Martinez, G. Bernard Orientation effects in Phys. Rev. A 72, 06272	i, P. Focke, D. Fregenal, S. Su $H_2$ dissociation by $He^{2+}$ i 2 (2005)	arez mpact at vp=1 and 2 a.u.	
	$He^{2+} + H_2 He^{2+} + H_2$	Dissociation Total Scattering	1-2 a.u. 1-2 a.u	Exp Exp
1098.	H. Brauning, R. Trassl, Luedde, T. Kirchner Charge transfer in <i>Li</i> J. Phys. B 38, 2311 (200	A. Theiss, A. Diehl, E. Salz <sup>2+</sup> $He^{2+}$ and $Li^{2+} + Li^{3}$	born, M. Keim, A. Achenbach, H.	J.
	$egin{array}{lll} {f Li}^{2+} + {f He}^{2+} \ {f Li}^{2+} + {f Li}^{3+} \end{array}$	Charge Transfer Charge Transfer	$6-148 \ {\rm keV}$ $6-148 \ {\rm keV}$	Exp
1099.	S. Legendre, E. Giglio, M Isotopic effects in wa J. Phys. B 38, L233 (200	M. Tarisien, A. Cassimi, B. Ge ter dication fragmentation 05)	ervais, L. Adoui 1.	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Dissociation Dissociation Charge Transfer Charge Transfer Ionization Ionization	11.7 MeV 11.7 MeV 11.7 MeV 11.7 MeV 11.7 MeV 11.7 MeV 11.7 MeV	E/T E/T E/T E/T E/T E/T
1100.	M. Zapukhlyak, T. Kirse Inner- and outer-shel J. Phys. B 38, 2353 (200	chner, H. J. Luedde, S. Knoop l electron dynamics in prot 05)	, R. Morgenstern, R. Hoekstra ton collisions with sodium atom	.s.
	$egin{array}{ll} { m H}^+ + { m Na} \ { m H}^+ + { m Na} \end{array}$	Charge Transfer Excitation	2-100 keV 2-100 keV	E/T E/T
	$H^+ + Na$	Ionization	2-100  keV	E/T
1101.	P. Sobocinski, Z. D. Pesic <b>Fragmentation of wat</b> J. Phys. B 38, 2495 (200	c, R. Hellhammer, N. Stolterfol cer molecules in slow $He^{2+}$ 05)	nt, B. Sulik, S. Legendre, JY. Chesn + $H_2O$ collisions.	lel
	$\mathrm{He}^{2+} + \mathrm{H}_2\mathrm{O}$	Dissociation	1-5  keV	$\mathrm{Th}$
1102.	A. Burgess, J. A. Tully <b>On proton excitation</b> J. Phys. B 38, 2629 (200	<b>of forbidden lines in posit</b> (5)	vive ions.	
	$\mathbf{H}^+ + \mathbf{S}^{3+}$	Excitation	100-40,000  eV	$\mathrm{Th}$
	$H^+ + Ar^{13+}$	Excitation	100-40,000  eV	Th
	$\mathbf{H}^+ + \mathbf{F} \mathbf{e}^{10+}$	Excitation	100-40,000 eV	Th
1103.	V. P. Shevelko, H. Tawa Yu. Tolstikhina <b>Target density effects</b> J. Phys. B 38, 2675 (200	ra, O. V. Ivanov, T. Miyoshi, s in collisions of fast ions v 05)	K. Noda, Y. Sato, A. V. Subbotin, with solid targets.	I.
	$\mathbf{C}^{4+-6+} + \mathbf{C}$	Charge Transfer	$100-40,000 \; \rm keV/u$	E/T
	$Ne^{8+-10+} + C$	Charge Transfer	$100-40,000 { m ~keV/u}$	$\dot{E/T}$
	$Mg^{10+-12+} + C$	Charge Transfer	100-40,000  keV/u	$\dot{E/T}$
	$\mathbf{Si}^{12+-14+} + \mathbf{C}$	Charge Transfer	100-40,000  keV/u	E/T
	$Cl^{4+} + H_2$	Charge Transfer	100-40,000  keV/u	E/T

	$\begin{array}{l} \mathbf{Ar}^{13+\_18+} + \mathbf{C} \\ \mathbf{Fe}^{19+\_26+} + \mathbf{C} \\ \mathbf{C}^{4+\_6+} + \mathbf{C} \\ \mathbf{Ne}^{8+\_10+} + \mathbf{C} \end{array}$	Charge Transfer Charge Transfer Ionization Ionization	100-40,000 keV/u 100-40,000 keV/u 100-40,000 keV/u 100-40,000 keV/u	E/T E/T E/T E/T
	$Mg^{10+-12+} + C$	Ionization	100-40,000  keV/u	E/T
	$Si^{12+-14+} + C$	Ionization	100-40,000  keV/u	E/T
	$Ar^{13+-18+} + C$	Ionization	100-40,000  keV/u	E/T
	$\mathbf{Fe}^{-0} + \mathbf{Fe}^{-0} + \mathbf{Fe}^{-0}$	Iomzation	100-40,000 kev/u	E/1
1104.	A. Surzhykov, S. Fritzsche Electron angular and e charged proejctile ions. J. Phys. B 38, 2711 (2005)	energy distributions following	g the ionization of highly	
	$\mathbf{U}^{91+} + \mathbf{H}^+$	Ionization	$1 { m GeV/u}$	Th
1105.	V. D. Rodriguez, P. Macri, $H_2^+$ ionization by ultra- perturbative Coulomb-V J. Phys. B 38, 2775 (2005)	R. Gayet short electromagnetic pulses i /olkov approach.	nvestigated through a non-	
	${f U}^{92+}+{f H_2}^+$	Ionization	$1 { m GeV/u}$	Th
1106.	T. J. McCarthy, D. E. Mur Non-thermal Doppler-b fo $H_2$ . J. Phys. B 38, 3043 (2005)	nick, M. Salvermoser, A. Ulrich roadened $Lyman - \alpha$ line shaj	pe in resonant dissociation	
	$Ne_2 + H_2$	Line Broadening	300 K	Exp
	$\mathbf{Ne}_{2}^{*}+\mathbf{H}_{2}$	Line Broadening	300 K	Exp
	$Ne_2 + H_2$	Dissociation	300 K	$\operatorname{Exp}$
	$\mathbf{Ne}_{2}^{*}+\mathbf{H}_{2}$	Dissociation	300 K	$\operatorname{Exp}$
	$\mathbf{Ne}_2 + \mathbf{H}_2$	Energy Transfer	300 K	$\operatorname{Exp}$
	$\mathbf{Ne}_{2}^{*} + \mathbf{H}_{2}$	Energy Transfer	300 K	$\operatorname{Exp}$
	$\mathbf{Ne}_2 + \mathbf{H}_2$	Excitation	300 K	$\operatorname{Exp}$
	$\mathbf{N}\mathbf{e}_{2}^{*}+\mathbf{H}_{2}$	Excitation	300 K	Exp
1107.	S. Knoop, M. Keim, H. J. I State selective single-ele J. Phys. B 38, 3163 (2005)	Luedde, T. Kirchner, R. Morgenster ectron capture in $O^{6+}$ + Na ce	ern, R. Hoekstra ollisions.	
	$egin{array}{lll} \mathbf{O}^{6+} + \mathbf{N}\mathbf{a} \ \mathbf{O}^{6+} + \mathbf{N}\mathbf{a} \end{array}$	Charge Transfer Ionization	1-9 keV/u 1-9 keV/u	E/T E/T
1108.	C. Dimopoulou, M. E. Gal Ullrich <b>Electron emission from</b> J. Phys. B 38, 3173 (2005)	assi, R. Moshammer, R. D. Riva fragmentation of $CO_2$ by fast	arola, D. Fischer, C. Hoehr, J. proton impact.	

$\mathbf{H}^+ + \mathbf{CO}_2$	Dissociation	$6 { m MeV}$	E/T
$\mathbf{H}^+ + \mathbf{CO}_2$	Ionization	$6 { m MeV}$	E/T

1109. D. Rabli, R. McCarroll

Completeness of an adiabatic expansion using reaction coordinates to describe rearrangement processes in ion-atom collisions: Application to the  $C^{4+}$  + H system.

J. Phys. B 38, 3311 (2005)

	$egin{array}{lll} {f C}^{4+} + {f H} \ {f C}^{4+} + {f H} \end{array}$	Charge Transfer Interaction Potentials	3-11 a.u. 3-11 a.u.	${ m Th}$ Th
1110.	K. Motohashi, T. Taka Emission cross secti molecule. J. Phys. B 38, 3339 (20	hashi, N. Takahashi, S. Tsurubuch ons in low-energy collisions be 005)	ni etween $He^+$ , $Ne^+$ ions and $CF_4$	
	$egin{array}{lll} {f He^+ + CF_4} \ {f Ne^+ + CF_4} \end{array}$	Fluorescence Fluorescence	1-5000 eV 1-5000 eV	$\begin{array}{c} \mathrm{Exp} \\ \mathrm{Exp} \end{array}$
1111.	S. Ben Yaghlane, S. La Stable and metastal J. Phys. B 38, 3395 (2)	thmar, Z. Ben Lakhdar, M. Hochla <b>ble states of</b> $SN^-$ . 005)	af	
	$f S^- + N \ S + N^-$	Interaction Potentials Interaction Potentials	2-6 bohr 2-6 bohr	${ m Th}$ Th
1112.	A. B. Voitkiv, B. Najja <b>Two-centre dielectre</b> J. Phys. B 38, 3587 (20	ari onic transitions in fast highly 005)	charged ion-atom collisions.	
	$C^{5+} + He$	Total Scattering	3.5-75 MeV	Th
	$\mathbf{O}^{7+} + \mathbf{He}$	Total Scattering	3.5-75 MeV	Th
	$\mathbf{C}^{5+} + \mathbf{He}$	Ionization	$3.5-75 { m ~MeV}$	Th
	$O^{7+} + He$	Ionization	$3.5-75 { m ~MeV}$	Th
1113.	M. Keim, A. Werner, Kirchner $Lyman - \alpha$ line polar J. Phys. B 38, 4045 (20	D. Hasselkamp, KH. Schartner, rization after proton impact o 005)	H. J. Luedde, A. Achenbach, T. n atomic hydrogen.	
	$H^+ + H$	Charge Transfer	1-1000 keV	E/T
	$\mathbf{H}^{+} + \mathbf{H}$	Excitation	1-1000  keV	E/T
1114.	<ul><li>F. Alvarado, R. Hoekst</li><li>Dissociation of wate</li><li>J. Phys. B 38, 4085 (2)</li></ul>	tra, T. Schlathoelter er molecules upon keV $H^+$ – av 005)	nd $He^{q+} - induced$ ionization.	
	$H^+ + H_2O$	Dissociation	3-24 keV	Exp
	$He^+ + H_2O$	Dissociation	3-24  keV	Exp
	$He^{2+} + H_2O$	Dissociation	3-24  keV	Exp
	$\mathbf{H}^+ + \mathbf{H}_2 \mathbf{\tilde{O}}$	Ionization	3-24  keV	Exp
	$He^+ + H_2O$	Ionization	3-24  keV	Exp
	$He^{2+} + H_2O$	Ionization	3-24  keV	Exp
1115.	Q. Chen, X. H. Ren, S Non-adiabatic time- plication to $H^+ + N$ J. Phys. B 38, 4291 (20	. S. Pu, F. Wang dependent mean-field descript $Na(3s) -; H^+ + Na(3p)$ case. 005)	ion for ion-atom collisions: Ap-	
	$\mathrm{H^{+}}$ + Na	Excitation	0.5-50  keV	$\mathrm{E}/\mathrm{T}$
1116.	A. S. Dickinson Radiative associatio	n of H and D.		

	$\begin{array}{l} \mathrm{H} + \mathrm{D} \\ \mathrm{H} + \mathrm{D} \\ \mathrm{H} + \mathrm{D} \end{array}$	Association Interaction Potentials Fluorescence	10-1000 deg K 10-1000 deg K 10-1000 deg K	Th Th Th
1117.	I. I. Beterov, D. B. Tretyak Klucharev Collisional and thermal is theory for nS and nD st J. Phys. B 38, 4349 (2005)	ov, I. I. Ryabtsev, N. N. Bezuglo onization of sodium Rydberg ates with $n = 8-20$ in crossed	v, K. Miculis, A. Ekers, A. N. atoms III. Experiment and atomic beams.	
	$f Na+Na \ Na^*+Na$	Association Association	420-630 K 420-630 K	E/T $E/T$
1118.	M. Wernli, P. Valiron, A. Fa Improved low-temperatu Astron. Astrophys. 446, 367	aure, L. Wiesenfeld, P. Jankowski, are rate constants for rotation 7 (2006)	K. Szalewicz mal excitation of CO by $H_2$ .	
	$\mathbf{CO} + \mathbf{H}_2$	Excitation	$1-520 \ cm^{-1}$	$\mathrm{Th}$
1119.	F. Lique, ML. Dubernet, A Rotational excitation of perature. Astron. Astrophys. 450, 399	A. Spielfiedel, N. Feautrier sulfur monoxide in collision 0 (2006)	with helium at high tem-	
	He + SO	Excitation	50-300 K	Th
1120.	F. Lique, A. Spielfiedel, J. C Rotational excitations of Astron. Astrophys. 451, 112	Cernicharo f <b>carbon monosulfide by collis</b> 25 (2006)	ions with helium.	
	He + CS	Interchange reaction	10-300 K	$\mathrm{Th}$
1121.	B. J. Wargelin, P. Beiersdor Charge-exchange spectra Astrophys. J., Part 1 634, 6	fer, P. A. Neill, R. E. Olson, J. H a of hydrogenic and He-like ir 87 (2005)	. Scofield ron.	
	$egin{array}{lll} {f Fe}^{24+} + {f N}_2 \ {f Fe}^{25+} + {f N}_2 \end{array}$	Charge Transfer Charge Transfer	10 eV/amu 10 eV/amu	Exp Exp
1122.	P. Barragan, L. F. Errea, L. Calculation of rate coefficient with H. Astrophys. J., Part 1 636, 5	Mendez, I. Rabadan, A. Riera acients for electron capture in 44 (2005)	a collisions of $O^{2+}$ and $N^{2+}$	
	$f N^{2+}+f H \ O^{2+}+f H$	Charge Transfer Charge Transfer	$\begin{array}{c} 0.00110,000 \; \mathrm{eV} \\ 0.00110,000 \; \mathrm{eV} \end{array}$	Th Th
1123.	G. Barinovs, M. C. van Hen $CH^+$ radiative associatio Astrophys. J., Part 1 636, 9	nert <b>n.</b> 23 (2005)		
	$C^+ + H$	Association	0-1000 K	$\mathrm{Th}$
1124.	A. P. Palov, M. D. Gray, D. Modeling of the SiO circ rotationally inelastic sca	Field, G. G. Balint-Kurti umstellar maser: Rate coeffic ttering of H+SiO.	ients for the vibrationally-	

Astrophys. J., Part 1 639, 204 (2006)

	H + SiO	Excitation	$2000-4000 {\rm K}$	Th
1125.	D. Bodewits, R. Hoekstra, E Charge exchange emissic Astrophys. J., Part 1 642, 5	8. Seredyuk, R. W. McCullough, 6 on from solar wind helium ior 73 (2006)	G. H. Jones, A.G.G.M. Tielens ns.	
	$egin{array}{lll} {f He}^{2+} &+ {f H_2O} \ {f He}^{2+} &+ {f CH_4} \ {f He}^{2+} &+ {f CO} \ {f He}^{2+} &+ {f CO} \ {f He}^{2+} &+ {f CO}_2 \end{array}$	Charge Transfer Charge Transfer Charge Transfer Charge Transfer	0.2-10.0 keV/amu 0.2-10.0 keV/amu 0.2-10.0 keV/amu 0.2-10.0 keV/amu	Exp Exp Exp Exp
1126.	M. Kimura, L. Pichl, Y. Li, Steric effect in $O^+/H_2$ a $H_3O^+$ collision intermedi Eur. Phys. J. D 38, 85 (200	HP. Liebermann, R. J. Buenker, and $H^+/H_2O$ collisions - Cha ate systems. 6)	I. F. Schneider rge transfer in $H_2O^+$ and	
	$egin{array}{lll} \mathbf{H}^+ + \mathbf{H}_2 \mathbf{O} \ \mathbf{O}^+ + \mathbf{H}_2 \end{array}$	Charge Transfer Charge Transfer	10-10,000  eV 10-10,000  eV	$_{\mathrm{Th}}^{\mathrm{Th}}$
1127.	R. Martinez, J. D. Sierra, M Cross sections of the $O^+$ variants $(D_2, \text{ HD})$ : Quas ments. J. Chem. Phys. 123, 174312	1. Gonzalez $H + H_2 - i OH^+ + H$ ion-mole iclassical trajectory study and H (2005)	ecule reaction and isotopic d comparison with experi-	
	$egin{array}{lll} \mathbf{O}^+ &+ \mathbf{H}_2 \ \mathbf{O}^+ &+ \mathbf{H} \mathbf{D} \ \mathbf{O}^+ &+ \mathbf{D}_2 \end{array}$	Interchange reaction Interchange reaction Interchange reaction	$\begin{array}{l} 0.01\text{-}6.0 \ \mathrm{eV} \\ 0.01\text{-}6.0 \ \mathrm{eV} \\ 0.01\text{-}6.0 \ \mathrm{eV} \end{array}$	Th Th Th
1128.	<ul><li>T. Gonzalez-Lezana, A. Agu</li><li>Quantum approaches for reactive collisions.</li><li>J. Chem. Phys. 123, 194309</li></ul>	ado, M. Paniagua, O. Roncero <b>the insertion dynamics of t</b> (2005)	he $H^+ + D_2$ and $D^+ + H_2$	
	$egin{array}{lll} {f H}^+ + {f H}_2 \ {f H}^+ + {f D}_2 \ {f D}^+ + {f H}_2 \end{array}$	Interchange reaction Interchange reaction Interchange reaction	0.0-2.0 eV 0.0-2.0 eV 0.0-2.0 eV	Th Th Th
1129.	S. Atahan, M. H. Alexander Cross sections and ther $D(^2S) + OH(^2\Pi)$ - $i OD(^2$ J. Chem. Phys. 123, 204306	, E. J. Rackham mal rate constants for the in $\Pi$ ) + $H(^{2}S)$ . (2005)	sotope exchange reaction:	
	D + OH	Interchange reaction	0-500 K	Th
1130.	L. Banares, F. J. Aoiz, T. G Influence of rotation an reactive system and of it J. Chem. Phys. 123, 224301	onzalez-Lezana, V. J. Herrero, I. d isotope effects on the dyn s deuterated variants. (2005)	Tanarro amics of the $N(^2D) + H_2$	
	$\mathbf{N} + \mathbf{H}_2$	Interchange reaction	$0.0\text{-}0.5~\mathrm{eV}$	$\mathrm{Th}$
1131.	F. Gogtas Quantum wave-packet c rate constants for Li + 1 J. Chem. Phys. 123, 244301	alculation of reaction probab $H_2^+$ reaction. (2005)	vilities, cross sections, and	
	$Li + H_2$	Interchange reaction	$0.0-2.0 \mathrm{eV}$	$\mathrm{Th}$

1132.	Y. Lu, SY. Lee, D. H. Zha A full dimensional time- lision induced dissociation for $J = 0$ . J. Chem. Phys. 124, 01110	ng dependent wave packet study on, and single exchange reacti 1 (2006)	for the $H_4$ four-center, col- ions: Reaction probabilities			
	$\mathbf{H}_2 + \mathbf{H}_2$	Interchange reaction	$0.0-6.0 \mathrm{~eV}$	Th		
1133.	S. Y. Lin, H. Guo Exact quantum dynami rate constants, and depo J. Chem. Phys. 124, 03110	cs of $N(^2D) + H_2$ -; NH + 1 endence on reactant rotation. 1 (2006)	H reaction: Cross-sections,			
	$\mathbf{N} + \mathbf{H}_2$	Interchange reaction	$9{,}909{,}5~\mathrm{eV}$	$\mathrm{Th}$		
1134.	T.J.D. Kumar, A. Saieswar, Elastic and charge trans J. Chem. Phys. 124, 034314	i, S. Kumar if <b>processes in</b> $H^+$ + <b>CO co</b> 4 (2006)	llisions.			
	$egin{array}{l} \mathrm{H}^+ + \mathrm{CO} \ \mathrm{H}^+ + \mathrm{CO} \end{array}$	Elastic Scattering Charge Transfer	$9.5 { m eV} \\ 9.5 { m eV}$	${ m Th}$ ${ m Th}$		
1135.	W. Wang, E. Santos, J. Bra <b>Theoretical rate coefficie</b> J. Chem. Phys. 124, 07430	W. Wang, E. Santos, J. Brandao <b>Theoretical rate coefficients for the exchange reaction OH + D -; OD + H.</b> J. Chem. Phys. 124, 074305 (2006)				
	OH + H OH + D	Interchange reaction Interchange reaction	100-1000 K 100-1000 K	Th Th		
1136.	P. F. Weck, N. Balakrishna Dynamics of the $O({}^{3}P)$ - siclassical trajectory wit J. Chem. Phys. 124, 074308	n, J. Brandao, C. Rosa, W. Wang + $H_2$ reaction at low tempera h quantum scattering calcula 8 (2006)	atures: Comparison of qua- ations.			
	$\mathbf{O} + \mathbf{H}_2$	Interchange reaction	0-0.6  eV	$\mathrm{Th}$		
1137.	B. Yang, P. C. Stancil, N. H Quenching of rotational J. Chem. Phys. 124, 104304	Balakrishnan, R. C. Forrey ly excited CO by collisions w 4 (2006)	ith $H_2$ .			
	$H_2 + CO$	Excitation	$10^{-6} - 15,000 \ cm^{-1}$	$\mathrm{Th}$		
1138.	L. Liu, Y. Li, J. M. Farrar Dynamics study of the r and density-functional t J. Chem. Phys. 124, 12431	eaction $OH^- + C_2H_2$ -; $C_2H^-$ heory calculations. 7 (2006)	$+ H_2O$ with crossed beams			
	$\mathbf{O}\mathbf{H}^- + \mathbf{C}_2\mathbf{H}_2$	Interchange reaction	$0.37\text{-}1.40~\mathrm{eV}$	$\mathrm{E}/\mathrm{T}$		
1139.	R. Martinez, J. M. Lucas, X Exact quantum dynamic molecule reaction and c J. Chem. Phys. 124, 14430	K. Gimenez, A. Aguilar, M. Gonza cs study of the $O^+ + H_2(v =$ comparison with quasiclassical 1 (2006)	alez $0, j = 0$ ) -; $OH^+ + H$ ion- trajectory calculations.			
	$O^+ + H_2$	Interchange reaction	$0.00\text{-}0.75\;\mathrm{eV}$	Th		
1140.	A. Le Padellec, E. M. Staic Reactive collisions betw	u-Casagrande, T. Nzeyimana, E. een $CH^+$ and $O^-$ .	A. Naji, X. Urbain			

J. Chem. Phys. 124, 154304 (2006)

	$\mathrm{CH^{+}}$ + $\mathrm{O^{-}}$	Interchange reaction	$0.01\text{-}10.00\;\mathrm{eV}$	Exp
1141.	P. Honvault, B. Bussery-Hor Quantum mechanical and $C(^{1}D) + H_{2}$ reaction on J. Chem. Phys. 124, 154314	nvault, JM. Launay, F. J. Aoiz, d quasiclassical trajectory sca the second excited $1 {}^{1}A$ " pote l (2006)	L. Banares ttering calculations for the ential energy surface.	
	$\mathbf{C} + \mathbf{H}_2$	Interchange reaction	$80 { m MeV}$	Th
1142.	D. Wang A full dimensional, nine study for the $H_2 + C_2 H$ J. Chem. Phys. 124, 201105	-degree-of-freedom, time-dep reaction. 5 (2006)	endent quantum dynamics	
	$\mathbf{H}_2 + \mathbf{C}_2 \mathbf{H}$	Interchange reaction	0-1.0 eV	$\mathrm{Th}$
1143.	<ul> <li>F. Dong, SH. Lee, K. Liu</li> <li>A crossed-beam study of channel.</li> <li>J. Chem. Phys. 124, 224312</li> </ul>	f the F + HD -; DF + H reac 2 (2006)	tion: The direct scattering	
	$f F + H_2 \ F + HD$	Interchange reaction Interchange reaction	1.18-4.00 kcal/mol 1.18-4.00 kcal/mol	Exp Exp
1144.	<ul><li>P. Defazio, C. Petrongolo</li><li>Renner-Teller quantum</li><li>J. Chem. Phys. 125, 064308</li></ul>	dynamics of the $N(^2D) + H_2$ (2006)	-; NH + H reaction.	
	$\mathbf{N} + \mathbf{H}_2$	Interchange reaction	1.0  eV	$\mathrm{Th}$
1145.	R. Krems, M. J. Jamieson, The ${}^{1}D{}-{}^{3}P$ transitions is gen. Astrophys. J., Part 1 647, 1	A. Dalgarno n atomic oxygen induced by i 531 (2006)	impact with atomic hydro-	
	O + H	Excitation	$1000-10,000 {\rm K}$	$\mathrm{Th}$
1146.	G. Lapicki Testing the ECPSSR th proton ionization cross s Nucl. Instrum. Methods Ph	eory and its modifications wi aections. ys. Res. B 241, 34 (2005)	th ratios of antiproton-to-	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Ionization Ionization Ionization Ionization Ionization Ionization	$10^{-3} - 10 \text{ MeV}$ $10^{-3} - 10 \text{ MeV}$	Th Th Th Th Th Th Th
1147.	A. Dubois, J. Caillat, J. P. R. Gayet, J. Fu, M. J. Fitzp Classical and quantal mo Nucl. Instrum. Methods Ph	Hansen, I. Dundvor, F. Fremont, batrick, W. F. Smith, M. J. Fitzpa ethods in atomic and molecul ys. Res. B 241, 48 (2005)	, P. Sobocinski, JY. Chesnel, atrick <b>ar collisions.</b>	
	$H^+ + H$	Charge Transfer	0.5-145  keV	$\mathrm{Th}$

$\mathbf{H}' + \mathbf{H}$	Charge Transfer	0.5-145 KeV	1 n
$\mathrm{He}^{2+} + \mathrm{H}_2$	Charge Transfer	0.5-145  keV	$\mathrm{Th}$
$\mathbf{O}^{5+} + \mathbf{H}_2$	Charge Transfer	0.5-145  keV	$\mathrm{Th}$
$Ar^{2+} + H_2$	Charge Transfer	0.5-145  keV	$\mathrm{Th}$

J. F. Reading, J. Fu, M. J. Fitzpatrick A critique of finite Hilbert basis set calculations for the angular distribution of ionized electrons produced in p + H impact at 20 keV. Nucl. Instrum. Methods Phys. Res. B 241, 54 (2005)				
$H^+ + H$	Ionization	20  keV	Th	
P. S. Krstic Vibrationally reso Nucl. Instrum. Meth	lved collisions in cold hydrog ods Phys. Res. B 241, 58 (2005)	en plasma.		
$egin{array}{lll} {f H}^+ + {f H}_2 \ {f H}^+ + {f H}_2^+ \ {f H}_2^+ + {f H}_2^+ \end{array}$	Charge Transfer Charge Transfer Charge Transfer	0.5-100 eV 0.5-100 eV 0.5-100 eV	Th Th Th	
R. Mehta, N. K. Pur L. Garg, T. Nandi, A L x-ray production ions.	i, Ajay Kumar, A. Kumar, B. P. A. Ahamad, G. Lapicki <b>n in</b> ${}_{57}La$ , ${}_{58}Ce$ , ${}_{60}Nd$ <b>and</b> ${}_{62}Sm$	Mohanty, P. Balouria, I. M. Govil, N by <b>35-60 MeV carbon and oxyge</b>	M. en	
$\begin{array}{l} {\rm C}^{4+} + {\rm La} \\ {\rm C}^{4+} + {\rm Ce} \\ {\rm C}^{4+} + {\rm Nd} \\ {\rm C}^{4+} + {\rm Sm} \\ {\rm O}^{5+} + {\rm La} \\ {\rm O}^{5+} + {\rm Ce} \\ {\rm O}^{5+} + {\rm Nd} \\ {\rm O}^{5+} + {\rm Sm} \end{array}$	Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization	35-60 MeV 35-60 MeV 35-60 MeV 35-60 MeV 35-60 MeV 35-60 MeV 35-60 MeV 35-60 MeV	Exp Exp Exp Exp Exp Exp Exp	
S. Jones, D. H. Madi Single and double Nucl. Instrum. Meth	son, J. H. Macek ionization of helium by the i ods Phys. Res. B 241, 73 (2005)	mpact of fast charged particles.		
$egin{array}{lll} {f C}^{6+} + {f He} \ {f C}^{6+} + {f He} \end{array}$	Total Scattering Ionization	$\begin{array}{l} 6 \ \mathrm{keV}; \ 100 \ \mathrm{MeV/amu} \\ 6 \ \mathrm{keV}; \ 100 \ \mathrm{MeV/amu} \end{array}$	Th Th	
S. Yu. Ovchinnikov, Sturmian theory of sions. Nucl. Instrum. Meth	J. H. Macek of electron energy distribution and Phys. Res. B 241, 78 (2005)	ons in low energy ion-atom coll	li-	
$\mathrm{H^-} + \mathrm{He} \ \mathrm{H} + \mathrm{He}$	Ionization Ionization	$5-25 \ { m keV}$ $5-25 \ { m keV}$	Th Th	
R. D. DuBois <b>Electron loss in M</b> Nucl. Instrum. Meth	eV/u collisions between many ods Phys. Res. B 241, 87 (2005)	y-electron projectiles and target	s.	
$egin{array}{llllllllllllllllllllllllllllllllllll$	Ionization Ionization Ionization Ionization Ionization Ionization Ionization	1.4-4.8 MeV/amu 1.4-4.8 MeV/amu 1.4-4.8 MeV/amu 1.4-4.8 MeV/amu 1.4-4.8 MeV/amu 1.4-4.8 MeV/amu 1.4-4.8 MeV/amu	Exp Exp Exp Exp Exp Exp Exp	
	J. F. Reading, J. Fu, A critique of finite ionized electrons p Nucl. Instrum. Meth $H^+ + H$ P. S. Krstic Vibrationally reso Nucl. Instrum. Meth $H^+ + H_2$ $H^+ + H_2^+$ $H_2^+ + H$ R. Mehta, N. K. Pur L. Garg, T. Nandi, A L x-ray production ions. Nucl. Instrum. Meth $C^{4+} + La$ $C^{4+} + Ce$ $C^{4+} + Nd$ $C^{4+} + Sm$ $O^{5+} + La$ $O^{5+} + Ce$ $O^{5+} + Nd$ $O^{5+} + Sm$ S. Jones, D. H. Madi Single and double Nucl. Instrum. Meth $C^{6+} + He$ $C^{6+} + He$ S. Yu. Ovchinnikov, Sturmian theory of sions. Nucl. Instrum. Meth $H^- + He$ H + He R. D. DuBois Electron loss in M Nucl. Instrum. Meth $Ne^{2+} + Ar$ $Ne^{2+} + N_2$ $Ne^{3+} + Ar$ $Ne^{3+} + N_2$ $Ne^{4+} + Ar$ $Ne^{4+} + Xe$	J. F. Reading, J. Fu, M. J. Fitzpatrick A critique of finite Hilbert basis set calculation ionized electrons produced in $\mathbf{p} + \mathbf{H}$ impact at Nucl. Instrum. Methods Phys. Res. B 241, 54 (2005) $\mathbf{H}^+ + \mathbf{H}$ Ionization P. S. Krstic Vibrationally resolved collisions in cold hydrog Nucl. Instrum. Methods Phys. Res. B 241, 58 (2005) $\mathbf{H}^+ + \mathbf{H}_2$ Charge Transfer $\mathbf{H}^+ + \mathbf{H}_2^+$ Charge Transfer $\mathbf{H}_2^+ + \mathbf{H}$ Charge Transfer $\mathbf{H}_2^+ + \mathbf{H}$ Charge Transfer R. Mehta, N. K. Puri, Ajay Kumar, A. Kumar, B. P. L. Garg, T. Nandi, A. Ahamad, G. Lapicki L x-ray production in ${}_{57}La$ , ${}_{58}Ce$ , ${}_{60}Nd$ and ${}_{62}Sm$ ions. Nucl. Instrum. Methods Phys. Res. B 241, 63 (2005) $\mathbf{C}^{4+} + \mathbf{Ce}$ Ionization $\mathbf{C}^{4+} + \mathbf{Nd}$ Ionization $\mathbf{C}^{4+} + \mathbf{Sm}$ Ionization $\mathbf{O}^{5+} + \mathbf{Ce}$ Ionization $\mathbf{O}^{5+} + \mathbf{Ce}$ Ionization $\mathbf{O}^{5+} + \mathbf{Sm}$ Ionization $\mathbf{S}$ . Jones, D. H. Madison, J. H. Macek Single and double ionization of helium by the i Nucl. Instrum. Methods Phys. Res. B 241, 73 (2005) $\mathbf{C}^{6+} + \mathbf{He}$ Ionization $\mathbf{S}$ . Yu. Ovchinnikov, J. H. Macek Sturmian theory of electron energy distribution sions. Nucl. Instrum. Methods Phys. Res. B 241, 78 (2005) $\mathbf{H}^- + \mathbf{He}$ Ionization $\mathbf{Ne}^{2+} + \mathbf{Ar}$ Ionization $\mathbf{Ne}^{2+} + \mathbf{N}_2$ Ionization $\mathbf{Ne}^{3+} + \mathbf{Ar}$ Ionization $\mathbf{Ne}^{3+} + \mathbf{Ar}$ Ionization $\mathbf{Ne}^{3+} + \mathbf{Ar}$ Ionization $\mathbf{Ne}^{4+} + \mathbf{Ar}$ Ionization N	J. F. Reading, J. Fu, M. J. Fitzpatrick A critique of finite Hilbert basis set calculations for the angular distribution ionized electrons produced in p + H impact at 20 keV. Nucl. Instrum. Methods Phys. Res. B 241, 54 (2005) H <sup>+</sup> + H Ionization 20 keV P. S. Krstic Vibrationally resolved collisions in cold hydrogen plasma. Nucl. Instrum. Methods Phys. Res. B 241, 58 (2005) H <sup>+</sup> + H <sub>2</sub> Charge Transfer 0.5-100 eV H <sup>+</sup> + H <sub>2</sub> Charge Transfer 0.5-100 eV H <sup>+</sup> + H <sub>2</sub> Charge Transfer 0.5-100 eV H <sub>2</sub> <sup>-</sup> + H Charge Transfer 0.5-100 eV R. Mehta, N. K. Puri, Ajay Kumar, A. Kumar, B. P. Mohanty, P. Balouria, I. M. Govil, 7 L. Garg, T. Nandi, A. Ahamad, G. Lapicki L x-ray production in <sub>57</sub> La, <sub>53</sub> Ce, <sub>60</sub> Nd and <sub>62</sub> Sm by 35-60 MeV carbon and oxyge ions. Nucl. Instrum. Methods Phys. Res. B 241, 63 (2005) C <sup>4+</sup> + La Ionization 35-60 MeV C <sup>4+</sup> + Ce Ionization 35-60 MeV C <sup>4+</sup> + Nd Ionization 35-60 MeV C <sup>4+</sup> + Nd Ionization 35-60 MeV O <sup>5+</sup> + La Ionization 35-60 MeV O <sup>5+</sup> + La Ionization 35-60 MeV O <sup>5+</sup> + Nd Ionization 35-60 MeV O <sup>5+</sup> + Ne Ionization 35-60 MeV O <sup>5+</sup> + Ne Ionization 14-4.8 MeV/amu Ne <sup>4+</sup> + He Ionization 5-25 keV H <sup>-</sup> + He Ionization 14-4.8 MeV/amu Ne <sup>2+</sup> + Xe Ionization 14-4.8 MeV/amu Ne <sup>2+</sup> + Xe Ionization 14-4.8 MeV/amu Ne <sup>3+</sup> + Xe Ionization 14-4.8 MeV/amu Ne <sup>3+</sup> + Xe Ionization 14-4.8 MeV/amu Ne <sup>3+</sup> + Xe Ionization 14-4.8 MeV/amu	

$Ne^{4+} + N_2$	Ionization	1.4-4.8  MeV/amu	Exp
$Ar^+ + Ar$	Ionization	1.4-4.8  MeV/amu	Exp
$Ar^+ + Xe$	Ionization	1.4-4.8  MeV/amu	Exp
$Ar^+ + N_2$	Ionization	1.4-4.8  MeV/amu	Exp
$Ar^{2+} + Ar$	Ionization	1.4-4.8  MeV/amu	$\operatorname{Exp}$
$Ar^{2+} + Xe$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$Ar^{2+} + N_2$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$Xe^{3+} + Ar$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$Xe^{3+} + Xe$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$\mathbf{X}\mathbf{e}^{3+} + \mathbf{N}_2$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$\mathbf{U}^{4+} + \mathbf{Ar}$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$\mathbf{U}^{4+} + \mathbf{X}\mathbf{e}$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$\mathbf{U}^{4+} + \mathbf{N}_2$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$\mathbf{U}^{6+} + \mathbf{Ar}$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$\mathbf{U}^{6+} + \mathbf{X}\mathbf{e}$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$\mathbf{U}^{6+}+\mathbf{N}_2$	Ionization	1.4-4.8  MeV/amu	$\operatorname{Exp}$
$\mathbf{U}^{10+} + \mathbf{Ar}$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$\mathbf{U}^{10+} + \mathbf{Xe}$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	Exp
$\mathbf{U}^{10+} + \mathbf{N}_2$	Ionization	$1.4-4.8 \mathrm{MeV/amu}$	Exp

### 1154. Y. C. Yu, J. Y. Hsu, K. M. Chen

K-shell X-ray production of In and Sn by proton, helium, and lithium ions. Nucl. Instrum. Methods Phys. Res. B 241, 90 (2005)

$H^+ + In$	Ionization	$1-10 { m MeV}$	Exp
$H^+ + Sn$	Ionization	$1-10 { m MeV}$	Exp
$He^{2+} + In$	Ionization	$1-10 {\rm ~MeV}$	Exp
$He^{2+} + Sn$	Ionization	$1-10 {\rm ~MeV}$	Exp
$Li^{2+} + In$	Ionization	$1-10 {\rm ~MeV}$	Exp
$Li^{2+} + Sn$	Ionization	$1-10 { m MeV}$	Exp
$Li^{3+} + In$	Ionization	$1-10 {\rm ~MeV}$	Exp
$Li^{3+} + Sn$	Ionization	1-10  MeV	Exp

# 1155. F. Naab, J. L. Duggan, O. W. Holland, F. D. McDaniel, G. Lapicki Measurements and calculations of M-shell X-ray production in Er, Yb and Lu by 0.75-6 MeV He ions.

Nucl. Instrum. Methods Phys. Res. B 241, 94 (2005)

$\mathrm{He^{+}}+\mathrm{Er}$	Ionization	$0.75\text{-}6.0~\mathrm{MeV}$	E/T
$\mathrm{He^{+}+Yb}$	Ionization	$0.75$ - $6.0 { m MeV}$	E/T
$\mathrm{He^{+}+Lu}$	Ionization	$0.75\text{-}6.0~\mathrm{MeV}$	E/T

# 1156. E. Wells, K. D. Carnes, H. Tawara, R. Ali, E. Y. Sidky, C. Illescas, I. Ben-Itzhak One- and two-electron processes in collisions between hydrogen molecules and slow highly charged ions.

Nucl. Instrum. Methods Phys. Res. B 241, 101 (2005)

$\mathbf{C}^{6+} + \mathbf{H}_2$	Charge Transfer	$1-5 \mathrm{MeV}$	$\operatorname{Exp}$
$\mathbf{C}^{6+} + \mathbf{D}_2$	Charge Transfer	$1-5 { m MeV}$	Exp
$Ar^{11+} + H_2$	Charge Transfer	$1-5 \mathrm{MeV}$	$\operatorname{Exp}$
$Ar^{11+} + D_2$	Charge Transfer	$1-5 {\rm ~MeV}$	Exp

# 1157. O. Abu-Haija, S. A. Al-Faify, G. Olmez, S. M. Ferguson, E. Y. Kamber State-selective single-electron capture by $Ar^{4+}$ and $Ar^{5+}$ ions from $N_2$ , $O_2$ and $CF_4$ molecules.

Nucl. Instrum. Methods Phys. Res. B 241, 109 (2005)

$Ar^{4+} + N_2$	Charge Transfer	200-250  eV	Exd
$Ar^{4+} + O_2^2$	Charge Transfer	200-250  eV	Exp
$Ar^{4+} + CF_4$	Charge Transfer	$200\text{-}250~\mathrm{eV}$	Exp
$Ar^{5+} + N_2$	Charge Transfer	$200\text{-}250~\mathrm{eV}$	Exp
$Ar^{5+} + O_2$	Charge Transfer	$200\text{-}250~\mathrm{eV}$	Exp
$Ar^{5+} + CF_4$	Charge Transfer	$200\text{-}250~\mathrm{eV}$	Exp
$Ar^{4+} + N_2$	Interaction Potentials	$200\text{-}250~\mathrm{eV}$	Exp
$Ar^{4+} + O_2$	Interaction Potentials	$200\text{-}250~\mathrm{eV}$	Exp
$Ar^{4+} + CF_4$	Interaction Potentials	$200\text{-}250~\mathrm{eV}$	Exp
$Ar^{5+} + N_2$	Interaction Potentials	$200\text{-}250~\mathrm{eV}$	Exp
$Ar^{5+} + O_2$	Interaction Potentials	$200\text{-}250~\mathrm{eV}$	Exp
$Ar^{5+} + CF_4$	Interaction Potentials	$200\text{-}250~\mathrm{eV}$	Exp

1158. T. Ehrenreich, K. Miller, P. Gee, Q. Kessel, E. Pollack, W. W. Smith, N. Djuric, J. Lozano, S. J. Smith, A. Chutjian
Photon emission resulting from collisions of O<sup>5+</sup> with CO.

Nucl. Instrum. Methods Phys. Res. B 241, 125 (2005)

$O^{5+} + CO$	Excitation	2.2  keV/amu	Exp
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1159. S. J. Cipolla, B. P. Hill

Relative intensities of L X-rays excited by 75-300 keV proton impact on elements with Z = 39-50.

Nucl. Instrum. Methods Phys. Res. B 241, 129 (2005)

$H^+ + Y$	Excitation	75-300  keV	Exp
$ m H^+ + Zr$	Excitation	75-300  keV	Exp
$H^+ + Nb$	Excitation	75-300  keV	Exp
$H^+ + Mo$	Excitation	75-300  keV	Exp
$\mathrm{H^{+}}+\mathrm{Rh}$	Excitation	75-300  keV	Exp
$\mathrm{H^{+}} + \mathrm{Pd}$	Excitation	75-300  keV	Exp
$\mathrm{H^{+}}+\mathrm{Ag}$	Excitation	75-300  keV	Exp
$H^+ + Sn$	Excitation	75-300  keV	Exp
$H^+ + Y$	Ionization	75-300  keV	Exp
$ m H^+ + Zr$	Ionization	75-300  keV	Exp
$H^+ + Nb$	Ionization	75-300  keV	Exp
$H^+ + Mo$	Ionization	75-300  keV	Exp
$H^+ + Rh$	Ionization	75-300  keV	Exp
$\mathrm{H^{+}}+\mathrm{Pd}$	Ionization	75-300  keV	Exp
$\mathrm{H^{+}}+\mathrm{Ag}$	Ionization	75-300  keV	Exp
$H^+ + Sn$	Ionization	75-300  keV	Exp

1160. J. A. Perez, R. E. Olson

Relative state selective capture cross sections for low energy collisions between highly charged bare ions and neutral atoms.

Nucl. Instrum. Methods Phys. Res. B 241, 134 (2005)

$N^{7+} + O$	Charge Transfer	1-100  eV/u	Th
$O^{8+} + H$	Charge Transfer	1-100  eV/u	$\mathrm{Th}$
$N^{7+} + O$	Excitation	1-100 eV/u	$\mathrm{Th}$
$O^{8+} + H$	Excitation	1-100 eV/u	Th

1161. H. Martinez, B. E. Fuentes

Absolute differential and total cross sections for  $N^+$  formation from the interaction of  $N_2^+$  with He and Ar.

Nucl. Instrum. Methods Phys. Res. B 241, 459 (2005)

$\mathbf{N}_2^+ + \mathbf{H}\mathbf{e}$	Dissociation	1-5  keV	Exp
$\mathbf{N}_2^+ + \mathbf{A}\mathbf{r}$	Dissociation	1-5  keV	Exp
$\mathbf{N}_2^+ + \mathbf{He}$	Total Scattering	1-5  keV	Exp
$\mathbf{N}_2^+ + \mathbf{Ar}$	Total Scattering	1-5  keV	Exp

1162. R. Dey, A. C. Roy

Ejected electron energy distribution in the ionization of atomic hydrogen by  $C^{6+}$  impact.

Nucl. Instrum. Methods Phys. Res. B 243, 28 (2005)

$C^{6+} + H$	Total Scattering	$2.5 \ \mathrm{MeV/amu}$	$\mathrm{Th}$
$C^{6+} + H$	Ionization	$2.5 \ \mathrm{MeV/amu}$	$\mathrm{Th}$

1163. K. Kawatsura, K. Takahiro, M. Sataka, M. Imai, K. Komaki, H. Sugai, H. Shibata Ejected-electron spectra from Rydberg states in high-energy collisions of  $O^{3+}$  ions with He.

Nucl. Instrum. Methods Phys. Res. B 245, 44 (2006)

$O^{3+} + He$	Excitation	$32 { m MeV}$	Exp
$O^{3+} + He$	Ionization	$32 { m MeV}$	Exp

1164. P. Verma, P. H. Mokler, A. Brauning-Demian, H. Brauning, C. Kozhuharov, F. Bosch, D. Liesen, S. Hagmann, Th. Stoehlker, Z. Stachura, D. Banas, A. Orsic-Muthig, M. Schoeffler, D. Sierpowski, U. Spillmann, S. Tashenov, S. Toleikis, M. A. Wahab Probing superheavy quasimolecular collisions with incoming inner shell vacancies.

Nucl. Instrum. Methods Phys. Res. B 245, 56 (2006)

$\mathbf{U}^{73+} + \mathbf{Au}$	Excitation	$69 { m MeV/u}$	Exp
$\mathbf{U}^{86+} + \mathbf{Au}$	Excitation	$69 { m MeV/u}$	Exp
$\mathbf{U}^{88+} + \mathbf{Au}$	Excitation	$69 { m MeV/u}$	Exp
$\mathbf{U}^{91+} + \mathbf{Au}$	Excitation	$69 { m MeV/u}$	Exp

1165. L. Adoui, T. Muranaka, M. Tarisien, S. Legendre, G. Laurent, A. Cassimi, J.-Y. Chesnel, X. Flechard, F. Fremont, B. Gervais, E. Giglio, D. Hennecart Swift heavy ion-induced small molecule fragmentation dynamics. Nucl. Instrum. Methods Phys. Res. B 245, 94 (2006)

$O^{7+} + CO$	Dissociation	$6.7$ -1 $3.6 \mathrm{MeV/u}$	$\operatorname{Exp}$
$\mathbf{Si}^{15+} + \mathbf{H}_2$	Dissociation	$6.7$ -1 $3.6 \mathrm{MeV/u}$	$\operatorname{Exp}$
$\mathbf{Si}^{15+} + \mathbf{D}_2$	Dissociation	$6.7$ -1 $3.6 \mathrm{MeV/u}$	$\operatorname{Exp}$
$Ni^{24+} + CO_2$	Dissociation	$6.7$ -1 $3.6 \mathrm{MeV/u}$	$\operatorname{Exp}$
$\mathbf{Ni}^{25+} + \mathbf{H}_2\mathbf{O}$	Dissociation	$6.7$ -1 $3.6 \mathrm{MeV/u}$	$\operatorname{Exp}$
$Ni^{25+} + HDO$	Dissociation	$6.7$ -1 $3.6 \mathrm{MeV/u}$	$\operatorname{Exp}$
$\mathbf{X}\mathbf{e}^{44+} + \mathbf{H}_2\mathbf{O}$	Dissociation	$6.7$ -1 $3.6 \mathrm{MeV/u}$	$\operatorname{Exp}$

1166. M. Nekab, A. Kahoul

Semi-empirical and empirical L X-ray production cross sections for elements with 50 ; Z ; 92 for protons of 0.5-3.0 MeV.

Nucl. Instrum. Methods Phys. Res. B 245, 395 (2006)

$H^+ + A$	Excitation	$0.5\text{-}3.0 \; \mathrm{MeV}$	Exp
$\mathbf{H}^+ + \mathbf{A}$	Ionization	$0.5$ - $3.0 { m MeV}$	Exp

# 1167. M. Goudarzi, F. Shokouhi, M. Lamehi-Rachti, P. Oliaiy L-subshell and total M-shell X-ray production cross sections of Ta, W, Pt, Au, Pb and Bi by 0.7-2.4 MeV protons. Nucl. Instrum. Methods Phys. Res. B 247, 217 (2006)

Excitation	$0.7-2.4 { m MeV}$	Exp
Excitation	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
Excitation	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
Excitation	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
Excitation	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
Excitation	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
Ionization	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
Ionization	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
Ionization	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
Ionization	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
Ionization	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
Ionization	$0.7-2.4 { m MeV}$	$\operatorname{Exp}$
	Excitation Excitation Excitation Excitation Excitation Excitation Ionization Ionization Ionization Ionization Ionization Ionization	Excitation         0.7-2.4 MeV           Ionization         0.7-2.4 MeV

1168. N. P. Barradas, E. Alves, C. Jeynes, M. Tosaki

Accurate simulation of backscattering spectra in the presence of sharp resonances.

Nucl. Instrum. Methods Phys. Res. B 247, 381 (2006)

$H^+ + C$	Elastic Scattering	$1.8-6.0 { m MeV}$	Exp
$H^+ + Si$	Elastic Scattering	$1.8-6.0 { m MeV}$	Exp
$H^+ + C$	Interaction Potentials	$1.8-6.0 { m MeV}$	Exp
$\mathbf{H}^+ + \mathbf{Si}$	Interaction Potentials	$1.8\text{-}6.0~\mathrm{MeV}$	Exp

1169. S. Ouziane, A. Amokrane, I. Toumert, A. Noureddine, A. Pape Proton induced L and L-subshell X-ray cross-sections in Sm and Yb at 1-2.5 MeV.

Nucl. Instrum. Methods Phys. Res. B 249, 73 (2006)

$H^+ + Sm$	Excitation	1-2.5  MeV	E/T
$H^+ + Yb$	Excitation	1-2.5  MeV	E/T
$H^+ + Sm$	Ionization	$1\text{-}2.5 \mathrm{MeV}$	E/T
$H^+ + Yb$	Ionization	$1\text{-}2.5~\mathrm{MeV}$	E/T

#### 1170. H. Martinez

Absolute cross sections for the production of positive atomic ions from dissociative collisions of  $H_3^+$ ,  $D_3^+$  and  $HD_2^+$  in He. ľ

N	ucl	. Instrum.	Methods	Phys.	Res.	В	249, 89	(2006)	)
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$H_3^+ + He$	Dissociation	1-5  keV	Exp
$\mathrm{HD}_{2}^{+} + \mathrm{He}$	Dissociation	1-5  keV	Exp
$\mathbf{D}_3^+ + \mathbf{He}$	Dissociation	1-5  keV	Exp
${ m H_3^+}+{ m He}$	Total Scattering	1-5  keV	Exp
$\mathrm{HD}_{2}^{+} + \mathrm{He}$	Total Scattering	1-5  keV	Exp
$\mathbf{D}_3{}^+ + \mathbf{He}$	Total Scattering	1-5  keV	Exp

1171. K. L. Streib, T. L. Alford, J. W. Mayer

Experimental verification of theoretical cross sections for FIB-PIXE. Nucl. Instrum. Methods Phys. Res. B 249, 92 (2006)

Excitation	$0.3-3.5 { m MeV}$	$\operatorname{Exp}$
Excitation	$0.3-3.5 { m MeV}$	$\operatorname{Exp}$
Excitation	$0.3-3.5 { m MeV}$	Exp
Excitation	$0.3-3.5 { m MeV}$	Exp
Excitation	$0.3-3.5 { m MeV}$	$\operatorname{Exp}$
Excitation	$0.3-3.5 { m MeV}$	$\operatorname{Exp}$
Excitation	$0.3-3.5 { m MeV}$	$\operatorname{Exp}$
Excitation	$0.3-3.5 { m MeV}$	$\operatorname{Exp}$
	Excitation Excitation Excitation Excitation Excitation Excitation Excitation Excitation	Excitation         0.3-3.5 MeV           Excitation         0.3-3.5 MeV

$\mathrm{Be^{+}+Ge}$	Excitation	$0.3-3.5~{ m MeV}$	Exp
$\mathrm{Be^{+}}+\mathrm{Ag}$	Excitation	$0.3-3.5~{ m MeV}$	Exp
$Be^+ + W$	Excitation	$0.3-3.5~{ m MeV}$	Exp
$\mathrm{Be^{+}} + \mathrm{Au}$	Excitation	$0.3-3.5 { m MeV}$	Exp
$H^+ + Cr$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$H^+ + Cu$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$H^+ + Ge$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$H^+ + Ag$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$H^+ + W$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$H^+ + Au$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$\mathrm{Be^{+}}+\mathrm{Cr}$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$\mathrm{Be^{+}}+\mathrm{Cu}$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$\mathrm{Be^{+}+Ge}$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$\mathrm{Be^{+}}+\mathrm{Ag}$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$\mathrm{Be}^+ + \mathrm{W}$	Ionization	$0.3-3.5~{ m MeV}$	Exp
$\mathrm{Be^{+}}+\mathrm{Au}$	Ionization	$0.3$ - $3.5 { m MeV}$	$\operatorname{Exp}$

1172. A. Caciolli, M. Chiari, A. Climent-Font, M. T. Fernandez-Jimenez, G. Garcia-Lopez, F. Lucarelli, S. Nava, A. Zucchiatti Proton elastic scattering cross-sections on F, C and Li from 3 to 7 MeV. Nucl. Instrum. Methods Phys. Res. B 249, 95 (2006)

$H^+ + Li$	Elastic Scattering	$3-7 { m MeV}$	Exp
$H^+ + C$	Elastic Scattering	$3-7 {\rm MeV}$	Exp
$H^+ + F$	Elastic Scattering	$3-7 {\rm MeV}$	$\operatorname{Exp}$

1173. A. Caciolli, M. Chiari, A. Climent-Font, M. T. Fernandez-Jimenez, G. Garcia-Lopez, F. Lucarelli, S. Nava, A. Zucchiatti Measurements of gamma-ray emission induced by protons on fluorine and lithium.

Nucl. Instrum. Methods Phys. Res. B 249, 98 (2006)

$H^+ + Li$	Excitation	$3-5.7 { m MeV}$	Exp
$H^+ + F$	Excitation	$3-5.7 { m MeV}$	Exp
$H^+ + Li$	Ionization	$3-5.7 { m MeV}$	Exp
$H^+ + F$	Ionization	$3-5.7 { m MeV}$	Exp

1174. J. C. Banks, W. R. Wampler, J. F. Browning, B. L. Doyle Cross sections for 165 deg backscattering of 8.0-11.7 MeV  $\alpha$  from carbon. Nucl. Instrum. Methods Phys. Res. B 249, 101 (2006)

$He^{2+} + C$	Elastic Scattering	$8-11.7 \mathrm{MeV}$	Exp
$\mathrm{He}^{2+} + \mathrm{C}$	Total Scattering	$8-11.7 { m MeV}$	Exp

1175. M. A. Munoz-Marquez, G. S. Parkinson, D. P. Woodruff, A. Hentz, P. L. Grande, G. Schiwietz, T. J. Wood, C. Boney, S. P. Tear, P. Bailey, T.C.Q. Noakes Energy loss in medium-energy ion scattering: A combined theoretical and experimental study of the model system Y on Si(111). Phys. Rev. B 72, 075415 (2005)

$H^+ + Si$	Ionization	100  keV	E/T
$H^+ + Y$	Ionization	100  keV	E/T

<sup>1176.</sup> G. Laurent, J. Fernandez, S. Legendre, M. Tarisien, L. Adoui, A. Cassimi, X. Frechard, F. Fremont, B. Gervais, E. Giglio, J. P. Grandin, F. Martin Kinematically complete study of dissociative ionization of D<sub>2</sub> by ion impact. Phys. Rev. Lett. 96, 173201 (2006)

$S^{15+} + I$	$\mathbf{H}_2$ Dissociation	13.6  MeV/u	Exp
$\mathbf{S}^{15+} + \mathbf{I}$	$\mathbf{D}_2$ Dissociation	$13.6 \; \mathrm{MeV/u}$	Exp
$\mathbf{S}^{15+} + \mathbf{I}$	$\mathbf{H}_2$ Excitation	$13.6 \; \mathrm{MeV/u}$	Exp
$\mathbf{S}^{15+} + \mathbf{I}$	$\mathbf{D}_2$ Excitation	$13.6 \; \mathrm{MeV/u}$	Exp
$\mathbf{S}^{15+} + \mathbf{I}$	$\mathbf{H}_2$ Ionization	$13.6 \; \mathrm{MeV/u}$	Exp
$\mathbf{S}^{15+} + \mathbf{I}$	$\mathbf{D}_2$ Ionization	$13.6 \; \mathrm{MeV/u}$	Exp
<b>Theoretic</b> <b>by helium</b> Phys. Rev.	al study of sodium and potassiu: atoms. A 73, 012506 (2006)	m resonance lines pressure br	oadened
Na + He	e Line Broadening	158-3000 K	$\mathrm{Th}$
K + He	Line Broadening	158-3000 K	Th
1178. D. Lisak, J.	T. Hodges, R. Ciurylo		

Comparison of semiclassical line-shape models to rovibrational  $H_2O$  spectra measured by frequency-stabilized cavity ring-down spectroscopy. Phys. Rev. A 73, 012507 (2006)

$H_2O + He$	Line Broadening	300 K	Exp
$H_2O + H_2O$	Line Broadening	300 K	Exp
$H_2O + N_2$	Line Broadening	300 K	Exp
$H_2O + SF_6$	Line Broadening	300 K	Exp
$\mathbf{N}_2 + \mathbf{N}_2$	Line Broadening	300 K	Exp

1179. H. Tawara, E. Takacs, T. Suta, K. Makonyi, L. P. Ratliff, J. D. Gillaspy **K** x rays produced in collisions of bare ions with atoms: Contribution of multipleelectron transfer in  $Kr^{36+}$ ,  $Ar^{18+}$ , and  $Ne^{10+}$  + Ar collisions. Phys. Rev. A 73, 012704 (2006)

$Ne^{9+} + Ar$	Charge Transfer	4  keV/u	Exp
$Ne^{10+} + Ar$	Charge Transfer	4  keV/u	Exp
$Ar^{17+} + Ar$	Charge Transfer	4  keV/u	Exp
$Ar^{18+} + Ar$	Charge Transfer	4  keV/u	Exp
$\mathbf{Kr}^{35+} + \mathbf{Ar}$	Charge Transfer	4  keV/u	Exp
$\mathbf{Kr}^{36+} + \mathbf{Ar}$	Charge Transfer	4  keV/u	Exp

1180. M. Pajek, D. Banas, J. Braziewicz, M. Czarnota, A. Bienkowski, M. Jaskola, A. Korman, D. Trautmann, G. Lapicki

M-shell ionization of heavy elements by 0.1-1.0 MeV/amu  $^{1,2}H$  and  $^{3,4}He$  ions. Phys. Rev. A 73, 012709 (2006)

H + Ta	Ionization	$0.1-1 \mathrm{MeV/u}$	E/T
H + W	Ionization	0.1-1  MeV/u	E/T
H + Re	Ionization	0.1-1  MeV/u	E/T
H + Os	Ionization	0.1-1  MeV/u	E/T
H + Ir	Ionization	0.1-1  MeV/u	E/T
H + Pt	Ionization	0.1-1  MeV/u	E/T
H + Au	Ionization	0.1-1  MeV/u	E/T
H + Bi	Ionization	0.1-1  MeV/u	E/T
H + Th	Ionization	0.1-1  MeV/u	E/T
He + Ta	Ionization	0.1-1  MeV/u	E/T
He + W	Ionization	0.1-1  MeV/u	E/T
He + Re	Ionization	$0.1-1 { m MeV/u}$	E/T
He + Os	Ionization	0.1-1  MeV/u	E/T
He + Ir	Ionization	$0.1-1 \ \mathrm{MeV/u}$	E/T

	$egin{array}{lll} { m He} + { m Pt} \ { m He} + { m Au} \ { m He} + { m Bi} \ { m He} + { m Th} \end{array}$	Ionization Ionization Ionization Ionization	0.1-1 MeV/u 0.1-1 MeV/u 0.1-1 MeV/u 0.1-1 MeV/u	E/T E/T E/T E/T
1181.	A. S. Kadyrov, I. Bray, A. <b>On-shell coupled-channe</b> wave expansion. Phys. Rev. A 73, 012710 (2	F. Stelbovics <b>l approach to proton-hydroge</b> 006)	n collisions without partial-	
	$egin{array}{lll} \mathbf{H}^+ \ + \ \mathbf{H} \ \mathbf{H}^+ \ + \ \mathbf{H} \end{array}$	Elastic Scattering Charge Transfer	$1 - 2x10^6 \text{ eV/u}$ $1 - 2x10^6 \text{ eV/u}$	Th Th
1182.	V. P. Mogendorff, E.J.D. Vi <b>Coupled-channel analysi</b> Phys. Rev. A 73, 012712 (2	redenbregt, H.C.W. Beijerinck s of Ne* thermalization cross 006)	s section.	
	$egin{array}{lll} { m Ne} + { m Ne} \ { m Ne} + { m Ne}^* \end{array}$	Elastic Scattering Elastic Scattering	0.2-0.8 mK 0.2-0.8 mK	Th Th
1183.	J. Caillat, N. Sisourat, A. D Orientation effects in He Phys. Rev. A 73, 014701 (2	Pubois, I. Dundvor, J. P. Hansen $H_2^{2+} - H_2^+$ collisions at interme 006)	ediate collision energies.	
	$\mathrm{He}^{2+} + \mathrm{H}_2^+$	Charge Transfer	1-56  keV/u	$\mathrm{Th}$
1184.	A. HT. Li, S. D. Chao Comment on "Intermole the local density approx Phys. Rev. A 73, 016701 (2	ecular interaction potentials c imation." 006)	of the methane dimer from	
	$\mathbf{CH}_4 + \mathbf{CH}_4$	Interaction Potentials		$\mathrm{Th}$
1185.	L. Gonzalez-Sanchez, E. Bo Quantum scattering of ( relaxation at ultralow en Phys. Rev. A 73, 022703 (2	do, F. A. Gianturco $DH(X^2\Pi)$ with $He(^1S)$ : Proper nergies. 006)	nsity features in rotational	
	$\mathrm{OH} + \mathrm{He}$ $\mathrm{OH} + \mathrm{He}$	De-excitation Excitation	$\frac{10^{-5} - 10^{-3} \ cm^{-1}}{10^{-5} - 10^{-3} \ cm^{-1}}$	$_{ m Th}^{ m Th}$
1186.	T. Kusakabe, Y. Miyamoto, Charge-transfer processe molecules below 4 keV/r Phys. Rev. A 73, 022706 (2	M. Kimura, H. Tawara es in collisions of $He^{2+}$ ions with u. 006)	th $H_2$ , $N_2$ , $O_2$ , <b>CO</b> , and $CO_2$	
	$\begin{array}{l} {\rm He}^{2+} + {\rm H}_2 \\ {\rm He}^{2+} + {\rm CO} \\ {\rm He}^{2+} + {\rm CO}_2 \\ {\rm He}^{2+} + {\rm N}_2 \\ {\rm He}^{2+} + {\rm O}_2 \end{array}$	Charge Transfer Charge Transfer Charge Transfer Charge Transfer Charge Transfer	0.2-2.7 keV/u 0.2-2.7 keV/u 0.2-2.7 keV/u 0.2-2.7 keV/u 0.2-2.7 keV/u	Exp Exp Exp Exp Exp
1187.	JY. Zhang, ZC. Yan, D. <b>Long-range interactions isotopes.</b> Phys. Rev. A 73, 022710 (2	Vrinceanu, J. F. Babb, H. R. Sado between a $He(2 \ {}^{3}S)$ atom and 006)	eghpour d a He(2 ${}^{3}P$ ) atom for like	
	He + He	Interaction Potentials		$\mathrm{Th}$

1188. S. Otranto, R. E. Olson, P. Beiersdofer

X-ray emission cross sections following charge exchange by multiply charged ions of astrophysical interest.

Phys. Rev. A 73, 022723 (2006)

$\mathbf{N}^{4+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	1-100,000  eV	E/T
$N^{4+} + CH_4$	Charge Transfer	1-100,000  eV	E/T
$N^{4+} + CO_2$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{N}^{5+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{N}^{5+} + \mathbf{CH}_4$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{N}^{5+} + \mathbf{CO}_2$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{N}^{6+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	1-100,000  eV	É/T
$N^{6+} + CH_4$	Charge Transfer	1-100,000  eV	É/T
$\mathbf{N}^{6+} + \mathbf{CO}_2$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{N}^{7+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	1-100,000  eV	É/T
$N^{7+} + CH_4$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{4+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{4+} + \mathbf{CH}_4$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{4+} + \mathbf{CO}_2$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{5+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{5+} + \mathbf{CH}_4$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{5+} + \mathbf{CO}_2$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{6+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	1-100,000  eV	E/T
$O^{6+} + CH_4$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{6+} + \mathbf{CO}_2$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{7+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{7+} + \mathbf{CH}_4$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{7+} + \mathbf{CO}_2$	Charge Transfer	1-100,000  eV	E/T
$O^{8+} + H$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{8+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{8+} + \mathbf{CH}_4$	Charge Transfer	1-100,000  eV	E/T
$\mathbf{O}^{8+} + \mathbf{CO}_2$	Charge Transfer	1-100,000  eV	E/T
$Ne^{4+} + H_2O$	Charge Transfer	1-100,000  eV	E/T
$Ne^{4+} + CH_4$	Charge Transfer	1-100,000  eV	E/T
$Ne^{4+} + CO_2$	Charge Transfer	1-100,000  eV	E/T
$\mathrm{Ne}^{5+} + \mathrm{H}_2\mathrm{O}$	Charge Transfer	1-100,000  eV	E/T
$Ne^{5+} + CH_4$	Charge Transfer	1-100,000  eV	E/T
$\mathrm{Ne}^{5+}+\mathrm{CO}_2$	Charge Transfer	1-100,000  eV	E/T
$\mathrm{Ne}^{6+} + \mathrm{H}_2\mathrm{O}$	Charge Transfer	1-100,000  eV	E/T
$Ne^{6+} + CH_4$	Charge Transfer	1-100,000  eV	E/T
$\mathrm{Ne}^{6+} + \mathrm{CO}_2$	Charge Transfer	1-100,000  eV	E/T
$Ne^{7+} + H_2O$	Charge Transfer	1-100,000  eV	E/T
$Ne^{7+} + CH_4$	Charge Transfer	1-100,000  eV	E/T
$Ne^{7+} + CO_2$	Charge Transfer	1-100,000  eV	E/T
$Ne^{8+} + H_2O$	Charge Transfer	1-100,000  eV	E/T
$Ne^{8+} + CH_4$	Charge Transfer	1-100,000  eV	E/T
$Ne^{8+} + CO_2$	Charge Transfer	1-100,000  eV	E/T
$Ne^{9+} + Ne$	Charge Transfer	1-100,000  eV	E/T
$Ne^{9+} + H_2O$	Charge Transfer	1-100,000  eV	E/T
$Ne^{9+} + CH_4$	Charge Transfer	1-100,000  eV	E/T
$Ne^{9+} + CO_2$	Charge Transfer	1-100,000  eV	E/T
$Ne^{10+} + He$	Charge Transfer	1-100,000  eV	E/T
$Ne^{10+} + Ne$	Charge Transfer	1-100,000  eV	E/T
$Ne^{10+} + H_2O$	Charge Transfer	1-100,000  eV	E/T

1189. S. Eden, J. Tabet, K. Samraoui, S. Louc, B. Farizon, M. Farizon, S. Ouaskit, T. D. Maerk Absolute cross sections for the dissociation of hydrogen cluster ions in high-

# energy collisions with helium atoms. Phys. Rev. A 73, 023201 (2006)

$H_3^+ + He$	Dissociation	60  keV/u	Exp
$\mathbf{H}_4^+ + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{27}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
${ m H}_5{}^+ + { m He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{7}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
$\mathbf{H}_{9}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
$\mathbf{H}_{11}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
$\mathbf{H}_{13}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
$\mathbf{H}_{6}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
$\mathbf{H}_{8}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
$\mathbf{H}_{10}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
$\mathbf{H}_{12}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
$\mathbf{H}_{14}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
$\mathbf{H}_{15}^{+} + \mathbf{He}$	Dissociation	60  keV/u	$\operatorname{Exp}$
$\mathbf{H}_{16}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{17}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{18}^+ + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{19}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{20}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{21}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{22}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{23}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{24}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{25}^+ + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{26}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{28}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{29}^+ + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{30}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{31}^{+} + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{32}^+ + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{33}^+ + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{34}^+ + \mathbf{He}$	Dissociation	60  keV/u	Exp
$\mathbf{H}_{35}^+ + \mathbf{He}$	Dissociation	60  keV/u	Exp

1190. J. P. D'Inaco, B. D. Esry

Mass dependence of ultracold three-body collision rates. Phys. Rev. A 73, 030702 (2006)

Interaction Potentials	Ultracold	$\mathrm{Th}$
Interaction Potentials	Ultracold	$\mathrm{Th}$
	Interaction Potentials Interaction Potentials	Interaction PotentialsUltracoldInteraction PotentialsUltracold

# 1191. E. Bodo, F. A. Gianturco

Ultra low-energy behavior of an ionic replacement reaction  ${}^{3}He^{4}He^{+} + {}^{4}He$  -:  ${}^{4}He_{2}^{+} + {}^{3}He$ . Phys. Rev. A 73, 032702 (2006)

$\mathbf{n}\mathbf{e}_{2} + \mathbf{n}\mathbf{e}_{3}$
---

Interchange reaction

### 1192. K. R. Cornelius

Updated single-electron-capture cross-section scaling rule for  $A^{q+} + H_2$  collisions. Phys. Rev. A 73, 032710 (2006)

$\mathbf{H}^+ + \mathbf{H}_2$	Charge Transfer	Th
$\mathrm{He^{+}}+\mathrm{H_{2}}$	Charge Transfer	Th
$\mathrm{He}^{2+} + \mathrm{H}_2$	Charge Transfer	Th
$\mathrm{Li}^{3+}+\mathrm{H}_2$	Charge Transfer	Th
$\mathbf{B}\mathbf{e}^{4+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{B}^{2+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{C}^{3+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{C}^{6+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{N}^{3+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{N}^{7+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{O}^{3+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{O}^{5+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{O}^{7+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{O}^{8+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{Na}^{11+} + \mathbf{H}_2$	Charge Transfer	Th
$Ar^{18+} + H_2$	Charge Transfer	Th
$\mathbf{F}\mathbf{e}^{12+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{F}\mathbf{e}^{20+} + \mathbf{H}_2$	Charge Transfer	Th
$\mathbf{Kr}^{36+} + \mathbf{H}_2$	Charge Transfer	Th

1193. Y. P. Singh, D. Misra, U. Kadhane, L. C. Tribedi Line-resolved M-shell x-ray production cross sections of Pb and Bi induced by highly charged C and F ions. Phys. Rev. A 73, 032712 (2006)

$\mathrm{H^{+}}+\mathrm{Pb}$	Dissociation	20-102  MeV	Exp
$\mathrm{H^{+}} + \mathrm{Bi}$	Dissociation	20-102  MeV	Exp
$Li^{3+} + Pb$	Dissociation	20-102  MeV	Exp
$Li^{3+} + Bi$	Dissociation	20-102  MeV	Exp
$C^{4+-6+} + Pb$	Dissociation	20-102  MeV	Exp
$C^{4+-6+} + Bi$	Dissociation	20-102  MeV	Exp
$\mathbf{F}^{4+-9+} + \mathbf{Pb}$	Dissociation	20-102  MeV	Exp
$\mathbf{F}^{4+-9+} + \mathbf{Bi}$	Dissociation	20-102  MeV	Exp
$H^+ + Pb$	Ionization	20-102  MeV	Exp
$\mathrm{H^{+}} + \mathrm{Bi}$	Ionization	20-102  MeV	Exp
$Li^{3+} + Pb$	Ionization	20-102  MeV	Exp
$Li^{3+} + Bi$	Ionization	20-102  MeV	Exp
$C^{4+-6+} + Pb$	Ionization	20-102  MeV	Exp
$C^{4+-6+} + Bi$	Ionization	20-102  MeV	Exp
$\mathbf{F}^{4+-9+} + \mathbf{Pb}$	Ionization	20-102  MeV	Exp
$\mathbf{F}^{4+-9+} + \mathbf{Bi}$	Ionization	20-102  MeV	Exp

1194. R.J.W. Stas, J. M. McNamara, W. Hogervorst, W. Vassen Homonuclear ionizing collisions of laser-cooled metastable helium atoms. Phys. Rev. A 73, 032713 (2006)

He + He Ionization $10^{-2} - 1$	$)^2 \text{ mK} \qquad E/T$
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1195. C. M. Dutta, C. Oubre, P. Nordlander, M. Kimura, A. Dalgarno Charge-transfer cross sections in collisions of ground-state Ca and H<sup>+</sup>. Phys. Rev. A 73, 032714 (2006)

$H^+ + Ca$	Charge Transfer	200-10,000  eV/u	Th

1196. S. Madzunkov, D. Fry, E. Lindroth, R. Schuch Characteristic x rays from multiple-electron capture by slow highly charged  $Ta^{q+}$ ions from He and Xe atoms.

Phys. Rev. A 73, 032715 (2006)

$Ta^{41+} + He$	Charge Transfer	10  keV/q	Exp
$Ta^{42+} + Xe$	Charge Transfer	10  keV/q	Exp
$Ta^{43+} + He$	Charge Transfer	10  keV/q	Exp
$Ta^{43+} + Xe$	Charge Transfer	10  keV/q	Exp
$Ta^{44+} + He$	Charge Transfer	10  keV/q	Exp
$Ta^{44+} + Xe$	Charge Transfer	10  keV/q	Exp
$Ta^{46+} + He$	Charge Transfer	10  keV/q	Exp
$Ta^{46+} + Xe$	Charge Transfer	10  keV/q	Exp
$Ta^{49+} + He$	Charge Transfer	10  keV/q	Exp
$Ta^{49+} + Xe$	Charge Transfer	10  keV/q	Exp

### 1197. V. Yu. Lazur, M. V. Khoma, R. K. Janev

Asymptotic properties of the three-Coulomb-center problem  $eZ_1ZZ$ . Phys. Rev. A 73, 032723 (2006)

$\mathbf{H}\mathbf{e}^{2+} + \mathbf{H}_{2}^{+}$	Charge Transfer	0.2-1.6 V(a.u.)	$\mathrm{Th}$
$Li^{3+} + H_2^+$	Charge Transfer	0.2-1.6 V(a.u.)	$\mathrm{Th}$
$\mathbf{B}\mathbf{e}^{4+} + \mathbf{H}_2^+$	Charge Transfer	0.2-1.6 V(a.u.)	$\mathrm{Th}$

### 1198. F. Ferlaino, C. D'Errico, G. Roati, M. Zaccanti, M. Inguscio, G. Modugno, A. Simoni Feshbach spectroscopy of a K-Rb atomic mixture. Phys. Rev. A 73, 040702 (2006)

K + Rb Elastic Scattering	$1x10^{-6}$ K	Exp
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1199. E. Juarros, P. Pellegrini, K. Kirby, R. Cote One-photon-assisted formation of ultracold polar molecules. Phys. Rev. A 73, 041403 (2006)

Li + H	Association	1 mK	$\mathrm{Th}$
Na + H	Association	1 mK	$\mathrm{Th}$

# 1200. T. Niederhausen, U. Thumm Capture and ionization in laser-assisted proton-hydrogen collisions. Phys. Rev. A 73, 041404 (2006)

$\mathbf{H}^+ + \mathbf{H}$	Charge Transfer	1.21  keV	Th
$H^+ + H$	Ionization	$1.21 \ \mathrm{keV}$	Th

1201. W. Glaz, T. Bancewicz, J.-L. Godet, G. Maroulis, A. Haskopoulos Hyper-Rayleigh light-scattering spectra determined by ab initio collisional hyperpolarizabilities of He-Ne atomic pairs. Phys. Rev. A 73, 042708 (2006)

$\mathbf{n}\mathbf{e} + \mathbf{N}\mathbf{e}$ Interaction Potentials 95-295 K	He + Ne	Interaction Potentials	95-295 K	T
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### 1202. B. Roth, P. Blythe, H. Wenz, H. Daerr, S. Schiller Ion-neutral chemical reactions between ultracold localized ions and neutral molecules with single-particle resolution. Phys. Rev. A 73, 042712 (2006)

	$egin{array}{llllllllllllllllllllllllllllllllllll$	Association Association Association	30 mK 30 mK 30 mK 30 mK	Exp Exp Exp Exp
1203.	S. B. Bayram, S. Kir Collisional depola Double-resonance Phys. Rev. A 73, 042	n, M. J. Welsh, J. D. Hinkle rization of Zeeman coherence two-photon polarization spectr 2713 (2006)	s in the ${}^{133Cs}$ 6p ${}^2P_{3/2}$ level: oscopy.	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	De-excitation De-excitation	$\begin{array}{c} 60\text{-}120 \ \mathrm{deg} \ \mathrm{C} \\ 60\text{-}120 \ \mathrm{deg} \ \mathrm{C} \end{array}$	$\begin{array}{c} \mathrm{Exp} \\ \mathrm{Exp} \end{array}$
1204.	F. Anis, V. Roudnev Laser-assisted char Phys. Rev. A 73, 043	, R. Cabrera-Trujillo, B. D. Esry rge transfer in $He^{2+}$ + H collisi 3414 (2006)	ons.	
	$\mathrm{He}^{2+} + \mathrm{H}$	Charge Transfer	1 keV	$\mathrm{Th}$
1205.	O. Heber, R. Golser Zaifman	, H. Gnaser, D. Berkovits, Y. Tok	er, M. Eritt, M. L. Rappaport, D.	
	Lifetimes of the ne Phys. Rev. A 73, 060	egative molecular hydrogen ion 0501 (2006)	s: $H_2^-$ , $D_2^-$ , and $HD^-$ .	
	$\mathbf{H}_{2}^{-} + \mathbf{H}_{2}$	Detachment	4.2  keV	Exp
	$HD^- + H_2$	Detachment	4.2  keV	Exp
	$\mathbf{D}_2^- + \mathbf{H}_2$	Detachment	4.2  keV	Exp
1206.	S. Knoop, V. G. Has Multielectron rem Phys. Rev. A 73, 062	an, R. Morgenstern, R. Hoekstra oval processes in $He^{2+}$ + Na co 2703 (2006)	ollisions.	
	$He^{2+} + Na$	Ionization	$10 \ \mathrm{keV/u}$	Exp
1207.	M. Schulz, A. Hasan, Kinematically con sions. Phys. Rev. A 73, 062	N. V. Maydanyuk, M. Foster, B. T aplete experiment on single ion 2704 (2006)	Tooke, D. H. Madison nization in 75-keV p+He colli-	
	TT_ , TT			<b>D</b> / <b>D</b>
	$H^+ + He$ $H^+ + He$	Iotal Scattering Ionization	75  keV 75  keV	E/T $E/T$
1208.	Y. V. Vanne, A. Saer Doubly excited au limit. Phys. Rev. A 73, 062	nz, A. Dalgarno, R. C. Forrey, P. Fr atoionizing states of $H_2$ converge 2706 (2006)	oelich, S. Jonsell <b>fing to the H(n=2) + H(n'=2)</b>	
	H + H	Interaction Potentials	$0-200 \ a_{0}$	$\mathbf{T}\mathbf{h}$
	$H + H^*$	Interaction Potentials	$0-200 a_0$	Th
	$H^* + H^*$	Interaction Potentials	$0-200 \ a_0$	Th
1209.	<ul> <li>R. Lazauskas, J. Car</li> <li>Description of <sup>4</sup>He</li> <li>Phys. Rev. A 73, 065</li> </ul>	bonell e <b>tetramer bound and scatterin</b> 2717 (2006)	g states.	
	$\mathrm{He} + \mathrm{He}$	Interaction Potentials	$0\text{-}120~\AA$	$\mathrm{Th}$

1210.	BL. Zhou, JM. Zhu, Z. Ground-state energy of Phys. Rev. A 73, 064503	-C. Yan of <i>HeH</i> <sup>+</sup> . (2006)		
	${f H^+} + {f He} {f He^+} + {f H}$	Interaction Potentials Interaction Potentials	3	Th Th
1211.	J. Rzadkiewicz, T. Stohll S. Fritzsche, A. Gojska, J. Nandi, R. Reuschl, D. Sie S. Trotsenko Selective population of Phys. Rev. A 74, 012511	ker, D. Banas, H. F. Bey A. Gumberidze, S. Hagm rpowski, U. Spillmann, A f the $[1s2s]$ <sup>1</sup> S <sub>0</sub> and $[1s]$ (2006)	yer, F. Bosch, C. Brandau, C. Z. Dong, nann, D. C. Ionescu, C. Kozhuharov, T. Surzhykov, S. Tashenov, M. Trassinelli, $s_{2s}$ ] <sup>3</sup> S <sub>1</sub> states of He-like uranium.	
	$\mathbf{U}^{89+} + \mathbf{N}_2$	Ionization	$98-398 { m MeV/u}$	Exp
1212.	H. Suno, S. N. Rai, HP. Elastic and inelastic pr Phys. Rev. A 74, 012701	Liebermann, R. J. Buenk rocesses in $H^+ + NH_2$ (2006)	ter, M. Kimura, L. Pichl collisions between 0.5 and 1.5 keV.	
	$egin{array}{lll} \mathbf{H}^+ + \mathbf{N}\mathbf{H}_2 \ \mathbf{H}^+ + \mathbf{N}\mathbf{H}_2 \end{array}$	Charge Transfer Total Scattering	$0.5{\text{-}}1.5 { m ~keV}$ $0.5{\text{-}}1.5 { m ~keV}$	$_{ m Th}^{ m Th}$
1213.	A. B. Voitkiv <b>Resonance transfer of</b> Phys. Rev. A 74, 012718	excitation in fast sym (2006)	metric atomic collisions.	
	$egin{array}{c} \mathbf{H} + \mathbf{H} \ \mathbf{H} + \mathbf{H}^* \end{array}$	Excitation Excitation	$\begin{array}{c} 1\text{-}10,000 \ \mathrm{MeV} \\ 1\text{-}10,000 \ \mathrm{MeV} \end{array}$	Th Th
1214.	P. Barragan, AT. Le, C. Hyperspherical close-c low-energy $Ne^{10+}$ + H Phys. Rev. A 74, 012720	D. Lin oupling calculations fo (1s) collisions. (2006)	or electron-capture cross sections in	
	$Ne^{10+} + He$	Charge Transfer	0.01-1000  eV	Th
1215.	L. F. Errea, L. Mendez, E Semiclassical treatment using spherical Bessel Phys. Rev. A 74, 012722	B. Pons, A. Riera, I. Sevilat of excitation and ele functions. (2006)	a, J. Suarez ectron loss in $A^{q+}$ + H(1s) collisions	
	$H^+ + H$	Excitation	40-7000  keV/u	$\mathrm{Th}$
	$He^{2+} + H$	Excitation	40-7000  keV'/u	$\mathrm{Th}$
	$Li^{3+} + H$	Excitation	40-7000  keV/u	Th
	$\mathrm{Be}^{4+} + \mathrm{H}$	Excitation	40-7000  keV/u	Th
	$\mathbf{B}^{5+}_{a+} + \mathbf{H}$	Excitation	40-7000  keV/u	$\mathrm{Th}$
	$C^{6+} + H$	Excitation	40-7000  keV/u	Th
	$\mathbf{H}^+ + \mathbf{H}$	Ionization	40-7000  keV/u	$\mathrm{Th}$
	$He^{2+} + H$	Ionization	40-7000  keV/u	Th
	$Li^{0+} + H$	Ionization	40-7000 keV/u	Th
	$Be^{++} + H$	Ionization	40-7000 keV/u	Th.
	$\mathbf{B}_{9+} + \mathbf{H}$	Ionization	40-7000 keV/u	Th
	$C^{\circ+} + H$	Ionization	40-7000 keV/u	Τh

1216. J.-Y. Zhang, Z.-C. Yan, D. Vrinceanu, J. F. Babb, H. R. Sadeghpour Long-range interactions for He(nS)-He(n'S) and He(nS)-He(n'P). Phys. Rev. A 74, 014704 (2006)

Ionization

40-7000 keV/u

	$\mathrm{He} + \mathrm{He} \ \mathrm{He}^* + \mathrm{He}$	Interaction Potentials Interaction Potentials		Th Th
1217.	M. M. Sant'Anna, F. Zappa V. de Castro Faria Multiple ionization of A ionization collision chann Phys. Rev. A 74, 022701 (20	, A.C.F. Santos, L.F.S. Coelho, V Ar by $F^-$ impact: Projectile nels. 006)	V. Wolff, A.L.F. de Barros, N. e-electron-loss and direct-	
	$\mathbf{F}^- + \mathbf{Ar}$	Ionization	0.46-1.45 a.u.	Exp
1218.	S. Y. Lin, H. Guo Quantum state-to-state of real wave-packet approad Phys. Rev. A 74, 022703 (20)	cross sections for atom-diator ch. 006)	m reactions: A Chebyshev	
1210	$H + H_2$ $N + H_2$ $H + H_2$ $N + H_2$ $H + H_2$ $N + H_2$ $N + H_2$	Association Association Interchange reaction Interchange reaction Total Scattering Total Scattering	0.08-1.4 eV 0.08-1.4 eV 0.08-1.4 eV 0.08-1.4 eV 0.08-1.4 eV 0.08-1.4 eV	Th Th Th Th Th Th
1213.	L. Adoui, D. Hennecart, N. Angular and high-freque MeV/u $Kr^{34+} + H_2$ colli Phys. Rev. A 74, 022707 (20	Stolterfoht ency analysis of electron inte sions. 006)	erference structures in 60	F
	$egin{array}{l} \mathbf{Kr}^{34+} + \mathbf{H}_2 \ \mathbf{Kr}^{34+} + \mathbf{H}_2 \ \mathbf{Kr}^{34+} + \mathbf{H}_2 \end{array}$	Dissociation Charge Transfer Ionization	60 MeV 60 MeV 60 MeV	Exp Exp Exp
1220.	P. Barragan, L. F. Errea, L. Electron capture in colle energies. Phys. Rev. A 74, 024701 (20	Mendez, I. Rabadan, A. Riera isions of $N^{2+}$ and $O^{2+}$ ions 006)	with H(1s) at low impact	
	$\mathbf{N}^{2+}$ + H $\mathbf{O}^{2+}$ + H	Charge Transfer Charge Transfer	$10^{-2} - 10^2 \text{ eV/amu}$ $10^{-2} - 10^2 \text{ eV/amu}$	$_{\mathrm{Th}}^{\mathrm{Th}}$
1221.	M. F. Ciappina, W. R. Crav <b>Theoretical description o</b> <b>of helium by ion impact.</b> Phys. Rev. A 74, 042702 (20	ero, M. Schulz, R. Moshammer, J f two- and three-particle inter 006)	J. Ullrich ractions in single ionization	
	$f C^{6+}$ + He Au <sup>24+</sup> + He Au <sup>53+</sup> + He C <sup>6+</sup> + He Au <sup>24+</sup> + He Au <sup>53+</sup> + He	Total Scattering Total Scattering Total Scattering Ionization Ionization Ionization	3.6-100 MeV/u 3.6-100 MeV/u 3.6-100 MeV/u 3.6-100 MeV/u 3.6-100 MeV/u 3.6-100 MeV/u	Exp Exp Exp Exp Exp Exp
1222.	G. Jalbert, L. Silva, W. We Castro Faria <b>Strong similarities betwe</b>	olff, S. D. Magalhaes, A. Medina een small cluster anions and e	, M. M. Sant'Anna, N. V. de	

**gon.** Phys. Rev. A 74, 042703 (2006)

$Al^- + Ar$	Total Scattering	$0.054\text{-}8.8~\mathrm{MeV}$	Exp
$\mathbf{Al}_2^- + \mathbf{Ar}$	Total Scattering	$0.054\text{-}8.8~\mathrm{MeV}$	Exp
$Al_3^- + Ar$	Total Scattering	$0.054\text{-}8.8~\mathrm{MeV}$	Exp
$\mathbf{Al}_4{}^- + \mathbf{Ar}$	Total Scattering	$0.054\text{-}8.8~\mathrm{MeV}$	Exp
$Al^- + Ar$	Detachment	$0.054-8.8 { m MeV}$	Exp
$Al_2^- + Ar$	Detachment	$0.054-8.8 { m MeV}$	Exp
$Al_3^- + Ar$	Detachment	$0.054\text{-}8.8~\mathrm{MeV}$	Exp
$\mathbf{Al}_4^- + \mathbf{Ar}$	Detachment	$0.054\text{-}8.8~\mathrm{MeV}$	Exp

1223. M. Schulz, T. Ferger, D. Fischer, R. Moshammer, M. Ullrich Multiple scattering mechanisms in simultaneous projectile-electron and targetelectron ejection in H<sup>-</sup> + He collisions. Phys. Rev. A 74, 042705 (2006)

$\mathrm{H}^- + \mathrm{He}$	Total Scattering	200  keV	Exp
$\mathrm{H^-} + \mathrm{He}$	Detachment	200  keV	Exp
$\mathrm{H^-} + \mathrm{He}$	Ionization	200  keV	Exp

1224. S. Yu. Ovchinnikov, P. S. Krstic, J. H. Macek

# Oscillations in the integral elastic cross sections for scattering of protons at inert gases.

Phys. Rev. A 74, 042706 (2006)

$H^+ + He$	Elastic Scattering	$10^{-4} - 1 \text{ eV}$	$\mathrm{Th}$
$H^+ + Ne$	Elastic Scattering	$10^{-4} - 1 \text{ eV}$	$\mathrm{Th}$
$H^+ + Ar$	Elastic Scattering	$10^{-4} - 1 \text{ eV}$	$\mathrm{Th}$

1225. J. A. Kunc

Probabilities for low-energy small-angle scattering in collisions of neutral particles.

Phys. Rev. A 74, 042715 (2006)

Li + Hg	Elastic Scattering	0.05 - 0.5  eV	$\mathrm{Th}$
Na + Hg	Elastic Scattering	0.05-0.5  eV	$\mathrm{Th}$
$\mathrm{K}+\mathrm{Hg}$	Elastic Scattering	0.05- $0.5  eV$	$\mathrm{Th}$
Li + Hg	Total Scattering	0.05-0.5  eV	$\mathrm{Th}$
Na + Hg	Total Scattering	0.05- $0.5  eV$	$\mathrm{Th}$
$\mathrm{K}+\mathrm{Hg}$	Total Scattering	0.05- $0.5  eV$	$\mathrm{Th}$

1226. G. N. Ogurtsov, V. M. Mikoushkin, S. Yu. Ovchinnikov, J. H. Macek Correlated electron detachment in H<sup>-</sup> + He collisions. Phys. Rev. A 74, 042720 (2006)

$H^- + He$	Detachment	1-10 keV	E/T
$H^- + He$	Ionization	1-10 keV	E/T

1227. M. Purkait, S. Sounda, A. Dhara, C. R. Mandal Double-charge-transfer cross sections in inelastic collisions of bare ions with helium atoms. Phys. Rev. A 74, 042723 (2006)

$He^{2+} + He$	Charge Transfer	50-500  keV/amu	E/T
$Li^{3+} + He$	Charge Transfer	50-500  keV/amu	E/T
$\mathbf{B}^{5+} + \mathbf{He}$	Charge Transfer	50-500  keV/amu	E/T

1228. V. D. Ovsiannikov, J. Mitroy

Regular approach for generating van der Waals  $C_s$  coefficients to arbitrary orders. J. Phys. B 39, 159 (2006) 1229. A. Kumar, D. Misra, A. H. Kelkar, U. Kadhane, Y. P. Singh, G. Lapicki, L. Gulyas, L. C. Tribedi

Saturation effect in projectile- and target-x-ray production in collisions between 2.5 MeV/u highly charged Cu ions and gaseous targets.

J. Phys. B 39, 331 (2006)

$Cu^{20+26+} + Ne$	Charge Transfer	$2.5 { m MeV}$	Exp
$Cu^{20+26+} + Ar$	Charge Transfer	$2.5 { m MeV}$	Exp
$Cu^{20+26+} + Kr$	Charge Transfer	$2.5 { m MeV}$	Exp
$Cu^{20+26+} + Xe$	Charge Transfer	$2.5 { m MeV}$	Exp
$Cu^{20+26+} + H_2$	Charge Transfer	$2.5 { m MeV}$	Exp
$Cu^{20+26+} + Ne$	Excitation	$2.5 { m MeV}$	Exp
$Cu^{20+26+} + Ar$	Excitation	$2.5 { m MeV}$	Exp
$Cu^{20+26+} + Kr$	Excitation	$2.5 { m MeV}$	Exp
$Cu^{20+26+} + Xe$	Excitation	$2.5 { m MeV}$	Exp
$\mathrm{Cu}^{20+26+} + \mathrm{H}_2$	Excitation	$2.5 { m MeV}$	Exp

1230. T.J.M. Zouros, B. Sulik, L. Gulyas, A. Orban

Production of projectile 1s2s2p  ${}^{4}P$  states by transfer-loss in collisions of  $O^{5+}$  and  $F^{6+}$  ions with  $H_2$  and He targets.

J. Phys. B 39, L45 (2006)

$O^{5+} + He$	Charge Transfer	0.25-2  MeV/u	$\mathrm{Th}$
$\mathbf{O}^{5+} + \mathbf{H}_2$	Charge Transfer	$0.25-2 { m MeV/u}$	$\mathrm{Th}$
$\mathbf{F}^{6+} + \mathbf{He}$	Charge Transfer	$0.25-2 { m MeV/u}$	$\mathrm{Th}$
$\mathbf{F}^{6+} + \mathbf{H}_2$	Charge Transfer	$0.25-2 { m MeV/u}$	$\mathrm{Th}$
$O^{5+} + He$	Ionization	0.25-2  MeV/u	$\mathrm{Th}$
$\mathbf{O}^{5+} + \mathbf{H}_2$	Ionization	0.25-2  MeV/u	$\mathrm{Th}$
$\mathbf{F}^{6+} + \mathbf{He}$	Ionization	0.25-2  MeV/u	$\mathrm{Th}$
$\mathbf{F}^{6+} + \mathbf{H}_2$	Ionization	0.25-2  MeV/u	$\mathrm{Th}$

1231. P. Sobocinski, Z. D. Pesic, R. Hellhammer, D. Klein, B. Sulik, J.-Y. Chesnel, N. Stolterfoht Anisotropic proton emission after fragmentation of H<sub>2</sub>O by multiply charged ions. J. Phys. B 39, 927 (2006)

$Ne^{3+} + H_2O$	Dissociation	1-5  keV	Exp
$\mathrm{Ne}^{7+} + \mathrm{H}_2\mathrm{O}$	Dissociation	1-5  keV	$\operatorname{Exp}$
$Ne^{3+} + H_2O$	Total Scattering	1-5  keV	$\operatorname{Exp}$
$Ne^{7+} + H_2O$	Total Scattering	1-5  keV	Exp

<sup>1232.</sup> A. L. Godunov, J. H. McGuire, V. S. Schipakov, H.R.J. Walters, C. T. Whelan Total cross sections for transfer ionization in fast ion-helium collisions. J. Phys. B 39, 987 (2006)

$\mathrm{H^{+}} + \mathrm{He}$	Charge Transfer	$100-6000 {\rm ~keV}$	$\mathrm{Th}$
$He^{2+} + He$	Charge Transfer	$100-6000 {\rm ~keV}$	$\mathrm{Th}$
$Li^{3+} + He$	Charge Transfer	100-6000  keV	$\mathrm{Th}$
$\mathrm{H^{+}+He}$	Ionization	$100\text{-}6000~\mathrm{keV}$	$\mathrm{Th}$
$\mathrm{He}^{2+} + \mathrm{He}$	Ionization	$100-6000 {\rm ~keV}$	$\mathrm{Th}$
$Li^{3+} + He$	Ionization	100-6000 $\rm keV$	$\mathrm{Th}$

1233. V. I. Matveev, E. S. Gusarevich, D. U. Matrasulov, Kh. Yu. Rakhimov, Th. Stoehlker, G. Baur

# $\label{eq:projectile} Projectile\ electron\ losses\ in\ the\ collisions\ with\ neutral\ targets:\ Sudden-perturbation\ approximation.$

J. Phys. B 39, 1447 (2006)

$\mathbf{U}^{10+} + \mathbf{Ar}$	Ionization	$1.4-6.5 \mathrm{MeV/u}$	$\mathrm{Th}$
$\mathbf{U}^{28+} + \mathbf{Ar}$	Ionization	$1.4-6.5 \mathrm{MeV/u}$	$\mathrm{Th}$
$U^{28+} + N_2$	Ionization	1.4-6.5  MeV/u	$\mathrm{Th}$

1234. K. Chakrabarti, J. Tennyson

R-matrix calculation of the potential energy curves for Rydberg states of carbon monoxide.

J. Phys. B 39, 1485 (2006)

C + O	Interaction Potentials	1.5-3.5 a.u.	$\mathrm{Th}$
$C + O^+$	Interaction Potentials	1.5-3.5 a.u.	$\mathrm{Th}$
$C^+ + O$	Interaction Potentials	1.5-3.5 a.u.	$\mathrm{Th}$

1235. S. Otranto, R. E. Olson, J. Fiol

Angular distributions and Dalitz plots for  $C^{6+}$  ionization of He. J. Phys. B 39, L175 (2006)

$C^{6+} + He$	Total Scattering	2  MeV/u	E/T
$C^{6+} + He$	Ionization	2  MeV/u	E/T

1236. A. M. Sayler, M. Leonard, K. D. Carnes, R. Cabrera-Trujillo, B. D. Esry, I. Ben-Itzhak Preference for breaking the O-H bond over the O-D bond following HDO ionization by fast ions. J. Phys. B 39, 1701 (2006)

 $\mathbf{H}^+ + \mathbf{H}_2\mathbf{O}$ Dissociation 1-14 MeV/uE/T $\begin{array}{c} \mathbf{H}^{+} + \mathbf{H} \tilde{\mathbf{D}} \mathbf{O} \\ \mathbf{F}^{7+} + \mathbf{H}_2 \mathbf{O} \end{array}$ E/TDissociation 1-14 MeV/uDissociation 1-14 MeV/uE/T $\mathbf{F}^{7+} + \mathbf{HDO}$ Dissociation E/T1-14 MeV/u $\mathbf{H}^+ + \mathbf{H}_2 \mathbf{O}$ Ionization 1-14 MeV/uE/T $\begin{array}{l} H^{+} + HDO \\ F^{7+} + H_2O \end{array}$ E/TIonization 1-14 MeV/uE/TIonization 1-14 MeV/u $\mathbf{F}^{7+} + \mathbf{HDO}$ Ionization 1-14 MeV/uE/T

1237. M. Fiori, A. B. Rocha, C. E. Bielschowsky, G. Jalbert, C. R. Garibotti Double ionization of atoms by ion impact: Two-step models. J. Phys. B 39, 1751 (2006)

$\mathrm{H^{+} + He}$	Ionization	50-2000  keV/u	$\mathrm{Th}$
$\mathrm{H^{+}+He^{+}}$	Ionization	50-2000  keV/u	$\mathrm{Th}$
$H^+ + Li$	Ionization	50-2000  keV/u	$\mathrm{Th}$
$He^{2+} + He$	Ionization	50-2000  keV/u	$\mathrm{Th}$
$He^{2+} + Li$	Ionization	50-2000  keV/u	$\mathrm{Th}$
$Li^{3+} + He$	Ionization	50-2000  keV/u	$\mathrm{Th}$

1238. M. Ivkovic, R. Zikic, S. Jovicevic, N. Konjevic

On simultaneous determination of electron impact width, ion-broadening and ion-dynamic parameter from the shape of plasma broadened non-hydrogenic atom line.

J. Phys. B 39, 1773 (2006)

$Kr^+ + Kr$	Line Broadening	E/T
$\mathrm{Kr}^{2+} + \mathrm{Kr}$	Line Broadening	E/T

1239. M. Busch, Th. Ludwig, R. Drozdowski, G. von Oppen Anticrossing spectra of  ${}^{3}He$  and  ${}^{4}He$  atoms excited by  $He^{+} - He$  collisions. J. Phys. B 39, 1929 (2006)

	$\mathrm{He^{+}}$ + He $\mathrm{He^{+}}$ + He	Charge Transfer Excitation		Exp Exp
1240.	<ul> <li>S. Knoop, V. G. Hasan, H. Ott, R. Morgenstern, R. Hoekstra</li> <li>Single ionization of Na(3s) and Na*(3p) by low energy ion impact.</li> <li>J. Phys. B 39, 2021 (2006)</li> </ul>			
	$\mathrm{He}^{2+} + \mathrm{Na}$ $\mathrm{O}^{6+} + \mathrm{Na}$	Ionization Ionization	$2-10 \ {\rm keV/u}$ $2-10 \ {\rm keV/u}$	Exp Exp
1241.	J. Ph. Karr, L. Hilico High accuracy results f $HD^+$ , up to J = 2. J. Phys. B 39, 2095 (2006)	or the energy levels of the	molecular ions $H_2^+$ , $D_2^+$ and	
	$egin{array}{lll} { m H}^+ + { m H} \ { m H}^+ + { m D} \ { m D}^+ + { m H} \ { m D}^+ + { m H} \ { m D}^+ + { m D} \end{array}$	Interaction Potentials Interaction Potentials Interaction Potentials Interaction Potentials		Th Th Th Th
1242.	M. F. Ciappina, W. R. Cra Fully differential cross a nucleus-nucleus interact J. Phys. B 39, 2183 (2006)	wero sections for $C^{6+}$ single ioni tion.	zation of helium: The role of	
	${f C^{6+}}$ + He ${f C^{6+}}$ + He	Total Scattering Ionization	$2 { m MeV/u}$ $2 { m MeV/u}$	Th Th
1243.	<ul> <li>243. G. Halmova, J. D. Gorfinkiel, J. Tennyson</li> <li>Low-energy electron collisions with C<sub>2</sub> using the R-matrix method.</li> <li>J. Phys. B 39, 2849 (2006)</li> </ul>			
	C + C	Interaction Potentials	0-10  eV	$\mathrm{Th}$
1244.	T. Minami, M. S. Pindzola Lattice, time-dependen collisions of $Be^{4+}$ with a J. Phys. B 39, 2877 (2006)	, TG. Lee, D. R. Schultz t Schrodinger equation app atomic hydrogen.	proach for charge transfer in	
	$Be^{4+} + H$	Charge Transfer	10-1000 keV/u	$\mathrm{Th}$
1245.	1245. L. F. Errea, C. Illescas, L. Mendez, B. Pons, A. Riera, J. Suarez Charge transfer and ionization involving argon ions and neutral hydrogen. J. Phys. B 39, L91 (2006)			
	$\begin{array}{l} \mathbf{Ar}^{16+\_18+} + \mathbf{H} \\ \mathbf{Ar}^{16+\_18+} + \mathbf{H} \end{array}$	Charge Transfer Ionization	30-300 keV/amu 30-300 keV/amu	Th Th
1246.	M. F. Ciappina, W. R. Cra Post-prior discrepancies differential cross section J. Phys. B 39, 1091 (2006)	wero s in CDW-EIS calculations : ns.	for ion impact ionization fully	
	${f C}^{6+}$ + He Au <sup>24+</sup> + He Au <sup>53+</sup> + He C <sup>6+</sup> + He Au <sup>24+</sup> + He Au <sup>53+</sup> + He	Total Scattering Total Scattering Total Scattering Ionization Ionization Ionization	3.6-8.3 MeV/amu 3.6-8.3 MeV/amu 3.6-8.3 MeV/amu 3.6-8.3 MeV/amu 3.6-8.3 MeV/amu 3.6-8.3 MeV/amu	E/T $E/T$ $E/T$ $E/T$ $E/T$ $E/T$
1247.	C. L. Liu, J. G. Wang, R. K. Janev Mutual neutralization in slow $H_2^+$ - $H^-$ collisions. J. Phys. B 39, 1223 (2006)			
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	$\mathbf{H}_{2}^{+} + \mathbf{H}^{-}$	Recombination	0.05-5  keV/u	$\mathrm{E}/\mathrm{T}$
1248.	S. A. Wrathmall, D. R. F. A quantum-mechanica J. Phys. B 39, L249 (2006	lower l study of rotational transit 3)	tions in $H_2$ induced by H.	
	$\begin{array}{l} \mathbf{H} + \mathbf{H}_2 \\ \mathbf{H} + \mathbf{H}_2 \end{array}$	Energy Transfer Interaction Potentials	0-10,000 K 0-10,000 K	Th Th
1249.	H. Martinez, C. L. Hernan Absolute differential a and mixed states ions J. Phys. B 39, 2535 (2006	adez, F. B. Yousif and total cross sections for in $N_2$ .	charge transfer of $O^+$ ground	
	$\mathbf{O}^+ + \mathbf{N}_2$	Charge Transfer	1-5  keV	Exp
	$\mathbf{O}^+ + \mathbf{N}_2$	Total Scattering	1-5  keV	Exp
	Critical comparison be tial ionization cross set J. Phys. B 39, L285 (2006) $C^{6+} + He$	tween theory and experime ctions. j) Ionization	ent for $C^{6+}$ + He fully differen- 100 MeV/u	$\mathrm{E/T}$
1251.	H. Braeuning, A. Diehl, E Charge transfer in hor J. Phys. B 39, 3255 (2006	2. Salzborn nonuclear collisions of heav 5)	y ions.	
	$\mathbf{Ar}^{2+4+} + \mathbf{Ar}$	Charge Transfer	2-94  keV	Exp
	$\mathbf{Kr}^{2+-4+} + \mathbf{Kr}$	Charge Transfer	2-94 keV	Exp
	$\mathbf{A}\mathbf{e}^{2+-\mathbf{x}+} + \mathbf{A}\mathbf{e}$ $\mathbf{D}\mathbf{h}^{2+-4+} + \mathbf{D}\mathbf{h}$	Charge Transfer	2-94 keV 2.04 keV	Exp
	$\mathbf{Bi}^{2+-4+} + \mathbf{Bi}$	Charge Transfer	2-94 keV	Exp
1252.	A. B. Voitkiv, B. Najjari, <b>Two-electron capture</b> <b>highly charged ion and</b> J. Phys. B 39, 3403 (2006	N. Toshima, J. Ullrich with emission of one photo l a light atom.	on in fast collisions between a	
	$Ar^{18+} + He$	Charge Transfer	$5-23 \ { m MeV/u}$	$\mathrm{Th}$
	$Ar^{18+} + Li$	Charge Transfer	5-23  MeV/u	Th
	$Ar^{18+} + Be$	Charge Transfer	5-23 MeV/u	Th
	$\mathbf{Ar}^{10+} + \mathbf{B}$ $\mathbf{Ar}^{18+} + \mathbf{C}$	Charge Transfer Charge Transfer	5-23 MeV/u 5-23 MeV/u	Th Th
1253.	<ul> <li>W. S. Melo, A.C.F. Santo</li> <li>Dissociative and non-di</li> <li>0.75-3.5 MeV He<sup>+</sup>.</li> <li>J. Phys. B 39, 3519 (2006)</li> </ul>	s, M. M. Sant'Anna, G. M. Sig lissociative ionization of the	aud, E. C. Montenegro e $N_2$ molecule by the impact of	
	$He^+ + N_2$	Dissociation	$0.75$ - $3.5 { m MeV}$	Exp
	$\mathrm{He^{+}}+\mathrm{N}_{2}$	Ionization	$0.75$ - $3.5 { m MeV}$	Exp

1254.	TG. Lee Low-energy single electron capture, target excitation and ionization in $He^{2+}$ + Na(3s) collisions. J. Phys. B 39, 3665 (2006)				
	$egin{array}{lll} {f He}^{2+} + {f Na} \ {f He}^{2+} + {f Na} \ {f He}^{2+} + {f Na} \ {f He}^{2+} + {f Na} \end{array}$	Charge Transfer Excitation Ionization	2-20 keV 2-20 keV 2-20 keV	E/T E/T E/T	
1255.	A. B. Voitkiv, N. Toshima, J. Donization of hydrogen b bound-bound atomic tra J. Phys. B 39, 3791 (2006)	J. Ullrich y ion impact in the presence nsitions.	of a laser field resonant to		
	$egin{array}{lll} {f C}^{6+} + {f H} \ {f C}^{6+} + {f H} \end{array}$	Total Scattering Ionization	$1 { m MeV/u}$ $1 { m MeV/u}$	Th Th	
1256.	<ol> <li>W. Zrafi, B. Oujia, F. X. Gadea Theoretical study of the CsH molecule: Adiabatic and diabatic potential energy curves and dipole moments. J. Phys. B 39, 3815 (2006)</li> </ol>				
	Cs + H	Interaction Potentials	3-80 a.u.	$\mathrm{Th}$	
1257.	T. Bergeman, J. Qi, D. Wa Stwalley, R. A. Cline, J. D. <b>Photoassociation of</b> <sup>85</sup> <i>Rb</i> J. Phys. B 39, S813 (2006)	ng, Y. Huang, H. K. Pechkis, E. Miller, D. J. Heinzen atoms into $O_u^+$ states near t	E. Eyler, P. L. Gould, W. C. he 5S+5P atomic limits.		
	Rb + Rb	Association	$2x10^{-4} { m K}$	$\mathrm{E}/\mathrm{T}$	
	$Rb + Rb^*$	Association	$2x10^{-4}$ K	E/T	
	$ m Rb + Rb  m Rb + Rb^*$	Interaction Potentials Interaction Potentials	$2x10^{-4}$ K $2x10^{-4}$ K	E/T $E/T$	
1258.	<ol> <li>E. van der Zwan, D. van Oosten, D. Nehari, P. van der Straten, H.T.C. Stoof On the role of Penning ionization in photoassociation spectroscopy. J. Phys. B 39, S825 (2006)</li> </ol>				
	He + He	Association	$1.9-2.7 \mathrm{~mK}$	E/T	
	$\mathrm{He} + \mathrm{He}^*$	Association	$1.9-2.7 \mathrm{mK}$	$\dot{\mathrm{E/T}}$	
	He + He	Interaction Potentials	1.9-2.7 mK	E/T	
	$\mathbf{n}\mathbf{e} + \mathbf{n}\mathbf{e}$	Interaction Potentials	1.9-2.1 MK	$\mathbf{E}/\mathbf{T}$	

1259. G. Auboeck, C. Binder, L. Holler, V. Wippel, K. Rumpf, J. Szczepkowski, W. E. Ernst, L. Windholz
Trap loss collisions of <sup>6</sup>Li and <sup>7</sup>Li with <sup>23</sup>Na in a combined magneto-optical trap. J. Phys. B 39, S871 (2006)

Li + Na	Energy Transfer	$3x10^{-4} - 4x10^{-4}$ K	$\operatorname{Exp}$
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1260. M. Aymar, O. Dulieu, F. Spiegelman Electronic properties of francium diatomic compounds and prospects for cold molecule formation. J. Phys. B 39, S905 (2006)

	$\begin{array}{l} \mathbf{Rb} + \mathbf{Fr} \\ \mathbf{Rb}^+ + \mathbf{Rb} \\ \mathbf{Rb}^+ + \mathbf{Cs} \\ \mathbf{Rb}^+ + \mathbf{Fr} \\ \mathbf{Cs} + \mathbf{Fr} \\ \mathbf{Cs}^+ + \mathbf{Cs} \\ \mathbf{Cs}^+ + \mathbf{Fr} \\ \mathbf{Fr} + \mathbf{Fr} \\ \mathbf{Fr}^+ + \mathbf{Rb} \\ \mathbf{Fr}^+ + \mathbf{Fr} \end{array}$	Interaction Potentials Interaction Potentials Interaction Potentials Interaction Potentials Interaction Potentials Interaction Potentials Interaction Potentials Interaction Potentials Interaction Potentials Interaction Potentials		Th Th Th Th Th Th Th Th Th	
1261.	O. Docenko, M. Tamanis, J. <b>The coupling of the</b> $X^1\Sigma^+$ <b>cold collisions.</b> J. Phys. B 39, S929 (2006)	Zaharova, R. Ferber, A. Pashov, and $a^3\Sigma^+$ states of the atom j	H. Knoeckel, E. Tiemann pair Na + Cs and modelling		
	Na + Cs Na + Cs	Elastic Scattering Interaction Potentials	$10^{-5}$ K $10^{-5}$ K	E/T $E/T$	
1262.	M. Vatasescu, C. M. Dion, O. Dulieu Efficient formation of strongly bound ultracold caesium molecules by photoasso- ciation with tunnelling. J. Phys. B 39, S945 (2006)				
	$egin{array}{cl} { m Cs} + { m Cs} \ { m Cs} + { m Cs}^* \end{array}$	Association Association	$1.5x10^{-4}$ K $1.5x10^{-4}$ K	Th Th	
1263.	C. Haimberger, J. Kleinert, <b>Processes in the formatic</b> J. Phys. B 39, S957 (2006)	O. Dulieu, N. P. Bigelow on of ultracold NaCs.			
	$egin{array}{l} { m Na} + { m Cs} \ { m Na} + { m Cs}^* \end{array}$	Association Association	$3x10^{-5}$ K $3x10^{-5}$ K	Exp Exp	
1264.	E. Juarros, K. Kirby, R. Cot Laser-assisted ultracold is spontaneous emission. J. Phys. B 39, S965 (2006)	e lithium-hydride molecule for	mation: Stimulated versus		
	$egin{array}{ll} { m H} + { m Li}^* \ { m Li} + { m H} \end{array}$	Association Association	1 mK 1 mK	Th Th	
1265.	S. D. Kraft, P. Staanum, J. Lange, L. Vogel, R. Wester, M. Weidemueller Formation of ultracold LiCs molecules. J. Phys. B 39, S993 (2006)				
	Li + Cs	Association	$10^{-4} {\rm K}$	Exp	
1266.	U. Poschinger, W. Salzmann <b>Theoretical model for ult</b> J. Phys. B 39, S1001 (2006)	n, R. Wester, M. Weidemueller, C racold molecule formation via	. P. Koch, R. Kosloff adaptive feedback control.		
	$egin{array}{lll} {f Rb} + {f Rb} \ {f Rb} + {f Rb}^* \end{array}$	Association Association	$10^{-4}$ K $10^{-4}$ K	Th Th	
1267.	C. P. Koch, R. Kosloff, E. L Photoassociation with ch of molecules per pulse.	uc-Koenig, F. Masnou-Seeuws, A hirped laser pulses: Calculati	. Crubellier on of the absolute number		

J. Phys. B 39, S1017 (2006)

	$egin{array}{llllllllllllllllllllllllllllllllllll$	Association Association	$\begin{array}{c} 0.5x10^{-4}-1.5x10^{-4} \ {\rm K} \\ 0.5x10^{-4}-1.5x10^{-4} \ {\rm K} \end{array}$	Th Th
1268.	B. Schaefer-Bung, R. Mitric <b>Photostabilization of the</b> J. Phys. B 39, S1043 (2006)	, V. Bonacic-Koutecky e ultracold <i>Rb</i> <sub>2</sub> molecule by o	ptimal control.	
	$f Rb+Rb\ Rb+Rb^*$	Association Association		Th Th
1269.	L. Gonzalez-Sanchez, F. Ma $OH^-(X^1\Sigma^+)$ collisions wir rotational quenching effic J. Phys. B 39, S1203 (2006)	rinetti, E. Bodo, F. A. Gianturco th ${}^{4}He({}^{1}S)$ at vanishing energ ciency.	ies: A quantum analysis of	
	$OH^- + He$	De-excitation	$10^{-9} - 0.1 \ cm^{-1}$	Th
1270.	P. F. Weck, N. Balakrishnar <b>Dynamics of chemical re</b> J. Phys. B 39, S1215 (2006)	actions at cold and ultracold	temperatures.	
	$\mathbf{O} + \mathbf{H}_2$	Interchange reaction	$10^{-9} - 0.1 \text{ eV}; 10^{-4} - 100 \text{ K}$	Th
1271.	<ul> <li>271. B. Yang, H. Perera, N. Balakrishnan, R. C. Forrey, P. C. Stancil Quenching of rotationally excited CO in cold and ultracold collisions with H, He and H<sub>2</sub>.</li> <li>J. Phys. B 39, S1229 (2006)</li> </ul>			
	$egin{array}{llllllllllllllllllllllllllllllllllll$	De-excitation De-excitation De-excitation	$\begin{array}{c} 10^{-5} - 10 \ cm^{-1} \\ 10^{-5} - 10 \ cm^{-1} \\ 10^{-5} - 10 \ cm^{-1} \end{array}$	Th Th Th
1272.	I. S. Vogelius, L. B. Madsen Rotational cooling of mo- lective modes of a two-ic J. Phys. B 39, S1267 (2006)	, M. Drewsen plecular ions through laser-in on Coulomb crystal.	duced coupling to the col-	
	$\mathrm{Ca^{+}} + \mathrm{MgH^{+}}$	Energy Transfer	300 K	$\mathrm{Th}$
1273.	S. Geltman Ultracold scattering of R J. Phys. B 39, 4563 (2006)	Ab atoms and bound states of	$f Rb_2.$	
	Rb + Rb	Interaction Potentials	100-10,000 $\mu~{\rm K}$	$\mathrm{Th}$
1274.	C. Bahrim, J. F. Hunt Infrared spectroscopy for HeNe molecule. J. Phys. B 39, 4683 (2006)	r the identification of modes o	of vibration in a temporary	
	He + Ne	Interaction Potentials		$\mathrm{Th}$
1275.	Y. Moriwaki, Y. Matsuo, Y. Laser spectroscopic mea alkali earth ions in collisi J. Phys. B 39, 4789 (2006)	Fukuyama, N. Morita surements of fine structure ions with molecular hydrogen	changing cross sections of $(H_2, D_2)$ .	

$\mathrm{Ca^{+}} + \mathrm{H_{2}}$	Energy Transfer	$298 \mathrm{K}$	Exp
$Ca^+ + D_2$	Energy Transfer	298 K	Exp
$\mathbf{Sr}^+ + \mathbf{H}_2$	Energy Transfer	298 K	$\operatorname{Exp}$
$\mathbf{Sr}^+ + \mathbf{D}_2$	Energy Transfer	298 K	Exp
${f Ba^+}+{f H_2}$	Energy Transfer	298 K	Exp
$\mathrm{Ba^+} + \mathrm{D}_2$	Energy Transfer	298 K	Exp

1276. L. Ponce, R. Taieb, V. Veniard, A. Maquet

Attosecond-scale dynamics in ion-atom collision versus laser-atom interaction. J. Phys. B 39, 4985 (2006)

$H^+ + H$	Charge Transfer	1-2 a.u.; 1 $\mu$ m	$\mathrm{Th}$
$C^{6+} + H$	Charge Transfer	1-2 a.u.; 1 $\mu$ m	$\mathrm{Th}$
$Ne^{10+} + H$	Charge Transfer	1-2 a.u.; 1 $\mu$ m	$\mathrm{Th}$
$H^+ + H$	Ionization	1-2 a.u.; 1 $\mu$ m	$\mathrm{Th}$
$\mathbf{C}^{6+} + \mathbf{H}$	Ionization	1-2 a.u.; 1 $\mu$ m	$\mathrm{Th}$
$Ne^{10+} + H$	Ionization	1-2 a.u.; 1 $\mu$ m	$\mathrm{Th}$

### 1277. M. F. Ciappina, L. B. Madsen

Electron emission in energetic ion-atom collisions in the presence of coherent electromagnetic radiation.

J. Phys. B 39, 5037 (2006)

$\mathrm{H^{+}} + \mathrm{H}$	Total Scattering	10 a.u.	$\mathrm{Th}$
$He^{2+} + H$	Total Scattering	10 a.u.	$\mathrm{Th}$
$\mathbf{C}^{6+} + \mathbf{H}$	Total Scattering	10 a.u.	$\mathrm{Th}$
$H^+ + H$	Ionization	10 a.u.	$\mathrm{Th}$
$He^{2+} + H$	Ionization	10 a.u.	$\mathrm{Th}$
$C^{6+} + H$	Ionization	10 a.u.	$\mathrm{Th}$

1278. L. B. Zhao, J. G. Wang, P. C. Stancil, J. P. Gu, H.-P. Liebermann, R. J. Buenker, M. Kimura Radiative charge transfer in Ne<sup>2+</sup> + He collisions. J. Phys. B 39, 5151 (2006)

$Ne^{2+} + He$	Charge Transfer	$10^{-4} - 10^4 \text{ eV}$	$\mathrm{Th}$
$Ne^{2+*} + He$	Charge Transfer	$10^{-4} - 10^4 \text{ eV}$	$\mathrm{Th}$
$Ne^{2+} + He$	Fluorescence	$10^{-4} - 10^4 \text{ eV}$	$\mathrm{Th}$
$Ne^{2+*} + He$	Fluorescence	$10^{-4} - 10^4 \text{ eV}$	$\mathrm{Th}$

#### 1279. H.J.Aa. Jensen, J. Oddershede, J. F. Ogilvie Rotational g factors calculated for diatomic molecular cations $H_2^+$ , $HeH^+$ , and

$NeH^+$ .		2) -	)
J. Phys. B 39, 5215 (	(2006)		
$H^+ + H$	Interaction Potentials	0.007-4 nm	Th
$\mathrm{H^{+}+He}$	Interaction Potentials	0.007-4 nm	$\mathrm{Th}$
$\mathbf{H}^+ + \mathbf{Ne}$	Interaction Potentials	0.007-4  nm	$\mathrm{Th}$
280 F Lique A Spielfied	al C Dhant N Fagutriar		

**Ro-vibrational excitation of the SO molecule by collision with the He atom.** Astron. Astrophys. 458, 331 (2006)

1281. F. Dayou, C. Balanca

Rotational excitation of SiO by collisions with helium. Astron. Astrophys. 459, 297 (2006)

	He + SiO	Excitation	10-300 K	$\mathrm{Th}$
1282.	ML. Dubernet, F. Daniel, Rist, J. Noga, J. Tennyson Influence of a new pote $H_2O$ by $H_2$ at low tempo Astron. Astrophys. 460, 32	A. Grosjean, A. Faure, P. Valiror ential energy surface on the r erature. 3 (2006)	n, M. Wernli, L. Wiesenfeld, C.	
	$\mathbf{H}_2 + \mathbf{H}_2 \mathbf{O}$	Excitation	5-20 K	$\mathrm{Th}$
1283.	L. Machin, E. Roueff Collisional excitation of Astron. Astrophys. 460, 95	monodeuterated ammonia $N$ 3 (2006)	$H_2D$ by helium.	
	$\begin{array}{l} \mathbf{He} + \mathbf{NH}_3 \\ \mathbf{He} + \mathbf{NH}_2 \mathbf{D} \end{array}$	Excitation Excitation	0-100 K 0-100 K	Th Th
1284.	F. Lique, A. Spielfiedel <b>Ro-vibrational excitatio</b> Astron. Astrophys. 462, 11	n of CS by He. 79 (2007)		
	He + CS	Excitation	300-1500 K	Th
1285.	35. M. Wernli, L. Wiesenfeld, A. Faure, P. Valiron <b>Rotational excitation of</b> $HC_3N$ by $H_2$ and He at low temperatures. Astron. Astrophys. 464, 1147 (2007)			
	$\begin{array}{l} \mathbf{He} + \mathbf{HC}_{3}\mathbf{N} \\ \mathbf{H}_{2} + \mathbf{HC}_{3}\mathbf{N} \end{array}$	Excitation Excitation	5-100 K 5-100 K	Th Th
1286.	L. Machin, E. Roueff Collisional excitation of Astron. Astrophys. 465, 64	<b>doubly deuterated ammonia</b> 7 (2007)	$ND_2H$ by helium.	
	$egin{array}{lll} {f He} + {f NH}_3 \ {f He} + {f ND}_2 {f H} \end{array}$	Excitation Excitation	5-100 K 5-100 K	Th Th
1287.	D. Fischer, K. Stochkel, H. A. Simonsson, H. T. Schmid <b>Experimental separation</b> <b>p-He collisions.</b> Phys. Rev. A 73, 052713 (2	Cederquist, H. Zettergren, P. Rei dt <b>of the Thomas charge-trans</b> 2006)	nhed, R. Schuch, A. Kaellberg, fer process in high-velocity	
	$egin{array}{ll} \mathrm{H}^+ +\mathrm{He} \ \mathrm{H}^+ +\mathrm{He} \end{array}$	Charge Transfer Total Scattering	7.5-12.5 MeV 7.5-12.5 MeV	${ m E/T}$ ${ m E/T}$
1288.	K. M. Dunseath, M. Terao- Laser-assisted electron-l Phys. Rev. A 73, 053407 (2	Dunseath nelium scattering at very low 2006)	collision energies.	
	C + He C + He	Elastic Scattering Total Scattering	0.2-2.5  eV 0.2-2.5  eV	E/T $E/T$
1289.	J. G. Wang, B. He, Y. Ning Charge transfer ionizati Phys. Rev. A 74, 052709 (2	g, C. L. Liu, J. Yan, P. C. Stancil, on in collisions of $Si^{3+}$ with F 2006)	D. R. Schultz I from low to high energy.	

$Si^{3+} + H$	Charge Transfer	$10^{-2} - 10^6 \text{ eV/u}$	E/T
$Si^{3+} + H$	Ionization	$10^{-2} - 10^6 \text{ eV/u}$	E/T

1290. Y. P. Singh, A. Kumar, U. Kadhane, L. C. Tribedi, D. Trautmann Projectile atomic number dependence of the relativistic effect on the K-shell ionization of high Z elements under heavy-ion impact. Phys. Rev. A 74, 052714 (2006)

$C^{4+} + Sb$	Ionization	2-6.25  MeV/u	E/T
$\mathbf{C}^{4+} + \mathbf{A}\mathbf{u}$	Ionization	2-6.25 MeV/u	E/T
$C^{4+} + Bi$	Ionization	2-6.25  MeV/u	É/T
$O^{4+} + Sb$	Ionization	2-6.25 MeV/u	E/T
$O^{4+} + Au$	Ionization	2-6.25 MeV/u	E/T
$O^{4+} + Bi$	Ionization	2-6.25 MeV/u	E/T
$\mathbf{O}^{5+} + \mathbf{Sb}$	Ionization	2-6.25 MeV/u	E/T
$\mathbf{O}^{5+} + \mathbf{Au}$	Ionization	2-6.25  MeV/u	E/T
$O^{5+} + Bi$	Ionization	2-6.25 MeV/u	E/T
$O^{7+} + Sb$	Ionization	2-6.25 MeV/u	E/T
$O^{7+} + Au$	Ionization	2-6.25  MeV/u	E/T
$O^{7+} + Bi$	Ionization	2-6.25  MeV/u	É/T
$\mathbf{S}^{7+10+} + \mathbf{Sb}$	Ionization	2-6.25  MeV/u	E/T
$S^{7+10+} + Au$	Ionization	2-6.25  MeV/u	É/T
$S^{7+-10+} + Bi$	Ionization	2-6.25 MeV/u	É/T

1291. A. Mack, T. K. Clark, R. C. Forrey, N. Balakrishnan, T.-G. Lee, P. C. Stancil Cold He + H<sub>2</sub> collisions near dissociation. Phys. Rev. A 74, 052718 (2006)

$He + H_2$	Dissociation	0.0001-1  eV	$\mathrm{Th}$
$He + H_2$	De-excitation	0.0001-1  eV	$\mathrm{Th}$
$He + H_2$	Energy Transfer	0.0001-1  eV	$\mathrm{Th}$

1292. M. Gustafsson, L. Frommhold Infrared absorption by  $H_2 - Ar$  collisional complexes and the anisotropy of the intermolecular interaction potential. Phys. Rev. A 74, 054703 (2006)

$Ar + H_2$ Inter	action Potentials 195	K Th
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1293.	R. Tobola, J. Klos, F. Lique, G. Chalasinski, M. H. Alexander
	Rotational excitation and de-excitation of PN molecules by He atoms
	Astron. Astrophys. 468, 1123 (2007)

$H_{0} \downarrow U_{N}$ Evaluation (1.2500 am $\pm$
$\mathbf{H}_{\mathbf{A}}$

1294. E. Abrahamsson, R. V. Krems Fine-structure excitation of O I and C I by impact with atomic hydrogen. Astrophys. J., Part 1 654, 1171 (2007)

H + C	Excitation	0-1000 K	Th
H + O	Excitation	0-1000 K	Th

<sup>1295.</sup> S. Sounda, A. Dhara, M. Purkait, C. R. Mandal State selective electron capture in partially stripped ion-atom interaction at intermediate and high energies. Eur. Phys. J. D 38, 257 (2006)

$C^{+-5+} + H$	Charge Transfer	50-200  keV/amu	$\mathrm{Th}$
$N^{+-5+} + H$	Charge Transfer	50-200  keV/amu	$\mathrm{Th}$
$O^{+-5+} + H$	Charge Transfer	50-200  keV/amu	$\mathrm{Th}$
$C^{+-5+} + H$	Excitation	50-200  keV/amu	$\mathrm{Th}$
$N^{+-5+} + H$	Excitation	50-200  keV/amu	$\mathrm{Th}$
$O^{+-5+} + H$	Excitation	50-200  keV/amu	$\mathrm{Th}$

1296. M. S. Weng, A. Schinner, A. Sharma, P. Sigmund Primary electron spectra from swift heavy-ion impact – Scaling relations and estimates from modified Bohr theory. Eur. Phys. J. D 39, 209 (2006)

C + He	Total Scattering	0.1- $1.48  MeV/amu$	$\mathrm{Th}$
$\mathbf{C}^{2+} + \mathbf{He}$	Total Scattering	0.1- $1.48  MeV/amu$	Th
$C^{4+} + He$	Total Scattering	0.1- $1.48  MeV/amu$	$\mathrm{Th}$
$C^{6+} + He$	Total Scattering	0.1- $1.48  MeV/amu$	$\mathrm{Th}$
C + He	Ionization	0.1- $1.48  MeV/amu$	$\mathrm{Th}$
$\mathbf{C}^{2+} + \mathbf{He}$	Ionization	0.1- $1.48  MeV/amu$	$\mathrm{Th}$
$C^{4+} + He$	Ionization	0.1- $1.48  MeV/amu$	$\mathrm{Th}$
$C^{6+} + He$	Ionization	0.1- $1.48  MeV/amu$	$\mathrm{Th}$

1297. D. H. Jakubassa-Amundsen

Competing processes for electron capture to continuum in relativistic ion-atom collisions.

Eur. Phys. J. D 41, 267 (2007)

$U^{88+} + N_2$	Jonization	$990 { m MeV/amu}$	Exp
- /			

1298. M. K. Pandey, R. K. Dubey, D. N. Tripathi

Charge exchange collisions of  $H^+/D^+$  ions with alkaline Earth atoms (Ca, Mg). Eur. Phys. J. D 41, 275 (2007)

$H^+ + Mg$	Charge Transfer	1-100  keV	$\mathrm{Th}$
$\mathrm{H^{+} + Ca}$	Charge Transfer	1-100  keV	Th
$\mathrm{D^{+}+Mg}$	Charge Transfer	1-100  keV	Th
$D^+ + Ca$	Charge Transfer	1-100  keV	Th
$\mathrm{H^{+}} + \mathrm{Mg}$	Total Scattering	1-100  keV	Th
$\mathrm{H^{+} + Ca}$	Total Scattering	1-100  keV	Th
$\mathrm{D^{+}+Mg}$	Total Scattering	1-100  keV	Th
$D^+ + Ca$	Total Scattering	1-100  keV	$\mathrm{Th}$

1299. X. M. Chen, J. X. Shao, Z. H. Yang, H. Q. Zhang, Y. Cui, X. Xu, G. Q. Xiao, Y. T. Zhao, X. A. Zhang, Y. P. Zhang K-shell ionization cross section of aluminum induced by low-energy highly charged argon ions. Eur. Phys. J. D 41, 281 (2007)

$Ar^{12+_{16}+} + Al$	Fluorescence	180-380 keV	Exp
	1 Iuoroboonioo	100 000 10 1	$\mathbf{L}_{\mathbf{M}}$

1300. G. Garcia, E. Mejia-Ospino, A. Guerrero, I. Alvarez, C. Cisneros Kinetic energy release for the collision-induced dissociation of  $CO^+$ . Eur. Phys. J. D 42, 393 (2007)

$\rm CO^+ + He$	Dissociation	5  keV	Exp
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<sup>1301.</sup> T. Gonzalez-Lezana, O. Roncero, P. Honvault, J.-M. Launay, N. Bulut, F. J. Aoiz, L. Banares A detailed quantum mechanical and quasiclassical trajectory study on the dynamics of the  $H^+ + H_2$  -;  $H_2 + H^+$  exchange reaction. J. Chem. Phys. 125, 094314 (2006)

	$\mathbf{H}^+ + \mathbf{H}_2$	Interchange reaction	$0.0\text{-}1.0\;\mathrm{eV}$	$\mathrm{Th}$
1302.	TG. Lee, N. Balakrishnan State-to-state rotational J. Chem. Phys. 125, 114302	, R. C. Forrey, P. C. Stancil, D. R transitions in $H_2 + H_2$ collisi 2 (2006)	. Schultz, G. J. Ferland ions at low temperatures.	
	$H_2 + H_2$	Interchange reaction	$0.0\text{-}2.0\;\mathrm{eV}$	$\mathrm{Th}$
1303.	D. H. Zhang State-to-state quantum of ferential cross section for J. Chem. Phys. 125, 133102	reactive scattering for four-ato r the H + $H_2O$ -; $H_2$ + OH a 2 (2006)	om chemical reactions: Dif- bstraction reaction.	
	$H + H_2O$	Interchange reaction	$1.4 \mathrm{~eV}$	$\mathrm{Th}$
1304.	SH. Lee, F. Dong, K. Liu A crossed-beam study mediated channel. J. Chem. Phys. 125, 133106	of the F + HD -; HF + D 6 (2006)	reaction: The resonance-	
	$f F + H_2 \ F + HD$	Interchange reaction Interchange reaction	1.30-4.53 kcal/mol 1.30-4.53 kcal/mol	Exp Exp
1305.	RF. Lu, TS. Chu, Y. Zha Nonadiabatic effects in t J. Chem. Phys. 125, 133108	ang, KL. Han $\mathbf{H} + D_2$ reaction. $B_1(2006)$		
	$egin{array}{l} \mathbf{H} + \mathbf{H}_2 \ \mathbf{H} + \mathbf{D}_2 \end{array}$	Interchange reaction Interchange reaction	$\begin{array}{c} 1.49\text{-}1.85 \text{ eV} \\ 1.49\text{-}1.85 \text{ eV} \end{array}$	Th Th
1306.	D. De Fazio, V. Aquilanti, S Exact quantum calculati constants for the F + H J. Chem. Phys. 125, 133109	S. Cavalli, A. Aguilar, J. M. Lucas ons of the kinetic isotope effe D reaction and role of tunnel 0 (2006)	ct: Cross sections and rate ing.	
	$f F + H_2 \ F + HD$	Interchange reaction Interchange reaction	5-220 MeV 5-220 MeV	$_{\mathrm{Th}}^{\mathrm{Th}}$
1307.	Z. Xie, J. M. Bowman, X. Z Quasiclassical trajectory a new ab initio potentia J. Chem. Phys. 125, 133120	Thang <b>study of the reaction</b> $H_CH_4(r)$ <b>l energy surface.</b> (2006)	$v_3=0,1)$ -; $CH_3 + H_2$ using	
	$\mathbf{H} + \mathbf{C}\mathbf{H}_4$	Interchange reaction	$2.0 \ \mathrm{eV}$	$\mathrm{Th}$
1308.	M. Hankel, S. C. Smith, R. State-to-state reactive of reaction on five different wavepacket computer co J. Chem. Phys. 125, 164303	J. Allan, S. K. Gray, G. G. Balind differential cross sections for at potential energy surfaces of ode: DIFFREALWAVE. 3 (2006)	t-Kurti t the $\mathbf{H} + H_2$ -; $H_2 + \mathbf{H}$ employing a new quantum	
	$\mathbf{H} + \mathbf{H}_2$	Interchange reaction	0.4-1.2  eV	$\mathrm{Th}$
1309.	R. Martinez, J. D. Sierra, S Time dependent quantu H ion-molecule reaction J. Chem. Phys. 125, 164303	. K. Gray, M. Gonzalez m dynamics study of the $O^+$ - and isotopic variants $(D_2, HI)$ 5 (2006)	+ $H_2$ (v=0, j=0) -; $OH^+$ + D).	

	$\mathrm{O^{+}} + \mathrm{H_{2}}$	Interchange reaction	0.0-1.1 eV	$\mathrm{Th}$
1310.	L. Adam, W. Hack, G. C. M Exploring Renner-Teller combined experimental J. Chem. Phys. 126, 034304	McBane, H. Zhu, ZW. Qu, R. Sc induced quenching in the rea and theoretical study. 4 (2007)	hinke action $H(^2S) + NH(a^1\Delta)$ : A	
	$\begin{array}{l} \mathrm{H} + \mathrm{NH} \\ \mathrm{H} + \mathrm{ND} \\ \mathrm{D} + \mathrm{HD} \\ \mathrm{D} + \mathrm{NH} \end{array}$	Interchange reaction Interchange reaction Interchange reaction Interchange reaction	0-1000 K 0-1000 K 0-1000 K 0-1000 K	E/T E/T E/T E/T
1311.	R. van Harrevelt, G. Nymar Accurate quantum calcu J. Chem. Phys. 126, 084303	n, U. Manthe dations of the reaction rates : 3 (2007)	for $H/D + CH_4$ .	
	$egin{array}{lll} \mathbf{H} + \mathbf{C}\mathbf{H}_4 \ \mathbf{D} + \mathbf{C}\mathbf{H}_4 \end{array}$	Interchange reaction Interchange reaction	250-400 K 250-400 K	${ m Th}$ Th
1312.	W. Wang, S. Feng, Y. Zhao Quantum instanton eval effects for $SiH_4 + H$ -; 3 J. Chem. Phys. 126, 11430	uation of the thermal rate co $SiH_3 + H_2$ reaction in full Ca 7 (2007)	nstants and kinetic isotope rtesian space.	
	$\mathbf{SiH}_4 + \mathbf{H}$	Interchange reaction	200-1000 K	Th
1313.	D. Sokolovski, D. De Fazio, Overlapping resonances sections of the $\mathbf{F} + H_2$ r J. Chem. Phys. 126, 12110	S. Cavalli, V. Aquilanti and Regge oscillations in the eaction. 1 (2007)	state-to-state integral cross	
	$\mathbf{F} + \mathbf{H}_2$	Interchange reaction	25-50 MeV	Th
1314.	R. V. Olkhov, I.W.M. Smith Rate coefficients for real tween CN in selected ro- and $C_2H_2$ . J. Chem. Phys. 126, 134314	h ction and for rotational energy tational levels $(X^2\Sigma^+, \mathbf{v} = 2, \Sigma^+)$ 4 (2007)	gy transfer in collisions be- N = 0, 1, 6, 10, 15, and 20)	
	$\mathbf{CN} + \mathbf{C}_2 \mathbf{H}_2$	Excitation	300 K	Exp
1315.	B. Yang, P. C. Stancil Close-coupling study of $H_2O$ collisions with He a J. Chem. Phys. 126, 154300	rotational energy transfer ar atoms. 5(2007)	nd differential scattering in	
	$\mathrm{He} + \mathrm{H}_2\mathrm{O}$	Excitation	$10^{-6} - 10^3 \ cm^{-1}$	$\mathrm{Th}$
1316.	A. Zanchet, P. Halvick, J. C Cross sections and rate of reaction using a quasicle J. Chem. Phys. 126, 184308	C. Rayez, B. Bussery-Honvault, P. constants for the $C({}^{3}P) + OH($ assical trajectory method. 8 (2007)	Honvault $(X^2\Pi) - \mathcal{L} CO(X^1\Sigma^+) + H(^2S)$	
	C + OH	Interchange reaction	0-1 eV	Th

	Prediction of product $+ H/C_3 + H_2$ reacting to the complete base radiationless transit J. Chem. Phys. 126, 20	et branching ratios in the $C({}^{3}F)$ on using ab initio coupled clusis set combined with Rice-F ion theories. 04310 (2007)	$P(r) + C_2H_2$ -; $l-C_3H + H/c-C_3H$ usters calculations extrapolated Ramsperger-Kassel-Marcus and	H d d
	$\mathbf{C} + \mathbf{C}_2 \mathbf{H}_2$	Interchange reaction	0-70  kJ/mol	$\mathrm{Th}$
1318.	TS. Chu, KL. Han, T Coriolis coupling eff tial cross sections fo J. Chem. Phys. 126, 22	M. Hankel, G. G. Balint-Kurti ects in the calculation of state r the $\mathbf{H} + D_2$ reaction. 14303 (2007)	e-to-state integral and differen	-
	$egin{array}{l} \mathbf{H}+\mathbf{H}_2 \ \mathbf{H}+\mathbf{D}_2 \end{array}$	Interchange reaction Interchange reaction	0.4-1.2  eV 0.4-1.2  eV	Th Th
1319.	M. Yang, J. C. Corchad Seven-dimensional q tion. J. Chem. Phys. 126, 23	lo <b>uantum dynamics study of tl</b> 14312 (2007)	he $\mathbf{H} + NH_3$ -; $H_2 + NH_2$ read	-
	$H + NH_3$	Interchange reaction	200-2000 K	$\mathrm{Th}$
1320.	X. Q. Zhang, Q. Cui, J Quantum dynamics J. Chem. Phys. 126, 23	.Z.H. Zhang <b>study of H</b> + NH <sub>3</sub> -; H <sub>2</sub> + N 34304 (2007)	$VH_2$ reaction.	
	$H + NH_3$	Interchange reaction	$0.4\text{-}1.6\;\mathrm{eV}$	$\mathrm{Th}$
1321.	L. Liu, E. S. Richards, <b>Hydride transfer rea</b> J. Chem. Phys. 126, 24	J. M. Farrar action dynamics of $OD^+ + C_3$ 44315 (2007)	ыН <sub>6</sub> .	
	$egin{array}{lll} \mathbf{O}\mathbf{H}^+ + \mathbf{C}_3\mathbf{H}_6 \ \mathbf{O}\mathbf{D}^+ + \mathbf{C}_3\mathbf{H}_6 \end{array}$	Interchange reaction	0.21-0.92 eV	E/T
		interchange reaction	0.21-0.92 eV	E/T
1322.	S. Suzuki, N. Shimakur Single electron-capte + O <sup>5+</sup> collisions. J. Phys. Soc. Japan 75	Ta ure cross sections in $C^{5+,6+}$ + 0,074301 (2006)	0.21-0.92  eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{ and } O^{7+,8-}$	E/T
1322.	S. Suzuki, N. Shimakun Single electron-capt $+ O^{5+}$ collisions. J. Phys. Soc. Japan 75 $\mathbf{C}^{5+} + \mathbf{C}^{3+}$	Ta ure cross sections in $C^{5+,6+}$ + $C^{5+,6+}$ + Charge Transfer	0.21-0.92  eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{ and } O^{7+,8-}$ 0.05-16  keV/amu	E/T + Th
1322.	S. Suzuki, N. Shimakun Single electron-capter + $O^{5+}$ collisions. J. Phys. Soc. Japan 75 $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$	Therefore the formula $C^{5+,6+}$ + and the cross sections in $C^{5+,6+}$ + b, 074301 (2006) Charge Transfer Charge Transfer	0.21-0.92 eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{and } O^{7+,8-}$ 0.05-16 keV/amu 0.05-16 keV/amu	E/T + Th Th
1322.	S. Suzuki, N. Shimaku Single electron-capt $+ O^{5+}$ collisions. J. Phys. Soc. Japan 75 $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$	Therefore the formula $C^{5+,6+}$ + $C^{5+,6+}$ + $C^{5}$ , 074301 (2006) Charge Transfer Charge Transfer Charge Transfer Charge Transfer	0.21-0.92 eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{and } O^{7+,8-}$ 0.05-16 keV/amu 0.05-16 keV/amu 0.05-16 keV/amu	E/T + Th Th Th
1322.	S. Suzuki, N. Shimakui Single electron-capt + $O^{5+}$ collisions. J. Phys. Soc. Japan 75 $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$	Ta Ta Ta Ta Ta Ta Ta Tansfer Charge Transfer Charge Transfer	0.21-0.92  eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{ and } O^{7+,8-}$ 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu	E/T + Th Th Th Th
1322.	S. Suzuki, N. Shimakun Single electron-capter + $O^{5+}$ collisions. J. Phys. Soc. Japan 75 $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$ $O^{7+} + O^{5+}$	Ta Ta Ta Ta Ta Ta Tansfer Charge Transfer Charge Transfer	0.21-0.92  eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{ and } O^{7+,8-}$ 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu	E/T + Th Th Th Th Th
1322.	S. Suzuki, N. Shimakun Single electron-captur $+ O^{5+}$ collisions. J. Phys. Soc. Japan 75 $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$ $O^{7+} + O^{5+}$ $O^{8+} + O^{5+}$ $C^{5+} + C^{3+}$	Therefore the formula $C^{5+,6+}$ + $C^{5+,$	0.21-0.92  eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{ and } O^{7+,8-}$ 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu	E/T + Th Th Th Th Th Th
1322.	S. Suzuki, N. Shimaku Single electron-capt $+ O^{5+}$ collisions. J. Phys. Soc. Japan 75 $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$ $O^{7+} + O^{5+}$ $O^{8+} + O^{5+}$ $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$	Therefore the formula $C^{5+,6+}$ + $C^{5+,6+}$ + $C^{5}$ , 074301 (2006) Charge Transfer Charge Transfer	0.21-0.92  eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{ and } O^{7+,8-}$ 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu	E/T + Th Th Th Th Th Th Th
1322.	S. Suzuki, N. Shimakui Single electron-capt $+ O^{5+}$ collisions. J. Phys. Soc. Japan 75 $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$ $O^{7+} + O^{5+}$ $O^{8+} + O^{5+}$ $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$	Therefore the formula $C^{5+,6+}$ + $C^{5}$ , 074301 (2006) Charge Transfer Charge Transfer Excitation Excitation	0.21-0.92  eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{ and } O^{7+,8-}$ 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu 0.05-16  keV/amu	E/T + Th Th Th Th Th Th Th Th Th
1322.	S. Suzuki, N. Shimakun Single electron-capter $+ O^{5+}$ collisions. J. Phys. Soc. Japan 75 $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$ $O^{7+} + O^{5+}$ $O^{8+} + O^{5+}$ $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$	Therefore the formula $C^{5+,6+}$ + $C^{5+,$	0.21-0.92  eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{ and } O^{7+,8-}$ 0.05-16  keV/amu 0.05-16  keV/amu	E/T + Th Th Th Th Th Th Th Th Th Th
1322.	S. Suzuki, N. Shimakun Single electron-capter $+ O^{5+}$ collisions. J. Phys. Soc. Japan 75 $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$ $O^{7+} + O^{5+}$ $O^{8+} + O^{5+}$ $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$ $O^{7+} + O^{5+}$	Therefore the formation is the formation of the formation is the formation of the formatio	0.21-0.92  eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{ and } O^{7+,8-}$ 0.05-16  keV/amu 0.05-16  keV/amu	E/T + Th Th Th Th Th Th Th Th Th Th Th
1322.	S. Suzuki, N. Shimaku Single electron-capt $+ O^{5+}$ collisions. J. Phys. Soc. Japan 75 $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$ $O^{7+} + O^{5+}$ $O^{8+} + O^{5+}$ $C^{5+} + C^{3+}$ $C^{6+} + C^{3+}$ $N^{6+} + N^{4+}$ $N^{7+} + N^{4+}$ $O^{7+} + O^{5+}$ $O^{8+} + O^{5+}$ $O^{8+} + O^{5+}$	Therefore the formation therefore the formation therefore the formation therefore the formation the	0.21-0.92  eV $C^{3+}, N^{6+,7+} + N^{4+}, \text{ and } O^{7+,8-}$ 0.05-16  keV/amu 0.05-16  keV/amu	E/T + Th Th Th Th Th Th Th Th Th Th Th Th

<sup>1323.</sup> S. Kita, S. Gotoh, T. Tanaka, N. Shimakura, M. Izawa, B. Irodionovich Kikiani **Excitation mechanisms in moderate-energy**  $K^+$  - Ne collisions. J. Phys. Soc. Japan 76, 044301 (2007)

$K^+ + Ne$	Charge Transfer	350-2000  eV	Exp
$K^+ + Ne$	Total Scattering	350-2000  eV	$\operatorname{Exp}$
$K^+ + Ne$	Ionization	350-2000  eV	$\operatorname{Exp}$

1324. M. Tanaka, Y. Takahashi, T. Shimoda, T. Furukawa, M. Yosoi, K. Takahisa, N. Shimakura, S. Yasui
Electron capture cross-sections between <sup>3</sup>He<sup>+</sup> ion and rubidium vapor in the energy range 1.0-19 keV.
Nucl. Instrum. Methods Phys. Res. A 568, 543 (2006)

$\mathrm{He^{+}+Rb}$	Charge Transfer	1-19  keV	Exp
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1325. T. Miyoshi, K. Noda, Y. Sato, H. Tawara, I. Yu, I. Yu. Tolstikhina, V. P. Shevelko Evaluation of excited nl-state distributions of fast exit ions after penetrating through solid foils. Part 1: Charge-state fractions for 4.3 MeV/u projectiles with atomic numbers Z = 6-26 passing through carbon foils. Nucl. Instrum. Methods Phys. Res. B 251, 79 (2006)

$C^{2+-7+} + C$	Charge Transfer	$4.3 \ \mathrm{MeV}/\mathrm{amu}$	Exp
$Ne^{6+-11+} + C$	Charge Transfer	4.3  MeV/amu	Exp
$Si^{9+-17+} + C$	Charge Transfer	4.3  MeV/amu	Exp
$C^{2+-7+} + C$	Ionization	4.3  MeV/amu	Exp
$Ne^{6+-9+} + C$	Ionization	$4.3 \ { m MeV}/{ m amu}$	Exp
$Mg^{7+-11+} + C$	Ionization	$4.3 \ { m MeV}/{ m amu}$	$\operatorname{Exp}$
$Si^{9+-13+} + C$	Ionization	$4.3 \ \mathrm{MeV/amu}$	Exp
$Ar^{13+17+} + C$	Ionization	4.3  MeV/amu	Exp

1326. T. Miyoshi, K. Noda, Y. Sato, H. Tawara, I. Yu. Tolstikhina, V. P. Shevelko Evaluation of excited nl-state distributions of fast exit ions after penetrating through solid foils. Part 2: Determination of the nl-state distribution fractions of exit ions.

Nucl. Instrum. Methods Phys. Res. B 251, 89 (2006)

 $Ar^{13+-18+} + C$ 

Ionization

4.3-20 MeV/amu

E/T

1327. A. Kocsonya, Z. Szoekefalvi-Nagy, A. Torri, E. Rauhala, J. Raisanen Absolute alpha particle induced gamma-ray yields for Ti-Zn. Nucl. Instrum. Methods Phys. Res. B 251, 367 (2006)

$He^{2+} + Ti$	Excitation	$5-10 { m MeV}$	Exp
$He^{2+} + Cr$	Excitation	$5-10 { m MeV}$	Exp
$He^{2+} + Mn$	Excitation	$5-10 { m MeV}$	Exp
$He^{2+} + Fe$	Excitation	$5-10 { m MeV}$	Exp
$He^{2+} + Co$	Excitation	$5-10 { m MeV}$	Exp
$He^{2+} + Ni$	Excitation	$5-10 { m MeV}$	Exp
$He^{2+} + Cu$	Excitation	$5-10 { m MeV}$	Exp
$He^{2+} + Zn$	Excitation	$5-10 { m MeV}$	Exp
$He^{2+} + Ti$	Ionization	$5-10 { m MeV}$	Exp
$He^{2+} + Cr$	Ionization	$5-10 { m MeV}$	Exp
$He^{2+} + Mn$	Ionization	$5-10 { m MeV}$	Exp
$He^{2+} + Fe$	Ionization	$5-10 { m MeV}$	Exp
$He^{2+} + Co$	Ionization	$5-10 { m MeV}$	Exp
$He^{2+} + Ni$	Ionization	$5-10 { m MeV}$	Exp
$He^{2+} + Cu$	Ionization	$5-10 { m MeV}$	Exp
$He^{2+} + Zn$	Ionization	$5-10 { m MeV}$	Exp

1328. D. Misra, A. Kelkar, U. Kadhane, A. Kumar, L. C. Tribedi, P. D. Fainstein Influence of Young-type interference on the forward-backward asymmetry in electron emission from  $H_2$  in collisions with 80-MeV bare C ions. Phys. Rev. A 74, 060701 (2006)

$\mathbf{C}^{6+} + \mathbf{H}_2$	Interaction Potentials	$80 { m MeV}$	Exp
$\mathbf{C}^{6+} + \mathbf{H}_2$	Ionization	$80 { m MeV}$	Exp

1329. S. Fazinic, M. Jaksic, L. Mandic, J. Dobrinic

Chemical dependence of second-order radiative contributions in the  $K\beta$  x-ray spectra of vanadium and its compounds. Phys. Rev. A 74, 062501 (2006)

$\mathbf{H}^+ + \mathbf{V}_2 \mathbf{O}_3$	Fluorescence	$3~{ m MeV}$	Exp
$H^+ + VO_2$	Fluorescence	$3 { m MeV}$	Exp
$\mathbf{H}^+ + \mathbf{V}_2 \mathbf{O}_5$	Fluorescence	$3 { m MeV}$	Exp
$H^+ + VC$	Fluorescence	$3 { m MeV}$	Exp
$H^+ + VN$	Fluorescence	$3 { m MeV}$	Exp
$\mathrm{H^{+}}+\mathrm{VCl}_{2}$	Fluorescence	$3 { m MeV}$	Exp
$\mathbf{H}^+ + \mathbf{N}\mathbf{H}_4\mathbf{VO}_3$	Fluorescence	$3 { m MeV}$	Exp
$\mathbf{H}^+ + \mathbf{VOSO}_4({}_5\mathbf{H}_2\mathbf{O})$	Fluorescence	$3 { m MeV}$	Exp

#### 1330. R. L. Watson, Y. Peng, V. Horvat, A. N. Perumal

Target K-vacancy production by 2.5 to 25 MeV/amu Ar, Kr, and Xe ions. Phys. Rev. A 74, 062709 (2006)

$Ar^{4+-11+} + Al$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$
$Ar^{4+-11+} + Ti$	Fluorescence	2.5-25  MeV/u	Exp
$Ar^{4+-11+} + Cu$	Fluorescence	2.5-25  MeV/u	Exp
$Ar^{4+-11+} + Zr$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$
$Ar^{4+-11+} + Ag$	Fluorescence	2.5-25  MeV/u	$\operatorname{Exp}$
$Ar^{4+-11+} + Sm$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
$Ar^{4+-11+} + Ta$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
$Kr^{8+23+} + Al$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
$Kr^{8+-23+} + Ti$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
$\mathrm{Kr}^{8+-23+} + \mathrm{Cu}$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
$\mathrm{Kr}^{8+-23+} + \mathrm{Zr}$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
$\mathrm{Kr}^{8+-23+} + \mathrm{Ag}$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
$Kr^{8+-23+} + Sm$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
$Kr^{8+-23+} + Ta$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
Xe + Al	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Xe^{13+\_31+} + Al$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Xe^{13+\underline{3}1+} + Ti$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Xe^{13+\underline{3}1+} + Cu$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Xe^{13+\underline{}31+} + Zr$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Xe^{13+\_31+} + Ag$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Xe^{13+-31+} + Sm$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Xe^{13+-31+} + Ta$	Fluorescence	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Ar^{4+11+} + Al$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Ar^{4+11+} + Ti$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Ar^{4+-11+} + Cu$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Ar^{4+-11+} + Zr$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Ar^{4+-11+} + Ag$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Ar^{4+-11+} + Sm$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	Exp
$Ar^{4+11+} + Ta$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
$Kr^{8+23+} + Al$	Ionization	$2.5-25 \ \mathrm{MeV/u}$	$\operatorname{Exp}$
$Kr^{8+23+} + Ti$	Ionization	2.5-25  MeV/u	Exp

1331.	$ \begin{array}{l} {\rm Kr}^{8+-23+} + {\rm Cu} \\ {\rm Kr}^{8+-23+} + {\rm Zr} \\ {\rm Kr}^{8+-23+} + {\rm Ag} \\ {\rm Kr}^{8+-23+} + {\rm Ag} \\ {\rm Kr}^{8+-23+} + {\rm Ta} \\ {\rm Xe}^{13+-31+} + {\rm Ta} \\ {\rm Xe}^{13+-31+} + {\rm Al} \\ {\rm Xe}^{13+-31+} + {\rm Cu} \\ {\rm Xe}^{13+-31+} + {\rm Cu} \\ {\rm Xe}^{13+-31+} + {\rm Ag} \\ {\rm Xe}^{13+-31+} + {\rm Ag} \\ {\rm Xe}^{13+-31+} + {\rm Ag} \\ {\rm Xe}^{13+-31+} + {\rm Ta} \\ {\rm A. B. Pacheco, A. Reyes, D. } \\ {\rm First-principles dynamic} \end{array} $	Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization Ionization	2.5-25 MeV/u 2.5-25 MeV/u	Exp Exp Exp Exp Exp Exp Exp Exp Exp Exp
	Phys. Rev. A 74, 062714 (2	gas atoms at 10 kev. 006)		
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Fluorescence Fluorescence	10 keV 10 keV	Th Th
1332.	L. Yao, L. Ju, T. Chu, KL <b>Time-dependent wave-p</b> $H_2$ -; $H^-$ + HD and $H^-$ Phys. Rev. A 74, 062715 (2	. Han acket quantum scattering stu + $D_2$ -; $D^-$ + HD. 006)	udy of the reactions $D^-$ +	
	$egin{array}{lll} {f H}^- + {f H}_2 \ {f H}^- + {f D}_2 \ {f D}^- + {f H}_2 \end{array}$	Interchange reaction Interchange reaction Interchange reaction	0.2-2.4 eV 0.2-2.4 eV 0.2-2.4 eV	Th Th Th
1333.	P. Sigmund, A. Schinner <b>Electron ejection in colli</b> Nucl. Instrum. Methods Ph	sions between swift heavy ion ys. Res. B 258, 116 (2007)	ns and atoms.	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Ionization Ionization Ionization	0.067-11  MeV/u 0.067-11  MeV/u 0.067-11  MeV/u	Th Th Th
1334.	J. X. Shao, X. M. Chen, B. Cui Double-to-single ionizati velocity $C^{q+}$ , $O^{q+}$ ( $\mathbf{q} = 1$ Nucl. Instrum. Methods Ph	W. Ding, H. B. Fu, Z. M. Gao, Y. ion ratios of helium bombard 3) ions. sys. Res. B 258, 340 (2007)	Y. W. Liu, J. Du, Y. X. Lu, Y. led by low-to-intermediate	
	$C^{+-3+} + He O^{+-3+} + He$	Ionization Ionization	25-500 keV/amu 25-500 keV/amu	${ m E/T} { m E/T}$
1335.	A. Hentz, G. S. Parkinson, Schiwietz, P. Bailey, T.C.Q. Inelastic energy loss in experiment for K, Rb, a Phys. Rev. B 74, 125408 (2	A. J. Window, P. D. Quinn, D. Noakes <b>100-keV</b> H <sup>+</sup> scattering from nd Cs. 006)	P. Woodruff, P. L. Grande, G. single atoms: Theory and	
	$egin{array}{lll} { m H}^+ + { m K} & \ { m H}^+ + { m Rb} & \ { m H}^+ + { m Cs} & \ { m H}^+ + { m K} & \ { m H}^+ + { m Rb} & \ { m H}^+ + { m Rb} & \ { m H}^+ + { m Cs} & \ { m$	Elastic Scattering Elastic Scattering Elastic Scattering Excitation Excitation Excitation	100 keV 100 keV 100 keV 100 keV 100 keV 100 keV	E/T E/T E/T E/T E/T

1336. D. Borodin, I. Beigman, L. Vainshtein, A. Pospieszczyk Close coupling approach for heavy particle collisions with an excited atom: Transitions between n=3 states in He. Phys. Scr. 74, 464 (2006)

$H^+ + He$	Excitation	$10 - 10^5$ ; $10 - 10^3 \text{ eV}$	$\mathrm{Th}$
$\mathrm{H^{+}+He^{*}}$	Excitation	$10 - 10^5$ ; $10 - 10^3 \text{ eV}$	$\mathrm{Th}$

#### 1337. C. L. Cocke

Momentum imaging in atomic collisions. Phys. Scr. T110, 9 (2004)

$He^{2+} + He$	Charge Transfer	3.6-8  MeV/u; 1-100 eV; 2 keV	E/T
$C^{6+} + He$	Ionization	3.6-8  MeV/u; 1-100  eV; 2  keV	E/T
$Au^{53+} + He$	Ionization	3.6-8  MeV/u; 1-100  eV; 2  keV	E/T

1338. M. Schulz, R. Moshammer, D. Fischer, A. A. Hasan, N. V. Maydanyuk, H. Kollmus, J. Ullrich, D. H. Madison, M. Foster, S. Jones

**Three-dimensional imaging of atomic break-up processes.** Phys. Scr. T110, 149 (2004)

$\mathrm{H^{+}}+\mathrm{He}$	Ionization	$0.075-100 { m MeV/u}$	$\operatorname{Exp}$
$\mathbf{C}^{6+} + \mathbf{He}$	Ionization	0.075-100  MeV/u	Exp
$Au^{53+} + He$	Ionization	0.075-100  MeV/u	Exp
${ m H_2^+}+{ m He}$	Ionization	$0.075\text{-}100 \; \mathrm{MeV/u}$	Exp

1339. A. Hatakeyama, K. Enomoto, T. Yabuzaki Properties of alkali atoms confined in a cold helium gas. Phys. Scr. T110, 294 (2004)

Rb + He	De-excitation	Exp
$\mathrm{Rb}^* + \mathrm{He}$	De-excitation	Exp
Cs + He	De-excitation	Exp
$Cs^* + He$	De-excitation	Exp

1340. S. Jonsell, R. C. Forrey, A. Saenz, P. Froelich, A. Dalgarno Fine structure in cold collisions of spin-polarized H(2s) atoms. Phys. Scr. T110, 299 (2004)

De-excitation	$5x10^{-10} - 10^{-6}$ a.u.	Th
Elastic Scattering	$5x10^{-10} - 10^{-6}$ a.u.	Th
Excitation	$5x10^{-10} - 10^{-6}$ a.u.	$\mathrm{Th}$
Ionization	$5x10^{-10} - 10^{-6}$ a.u.	$\mathrm{Th}$
	De-excitation Elastic Scattering Excitation Ionization	De-excitation $5x10^{-10} - 10^{-6}$ a.u.Elastic Scattering $5x10^{-10} - 10^{-6}$ a.u.Excitation $5x10^{-10} - 10^{-6}$ a.u.Ionization $5x10^{-10} - 10^{-6}$ a.u.

1341. H. Kohguchi, T. Suzuki Spin-orbit conserving and changing transitions in inelastic scattering of  $NO(^{2}\Pi)$ 

+	Ar.	
	0	-

Phys. Scr. T110, 312 (2004)

NO + Ar	Excitation	$516 \ cm^{-1}$	Exp
			-

1342. P. C. Stancil

Theoretical studies of vibrationally-resolved electron capture in low-energy ionmolecule collisions. Phys. Scr. T110, 340 (2004)

 $\begin{array}{ccc} \mathbf{H}^+ + \mathbf{CO} & & \mbox{Charge Transfer} & 10^{-1} - 10^4 \ {\rm eV} & \mbox{Th} \\ \mathbf{O}^{3+} + \mathbf{H}_2 & & \mbox{Charge Transfer} & 10^{-1} - 10^4 \ {\rm eV} & \mbox{Th} \end{array}$ 

1343.	B. Sulik, J. A. Tanis, J. Y. Chesnel, N. Stolterfoht
	Young-type interferences in the ionization of the $H_2$ molecule by fast ions.
	Phys. Scr. T110, 345 (2004)

$\mathrm{Kr}^{33+} + \mathrm{He}$	Ionization	60-70  keV/amu	Exp
$\mathbf{Kr}^{33+} + \mathbf{H}_2$	Ionization	60-70 keV/amu	Exp

1344. J. B. Greenwood, R. J. Mawhorter, I. Cadez, J. Lozano, S. J. Smith, A. Chutjian The contribution of charge exchange to extreme ultra-violet and X-ray astronomy.

Phys. Scr. T110, 358 (2004)

$He^{2+} + He$	Charge Transfer	0.35-20.0  keV	Exp
$\mathrm{He}^{2+} + \mathrm{H}_2\mathrm{O}$	Charge Transfer	0.35-20.0  keV	Exp
$O^{7+} + He$	Charge Transfer	0.35-20.0  keV	Exp
$\mathbf{O}^{7+} + \mathbf{H}_2 \mathbf{O}$	Charge Transfer	$0.35\text{-}20.0\;\mathrm{keV}$	$\operatorname{Exp}$
$O^{8+} + He$	Charge Transfer	$0.35\text{-}20.0\;\mathrm{keV}$	$\operatorname{Exp}$
$\mathbf{O}^{8+} + \mathbf{H}_2\mathbf{O}$	Charge Transfer	0.35-20.0  keV	Exp
$Ne^{9+} + He$	Charge Transfer	0.35-20.0  keV	Exp
$\mathrm{Ne}^{9+} + \mathrm{H}_2\mathrm{O}$	Charge Transfer	0.35-20.0  keV	Exp
$Ne^{10+} + He$	Charge Transfer	$0.35\text{-}20.0\;\mathrm{keV}$	$\operatorname{Exp}$
$\mathrm{Ne}^{10+} + \mathrm{H}_2\mathrm{O}$	Charge Transfer	0.35-20.0  keV	$\operatorname{Exp}$

1345. T. Kirchner, H. J. Ludde, M. Horbatsch

Nonperturbative study of the rearrangement dynamics in ion-atom collisions with active electrons on projectile and target.

Phys. Scr. T110, 364 (2004)

$He^+ + Ne$	Charge Transfer	10-1000  keV/amu	$\mathrm{Th}$
$\mathrm{He^{+} + Ne}$	Ionization	10-1000 keV/amu	Th

1346. G. N. Ogurtsov, S. Yu. Ovchinnikov, V. M. Mikoushkin Electron emission in  $H^-$  - He,  $H_2$  collisions. Phys. Scr. T110, 370 (2004)

$H^- + He$	Detachment	2-10  keV	E/T
$\mathbf{H}^- + \mathbf{H}_2$	Detachment	2-10  keV	E/T

1347. M. M. Sant'Anna, H. Luna, A.C.F. Santos, C. McGrath, M. B. Shah, E. G. Cavalcanti, G. M. Sigaud, E. C. Montenegro Multiple ionization of Ne by  $H_2^+$  ions with correlated projectile electron loss.

Phys. Scr. T110, 374 (2004)

$\mathbf{H}_{2}{}^{+} + \mathbf{N}\mathbf{e}$	Dissociation	0.1-4  MeV/amu	E/T
$\mathbf{H}_{2}{}^{+} + \mathbf{N}\mathbf{e}$	Ionization	$0.1-4 { m MeV/amu}$	E/T

1348. L.Ph.H. Schmidt, F. Afaneh, M. Schoeffler, J. Titze, O. Jagutzki, Th. Weber, K. E. Stiebing, R. Doerner, H. Schmidt-Boecking Fully differential study of transfer ionization processes – a view into correlated many particle dynamics. Phys. Scr. T110, 379 (2004)

$He^{2+} + He$	Charge Transfer	6  keV	Exp
$He^{2+} + He$	Ionization	6  keV	Exp

1349. T. Stoehlker, D. Banas, S. Fritzsche, A. Gumberidze, C. Kozhuharov, X. Ma, A. Orsic-Muthig, U. Spillmann, D. Sierpowski, A. Surzhykov, S. Tachenov, A. Warczak Angular correlation and polarization studies for radiative electron capture into high-Z ions.

Phys. Scr. T110, 384 (2004)

	$egin{array}{lll} {f U}^{92+} + {f N}_2 \ {f U}^{92+} + {f N}_2 \end{array}$	Charge Transfer Excitation	20-400 MeV/amu 20-400 MeV/amu	Exp Exp
1350.	L. Tong, K. Nanbu <b>Model for charge exchar</b> Vacuum 81, 1119 (2007)	nges in $N_2^+$ on $N_2$ and $O_2^+$ or	$O_2$ collisions.	
	$\frac{\mathbf{N}_2^+ + \mathbf{N}_2}{\mathbf{O}_2^+ + \mathbf{O}_2}$	Charge Transfer Charge Transfer	0-3 eV 0-3 eV	${ m Th} { m Th}$
1351.	K. Giri, N. Sathyamurthy <b>Rotational excitation in</b> J. Phys. B 39, 4123 (2006)	$(H^-, H_2)$ collisions: A quant	um mechanical study.	
	$\mathbf{H}^- + \mathbf{H}_2$	Excitation	$1.66-2.79 \ eV$	Th
1352.	Y. Li, Q. Gou, T. Shi Halo state in realistic m Phys. Rev. A 74, 032502 (2	olecular systems. 006)		
	He + He He + K	Interaction Potentials Interaction Potentials		Th Th
1353.	J. Rajput, S. De, A. Roy, C Kinetic energy distribut tion on collisions with A Phys. Rev. A 74, 032701 (2	. P. Safvan ions and signature of target $\epsilon$ $r^{9+}$ ions. 006)	excitation in $N_2$ fragmenta-	
	$egin{array}{lll} \mathbf{Ar}^{9+} + \mathbf{N}_2 \ \mathbf{Ar}^{9+} + \mathbf{N}_2 \ \mathbf{Ar}^{9+} + \mathbf{N}_2 \end{array}$	Dissociation Charge Transfer Ionization	v=1 a.u. v=1 a.u. v=1 a.u.	Exp Exp Exp
1354.	A. Hasan, B. Tooke, M. Zap Kinematically complete of p+He collisions. Phys. Rev. A 74, 032703 (2	oukhlyak, T. Kirchner, M. Schulz experiment on transfer excita 006)	tion in intermediate-energy	
	$egin{array}{ll} { m H}^+ + { m He} \ { m H}^+ + { m He} \end{array}$	Charge Transfer Excitation	25-75 keV 25-75 keV	${ m E/T} { m E/T}$
1355.	M. Kajita Collision between magne Phys. Rev. A 74, 032710 (2	etically trapped NH molecule 006)	es in the $(N=0, J=1)$ state.	
	NH + NH $     NH + NH$	Elastic Scattering Energy Transfer	$10^{-6}$ K $10^{-6}$ K	Th Th
1356.	L. Gulyas, A. Igarashi, T. K Double ionization of heli function. Phys. Rev. A 74, 032713 (2	Tirchner <b>um by fast ion impact: Reexa</b> 006)	mination of the correlation	
	$egin{array}{lll} {f C^{6+}} + {f He} \ {f Au}^{53+} + {f He} \end{array}$	Ionization Ionization	3.6-100 MeV/u 3.6-100 MeV/u	Th Th
1357.	T. Majima, Y. Nakai, T. Mi Fragmentation processes 2-MeV $Si^{2+}$ .	izuno, H. Tsuchida, A. Itoh of $C_{60}$ in multiple electron lo	oss and capture collisions of	

Phys. Rev. A 74, 033201 (2006)

$\mathbf{Si}^{2+} + \mathbf{C}_{60}$	Charge Transfer	$2 { m MeV}$	Exp
$\mathbf{Si}^{2+} + \mathbf{C}_{60}$	Ionization	$2 { m MeV}$	$\operatorname{Exp}$

1358. T. Tabata, T. Shirai

Analytic cross sections for collisions of  $H^+$ ,  $H_2^+$ ,  $H_3^+$ , H,  $H_2$ , and  $H^-$  with hydrogen molecules.

At. Data Nucl. Data Tables 76, 1 (2000)

$\mathbf{H}^- + \mathbf{H}_2$	Dissociation	$10^{-2} - 10^5 \text{ eV}$	E/T
$H + H_2$	Dissociation	$10^{-2} - 10^5 \text{ eV}$	E/T
$H_2 + H_2$	Dissociation	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_2^+ + \mathbf{H}_2$	Dissociation	$10^{-2} - 10^5 \text{ eV}$	É/T
$H_{3}^{+} + H_{2}$	Dissociation	$10^{-2} - 10^5 \text{ eV}$	E/T
$H^{-} + H_{2}$	Elastic Scattering	$10^{-2} - 10^5 \text{ eV}$	E/T
$H + H_2$	Elastic Scattering	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}^+ + \mathbf{H}_2$	Elastic Scattering	$10^{-2} - 10^5 \text{ eV}$	E/T
${ m H}^+ + { m H}_2{ m *}$	Elastic Scattering	$10^{-2} - 10^5 \text{ eV}$	E/T
$H_2 + H_2$	Elastic Scattering	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_{3}^{+} + \mathbf{H}_{2}$	Elastic Scattering	$10^{-2} - 10^5 \text{ eV}$	E/T
$H + H_2$	Charge Transfer	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}^+ + \mathbf{H}_2$	Charge Transfer	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_2 + \mathbf{H}_2$	Charge Transfer	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_{2}{}^{+}+\mathbf{H}_{2}$	Charge Transfer	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_{3}{}^{+}+\mathbf{H}_{2}$	Charge Transfer	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}^+ + \mathbf{H}_2$	Interchange reaction	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_{2}{}^{+}+\mathbf{H}_{2}$	Interchange reaction	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}^- + \mathbf{H}_2$	Detachment	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H} + \mathbf{H}_2$	Excitation	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}^+ + \mathbf{H}_2$	Excitation	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}^{+} + \mathbf{H}_{2}{}^{*}$	Excitation	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_2 + \mathbf{H}_2$	Excitation	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_{2}{}^{+}+\mathbf{H}_{2}$	Excitation	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_{3}{}^{+}+\mathbf{H}_{2}$	Excitation	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}^- + \mathbf{H}_2$	Ionization	$10^{-2} - 10^5 \text{ eV}$	E/T
$H + H_2$	Ionization	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}^+ + \mathbf{H}_2$	Ionization	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_2 + \mathbf{H}_2$	Ionization	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_{2}{}^{+}+\mathbf{H}_{2}$	Ionization	$10^{-2} - 10^5 \text{ eV}$	E/T
$\mathbf{H}_{3}^{+} + \mathbf{H}_{2}$	Ionization	$10^{-2} - 10^5 \text{ eV}$	E/T

1359. H. Merabet, R. Bruch, J. Hanni, M. Bailey, A. L. Godunov, J. H. McGuire, D. V. Fursa, I. Bray, K. Bartschat, H. C. Tseng, C. D. Lin
Scattering angle-integrated (total) and magnetic sublevel cross-sections and degree of linear polarization for electron and proton induced excitation [Hel (1snp) <sup>1</sup>P<sup>0</sup> (n=2-5)] of helium.

At. Data Nucl. Data Tables 83, 45 (2003)

$\mathbf{H}^+ + \mathbf{He}$ Excitation $3x10^{-5} - 1.4 \text{ MeV}$	$E_{/}$	/T
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1360. M. S. Dimitrijevic, S. Sahal-Brechot Stark broadening of Ag I spectral lines. At. Data Nucl. Data Tables 85, 269 (2003)

$\mathrm{H^{+}} + \mathrm{Ag}$	Line Broadening	2500-50,000 K	Th
$\mathrm{He^{+}}+\mathrm{Ag}$	Line Broadening	$2500-50,000 { m K}$	Th

1361. H. Suno, T. Kato

Cross section database for carbon atoms and ions: Electron-impact ionization,

excitation, and charge exchange in collisions with hydrogen atoms.

At. Data Nucl. Data Tables 92, 407 (2006)

$\mathbf{C}^{+-6+} + \mathbf{H}$	Charge Transfer	$10^{-1} - 10^7 \text{ eV}$	E/T
$C^+ + C$	Charge Transfer	$10^{-1} - 10^7 \text{ eV}$	E/T

#### 1362. S. Wu, X. Zhanga, G. Li

Single-electron detachment cross sections for negative ions of transition elements colliding with gases.

At. Data Nucl. Data Tables 93, 575 (2007)

$Ti^- + N_2$	Detachment	7-30  keV	Exp
$Cr^- + He$	Detachment	7-30  keV	Exp
$\mathbf{Cr}^- + \mathbf{N}_2$	Detachment	7-30  keV	Exp
$Fe^- + He$	Detachment	7-30  keV	$\operatorname{Exp}$
$Fe^- + N_2$	Detachment	7-30  keV	$\operatorname{Exp}$
$Cu^- + He$	Detachment	7-30  keV	$\operatorname{Exp}$
$Cu^- + Ne$	Detachment	7-30  keV	$\operatorname{Exp}$
$Cu^- + Ar$	Detachment	7-30  keV	$\operatorname{Exp}$
$Cu^- + N_2$	Detachment	7-30  keV	Exp
$Ag^- + He$	Detachment	7-30  keV	$\operatorname{Exp}$
$Ag^- + N_2$	Detachment	7-30  keV	Exp

# **3.3 Surface Interactions**

1363.	M. N. Faraggi, M. S. Gravie Band-structure-based co collisions. Phys. Rev. A 72, 012901 (2	elle, M. Alducin, J. I. Juaristi, V. ollisional model for electronic 005)	M. Silkin e excitations in ion-surface	
	$H^+ + Al$	Secondary Electron Emission	100  keV	Th
1364.	<ul> <li>P. L. Grande, A. Hentz, G.</li> <li>Observation of collective Al(110) surface.</li> <li>Phys. Rev. A 72, 012902 (2)</li> </ul>	Schiwietz, D. Starodub, E. Garfu e <b>inner-shell effects for proto</b> 005)	nkel, T. Gustafsson ns backscattered from the	
	$H^+ + Al$	Reflection	$98 { m keV}$	$\mathrm{E}/\mathrm{T}$
1365.	YH. Song, YN. Wang, Z. Vicinage effects in energy heavy molecular ions from Phys. Rev. A 72, 012903 (2)	L. Miskovic y loss and electron emission d om a solid surface. 005)	luring grazing scattering of	
	$\mathbf{N}_{2}{}^{+}+\mathbf{C}$	Secondary Electron Emission	100-400 keV/u	$\mathrm{Th}$
1366.	M. J. Gordon, J. Mace, K. I Charge-exchange mecha with surfaces. Phys. Rev. A 72, 012904 (2	P. Giapis nisms at the threshold for in 005)	elasticity in $Ne^+$ collisions	
	$Ne^+ + Mg$	Reflection	100-400  eV	Exp
	$Ne^+ + Al$	Reflection	$100-400 {\rm \ eV}$	Exp
	$Ne^+ + Si$	Reflection	$100-400 {\rm \ eV}$	Exp
	$Ne^+ + P$	Reflection	$100-400 {\rm \ eV}$	Exp
	${f Ne^+}+{f Mg}$	Neutraliz., Ioniz., Dissoc.	100-400  eV	Exp
	$Ne^+ + Al$	Neutraliz., Ioniz., Dissoc.	100-400  eV	Exp
	$\mathrm{Ne^{+}+Si}$	Neutraliz., Ioniz., Dissoc.	100-400  eV	Exp
	$Ne^+ + P$	Neutraliz., Ioniz., Dissoc.	100-400  eV	$\operatorname{Exp}$

1367. M. Alducin, J. I. Juaristi, R. Diez Muino, M. Roesler, P. M. Echenique Spin-dependent electron emission from metals in the neutralization of  $He^+$  ions. Phys. Rev. A 72, 024901 (2005)

$\mathrm{He^{+}}$ + Al	Secondary Electron Emission	15-500  eV	$\mathrm{Th}$
$\mathrm{He^{+}+Cu}$	Secondary Electron Emission	15-500  eV	$\mathrm{Th}$
$\mathrm{He^{+}}$ + Au	Secondary Electron Emission	15-500  eV	$\mathrm{Th}$
$\mathrm{He^{+}}+\mathrm{Al}$	Neutraliz., Ioniz., Dissoc.	15-500  eV	$\mathrm{Th}$
$\mathrm{He^{+}}+\mathrm{Cu}$	Neutraliz., Ioniz., Dissoc.	15-500  eV	$\mathrm{Th}$
$\mathrm{He^{+}} + \mathrm{Au}$	Neutraliz., Ioniz., Dissoc.	15-500  eV	$\mathrm{Th}$

1368. L. I. Vergara, F. W. Meyer, H. F. Krause

Chemical sputtering of ATJ graphite induced by low-energy  $D_2^+$  bombardment. J. Nucl. Mater. 347, 118 (2005)

$\mathbf{H}_{2}^{+} + \mathbf{C}$	Sputtering	10-250  eV	$\operatorname{Exp}$
$\mathbf{D}_2{}^+ + \mathbf{C}$	Sputtering	$10-250 {\rm ~eV}$	Exp

1369. S. B. Gilliam, S. M. Gidcumb, N. R. Parikh, D. G. Forsythe, B. K. Patnaik, J. D. Hunn, L. L. Snead, G. P. Lamaze
Retention and surface blistering of helium irradiated tungsten as a first wall material.
J. Nucl. Mater. 347, 289 (2005)

$He^+ + W$ Trapping, Detrapping	$1.3 { m MeV}$	$\operatorname{Exp}$
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1370. B. B. Cipiti, G. L. Kulcinski

Helium	and d	eute	rium	implantation	ı in	tungsten	$\mathbf{at}$	elevated	tempera	atures.
J. Nucl.	Mater.	347,	298 (	2005)						

$\mathbf{H}^+ + \mathbf{W}$	Trapping, Detrapping	20-40  keV	Exp
$\mathrm{He^{+}} + \mathrm{W}$	Trapping, Detrapping	20-40  keV	Exp
$D^+ + W$	Trapping, Detrapping	$20-40 \ \mathrm{keV}$	Exp

1371. N. Hashimoto, J. D. Hunn, N. Parikh, S. Gilliam, S. Gidcumb, B. Patnaik, L. L. Snead Microstructural analysis on helium retention of ion-irradiated and annealed tungsten foils.

J. Nucl. Mater. 347, 307 (2005)

$He^+ + W$	Trapping, Detrapping	$1.3 { m MeV}$	Exp
$\mathbf{He} + \mathbf{w}$	riapping, Detrapping	1.0 1010 V	Цлр

1372. C. Focsa, C. Mihesan, M. Ziskind, B. Chazallon, E. Therssen, P. Desgroux, J. L. Destombes Wavelength-selective vibrationally excited photodesorption with tunable IR sources. J. Phys. Condens. Matter 18, S1357 (2006)

$h\nu + H_2O$	Desorption	0.32 - 0.42  eV	Exp
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1373. E. Kobayashi, K. Mase, A. Nambu, J. Seo, S. Tanaka, T. Kalkiuchi, K. K. Okudaira, S.-I. Nagaoka, M. Tanaka

Recent progress in coincidence studies on ion desorption induced by core excitation.

J. Phys. Condens. Matter 18, S1389 (2006)

$h\nu + Si$	Desorption	98-690  eV	Exp
$h\nu + TiO_2$	Desorption	$98\text{-}690~\mathrm{eV}$	Exp
$h\nu + SiO_2$	Desorption	$98\text{-}690~\mathrm{eV}$	Exp
$h\nu + H_2O + Si$	Desorption	$98\text{-}690~\mathrm{eV}$	Exp
$h\nu + H_2O + SiO_2$	Desorption	$98\text{-}690~\mathrm{eV}$	Exp

1374.	P. Saalfrank, M. Nest, I. A Quantum dynamics of surfaces, and related pl J. Phys. Condens. Matter	ndrianov, T. Klamroth, D. Kroend laser-induced desorption from nenomena. 18, S1425 (2006)	er, S. Beyvers n metal and semiconductor	
	$egin{array}{l} \mathbf{h} u + \mathbf{Pt} \ \mathbf{h} u + \mathbf{NO} + \mathbf{Pt} \end{array}$	Desorption Desorption		$_{\mathrm{Th}}^{\mathrm{Th}}$
1375.	A. Hoffman, A. Laikhtman Photon stimulated desc excitations: Fundament J. Phys. Condens. Matter	prption of hydrogen from dian tal processes and applications 18, S1517 (2006)	nond surfaces via core-level to surface studies.	
	$h\nu + C$	Desorption	150-600 eV	Evn
	$h\nu + C$ $h\nu + H + C$	Desorption	150-600 eV	Exp
	$h\nu + D + C$	Desorption	150-600 eV	Exp
1376.	M. Szymonski, A. Droba, I Alkali halide decomposi defects and surface top J. Phys. Condens. Matter	M. Goryl, J. J. Kolodziej, F. Krok tion and desorption by photon ographies. 18, S1547 (2006)	as – the role of excited point	
	$h\nu + RbI$	Desorption	4-6 eV	Exp
1377.	T. Hirayama, I. Arakawa <b>Exciton induced photoe</b> J. Phys. Condens. Matter	<b>lesorption in rare gas solids.</b> 18, S1563 (2006)		
	$h\nu + Ne$	Desorption	16-22  eV	Exp
	$h\nu + Ar$	Desorption	16-22  eV	Exp
	$h\nu + Kr$	Desorption	16-22 eV	Exp
1378.	<ul><li>R. P. Doerner</li><li>Low-energy sputtering</li><li>J. Vac. Sci. Technol. A 23</li></ul>	yields of tungsten and tantalı , 1545 (2005)	ım.	
	$Xe^+ + Mo$	Sputtering	30-125  eV	Exp
	$Xe^+ + Ta$	Sputtering	30-125  eV	Exp
	$Xe^+ + W$	Sputtering	30-125  eV	Exp
1379.	Y. Suetsugu, K. Kanazawa valov, A. A. Krasnov, K. Y A. N. Shmakov <b>First experimental and s</b> <b>tron yield of NEG mate</b> Nucl. Instrum. Methods P	a, K. Shibata, H. Hisamatsu, K. C. V. Zolotarev, E. S. Konstantinov, simulation study on the second erials (Ti-Zr-V) coating under hys. Res. A 554, 92 (2005)	Dide, F. Takasaki, R. V. Dosto- V. A. Chernov, A. E. Bondar, lary electron and photoelec- intense photon irradiation.	
	$h_{\nu} + Ti$	Secondary Electron Emission	$0-600 \text{ eV} \cdot 4.1 \text{ keV}$	Evn
	$h\nu + V$	Secondary Electron Emission	$0.600 \text{ eV} \cdot 4.1 \text{ keV}$	Evn
	$h\nu + Zr$	Secondary Electron Emission	0-600  eV; 4.1 keV	Exp
	e + Ti	Secondary Electron Emission	0-600  eV; 4.1  keV	Exp
	e + V	Secondary Electron Emission	0-600  eV; 4.1  keV	Exp
	e + Zr	Secondary Electron Emission	0-600  eV: 4.1  keV	Exp
				p

1380. M. P. Seah

Erratum to "An accurate semi-empirical equation for sputtering yields, II: for neon, argon and xenon ions" [Nucl. Instr. and Meth. B 229 (2005) 348-358]. Nucl. Instrum. Methods Phys. Res. B 239, 286 (2005)

	$egin{array}{l} { m Ne}^+ + { m PERT} \ { m Ar}^+ + { m PERT} \ { m Xe}^+ + { m PERT} \end{array}$	Sputtering Sputtering Sputtering	1-5 keV 1-5 keV 1-5 keV	$\begin{array}{c} \text{Exp} \\ \text{Exp} \\ \text{Exp} \end{array}$
1381.	J. Samela, J. Kotakosk A quantitative and o Nucl. Instrum. Method	i, K. Nordlund, J. Keinonen comparative study of sputtering ls Phys. Res. B 239, 331 (2005)	yields in Au.	
	$Xe^+ + Au$	Sputtering	0.1-200  keV	$\mathrm{Th}$
1382.	J. P. Allain, D. N. Ruzi <b>A model for ion-bon</b> <b>perature in liquid lit</b> Nucl. Instrum. Method	ic, D. A. Alman, M. D. Coventry mbardment induced erosion enh chium. Is Phys. Res. B 239, 347 (2005)	ancement with target tem-	
	$Li^+ + Li$	Sputtering	200-1000  eV	$\mathrm{Th}$
1383.	S. Mammeri, S. Ouicha Sputtering yields, ra ment in the energy Nucl. Instrum. Method	oui, R. Zemih, H. Ammi, M. Abdesse ange and range straggling in Al for range (20-160) keV. Is Phys. Res. B 240, 162 (2005)	elam, A. C. Chami bllowing $Kr^+$ ions bombard-	
	$Kr^+ + Al$	Sputtering	20-160  keV	Exp
1384.	C. S. Lee, M. C. Chueh The measurement of of sputtered particle Nucl. Instrum. Method	A, Y. C. Liu, CY. Hsu, S. H. Liu, W sputtering yields and spectrum of sinduced by ion bombardment ls Phys. Res. B 240, 345 (2005)	. H. Ip, S. Lee of mass and optical emission of $H_2O$ ice.	
	$\mathrm{He^{+}}+\mathrm{H_{2}O}$	Sputtering	15  keV	Exp
	$\mathrm{Ar^{+}} + \mathrm{H_{2}O}$	Sputtering	15  keV	Exp
	$\mathbf{H}_{3}{}^{+}+\mathbf{H}_{2}\mathbf{O}$	Sputtering	15  keV	Exp
	$\mathbf{N}_2^+ + \mathbf{H}_2 \mathbf{O}$	Sputtering	15  keV	Exp
1385.	H. Labrim, MF. Bartl J. P. Piron	ne, T. Sauvage, P. Desgardin, G. Blon in sintered polished $UO_2$ disks	ndiaux, C. Corbel, F. Miserque,	
	Nucl. Instrum. Method	ls Phys. Res. B 240, 434 (2005)		
	$\begin{array}{l} \mathbf{H}_2 + \mathbf{UO}_2 \\ \mathbf{D}_2 + \mathbf{UO}_2 \end{array}$	Trapping, Detrapping Trapping, Detrapping	700 deg K 700 deg K	Exp Exp
1386.	J. W. McDonald, T. Sc Material dependence ion impact. Nucl. Instrum. Method	henkel, A. V. Hamza, D.H.G. Schneid e of total electron emission yields ls Phys. Res. B 240, 829 (2005)	ler following slow highly charged	l
	$O^{8+} + C$	Secondary Electron Emission	2  keV/amu	Exp
	$O^{8+} + Si$	Secondary Electron Emission	2  keV/amu	Exp
	$O^{8+} + Au$	Secondary Electron Emission	2  keV/amu	Exp
	$O^{8+} + SiO_2$	Secondary Electron Emission	2  keV/amu	Exp
	$Xe^{12+} + C$	Secondary Electron Emission	2 keV/amu	Evn

. 2		/	1
$Xe^{12+} + C$	Secondary Electron Emission	2  keV/amu	Exp
$Xe^{12+} + Si$	Secondary Electron Emission	2  keV/amu	Exp
$\mathbf{X}\mathbf{e}^{12+} + \mathbf{A}\mathbf{u}$	Secondary Electron Emission	2  keV/amu	Exp
$\mathbf{Xe}^{12+} + \mathbf{SiO}_2$	Secondary Electron Emission	2  keV/amu	Exp
$\mathbf{X}\mathbf{e}^{20+} + \mathbf{C}$	Secondary Electron Emission	2  keV/amu	Exp
$Xe^{20+} + Si$	Secondary Electron Emission	2  keV/amu	Exp

$Xe^{20+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{20+} +$	$SiO_2$	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{24+} +$	С	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{24+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{24+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{24+} +$	$SiO_2$	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{26+} +$	<b>C</b>	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{26+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{26+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{26+} +$	SiO	Secondary	Electron	Emission	2  keV/a		Exp
$Xe^{28+} +$	C	Secondary	Electron	Emission	2  keV/a		Exp
$Xe^{28+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{28+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{28+} +$	SiO	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{30+} +$	C	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{30+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{30+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{30+} +$	SiO	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{34+} +$	C	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{34+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{34+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{34+} +$	SiO	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{38+}$ +	C	Secondary	Electron	Emission	2  keV/a 2  keV/a		Evn
$Xe^{38+} \perp$	Si	Secondary	Electron	Emission	2  keV/a 2  keV/a		Evn
$Xe^{38+} \perp$	A 11	Secondary	Electron	Emission	2  keV/a 2  keV/a		Evn
$Xe^{38+} +$	SiO	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{40+} +$	C	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{40+} \perp$	Si	Secondary	Electron	Emission	2  keV/a 2  keV/a		Evn
$Xe^{40+} \perp$	A 11	Secondary	Electron	Emission	2  keV/a 2  keV/a		Evn
$Xe^{40+} \perp$	SiO	Secondary	Electron	Emission	2  keV/a 2  keV/a		Evn
$Xe^{44+} +$	C	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{44+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{44+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{44+} +$	SiO	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{48+} +$	C C	Secondary	Electron	Emission	2  keV/a	mu	Evn
$Xe^{48+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{48+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{48+} +$	SiO	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{52+} +$	C	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{52+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{52+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Xe^{52+} +$	SiO <sub>2</sub>	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{52+} +$	C	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{52+} +$	Si	Secondary	Electron	Emission	2  keV/a		Exp
$Au^{52+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{52+} +$	SiO	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{58+} +$	C	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{58+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{58+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{58+} +$	SiO <sub>2</sub>	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{64+} +$	C	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{64+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{64+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{64+} +$	SiO	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{69+} +$	C	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{69+} +$	Si	Secondary	Electron	Emission	2  keV/a	mu	Exp
$Au^{69+} +$	Au	Secondary	Electron	Emission	2  keV/a	mu	Exp

	$\mathbf{A}\mathbf{u}^{69+} + \mathbf{SiO}_2$	Secondary Electron Emission	$2 \ \mathrm{keV/amu}$	Exp
1387.	H. S. Chakraborty, T. N On the effect of image	iederhausen, U. Thumm e <b>states on resonant neutralizat</b> i	ion of hydrogen anions near	
	Nucl. Instrum. Methods	Phys. Res. B 241, 43 (2005)		
	$egin{array}{l} \mathrm{H}^- +\mathrm{Pd} \ \mathrm{H}^- +\mathrm{Ag} \end{array}$	Neutraliz., Ioniz., Dissoc. Neutraliz., Ioniz., Dissoc.	1 keV 1 keV	Th Th
1388.	M. A. Karolewski Molecular dynamics s overlayer system: 2 k Nucl. Instrum. Methods	imulations of the initial stages of eV Ar -; Cu/Ni(100). Phys. Res. B 243, 6 (2005)	of sputter erosion of a metal	
	$Ar^+ + Ni$	Sputtering	$2 { m keV}$	$\mathrm{Th}$
	$Ar^+ + Cu$	Sputtering	$2 {\rm ~keV}$	$\mathrm{Th}$
1389.	J. Cazaux <b>e-Induced secondary</b> Nucl. Instrum. Methods	electron emission yield of insula Phys. Res. B 244, 307 (2005)	ators and charging effects.	
	e + BeO	Secondary Electron Emission	0-10  keV	E/T
	$\mathbf{e} + \mathbf{SiO}_2$	Secondary Electron Emission	0-10  keV	$\dot{E/T}$
	e + LiF	Secondary Electron Emission	0-10  keV	E/T
	$\mathbf{e} + \mathbf{BaF}_2$	Secondary Electron Emission	0-10  keV	E/T
	e + MgO	Secondary Electron Emission	0-10  keV	E/T
	e + KCl	Secondary Electron Emission	0-10  keV	E/T
	$\mathbf{e} + \mathbf{KBr}$	Secondary Electron Emission	0-10  keV	E/T
	e + KI	Secondary Electron Emission	0-10  keV	E/T
1390.	Y. Zhao, G. Xiao, X. Zh X-ray spectroscopy of Nucl. Instrum. Methods	ang, Z. Yang, W. Zhan, X. Chen, F. f hollow argon atoms formed on Phys. Res. B 245, 72 (2006)	Li a beryllium surface.	
	$\mathbf{Ar}^{15+\_18+} + \mathbf{Be}$	Reflection		Exp
1391.	P. Rajasekar, D. Scott, M Light emission from id and silane exposures. Nucl. Instrum. Methods	N. F. Materer on-bombarded Ge(100) surfaces Phys. Res. B 245, 411 (2006)	s under continuous germane	
	$Ar^+ + Ge$	Sputtering	1-5  keV	Exp
	${ m Ar^+}+{ m GeH_4}$	Sputtering	1-5  keV	Exp
	$Ar^+ + SiH_4$	Sputtering	1-5  keV	Exp
1392.	S. I. Kononenko, O. V. H Features of silica lum Nucl. Instrum. Methods	Kalantaryan, V. I. Muratov, V. P. Zl inescence induced by molecular Phys. Res. B 246, 340 (2006)	hurenko • <b>hydrogen ions.</b>	
	$egin{array}{ll} { m H}^+ + { m Si} \ { m H}_2^+ + { m Si} \end{array}$	Surface Interactions Surface Interactions	210-420  keV 210-420  keV	Exp
1393.	F. Gou, M. A. Gleeson,	J. Villette, A. W. Kleyn		-

3 keV Ar scattering from unreconstructed Si(100) at grazing incidence: Molecular dynamics simulation.

Nucl. Instrum. Methods Phys. Res. B 247, 244 (2006)

$\mathbf{Ar}$	+	$\mathbf{Si}$
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Th

1394. A. Kutana, M. J. Gordon, K. P. Giapis

Neutralization of hyperthermal  $Ne^+$  on metal surfaces. Nucl. Instrum. Methods Phys. Res. B 248, 16 (2006)

$Ne^+ + Mg$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + Al$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + Si$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + Ti$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + Y$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$\mathrm{Ne^{+}}+\mathrm{Zr}$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + Nb$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + Te$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + Nd$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$\mathrm{Ne^{+}+Gd}$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + Dy$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
${ m Ne^+} + { m Ta}$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + Au$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + Hf$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp
$Ne^+ + At$	Neutraliz., Ioniz., Dissoc.	320  eV	Exp

1395. K. Nakajima, A. Nakamoto, M. Suzuki, K. Kimura Convoy electrons emitted by 2-MeV  $He^+$  ions at grazing incidence on KCl(001). Nucl. Instrum. Methods Phys. Res. B 248, 311 (2006)

$He^+ + KCl$ Secondary Electron Emission	$2 { m MeV}$	Exp
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## 1396. P. K. Kuiri, B. Joseph, J. Ghatak, H. P. Lenka, G. Sahu, B. S. Acharya, D. P. Mahapatra Observation of ZnS nanoparticles sputtered from ZnS films under 2 MeV Au irradiation.

Nucl. Instrum. Methods Phys. Res. B 248, 25 (2006)

$Au^+ + ZnS$ Sputtering 2	2 MeV E	xp
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1397. J. Deiwiks, G. Schiwietz, S. R. Bhattacharyya, G. Xiao, R. Hippler Evidence for enhanced desorption of hydrogen atoms from a Si(100) surface induced by slow highly-charged ions. Nucl. Instrum. Methods Phys. Res. B 248, 253 (2006)

$Xe^{6+} + Si$	Desorption	30  keV	Exp
$\mathrm{Xe}^{6+} + \mathrm{H} + \mathrm{Si}$	Desorption	30  keV	Exp
$\mathbf{X}\mathbf{e}^{10+} + \mathbf{S}\mathbf{i}$	Desorption	30  keV	Exp
$\mathbf{X}\mathbf{e}^{10+} + \mathbf{H} + \mathbf{S}\mathbf{i}$	Desorption	$30 { m keV}$	$\operatorname{Exp}$
$Xe^{11+} + Si$	Desorption	30  keV	Exp
$Xe^{11+} + H + Si$	Desorption	$30 { m keV}$	$\operatorname{Exp}$
$\mathbf{X}\mathbf{e}^{14+} + \mathbf{S}\mathbf{i}$	Desorption	$30 { m keV}$	$\operatorname{Exp}$
$Xe^{14+} + H + Si$	Desorption	$30 { m keV}$	$\operatorname{Exp}$
$Xe^{19+} + Si$	Desorption	$30 { m keV}$	$\operatorname{Exp}$
$\mathrm{Xe}^{19+} + \mathrm{H} + \mathrm{Si}$	Desorption	$30 { m keV}$	$\operatorname{Exp}$
$\mathbf{X}\mathbf{e}^{20+} + \mathbf{S}\mathbf{i}$	Desorption	$30 { m keV}$	$\operatorname{Exp}$
$\mathrm{Xe}^{20+} + \mathrm{H} + \mathrm{Si}$	Desorption	$30 { m keV}$	$\operatorname{Exp}$
$Xe^{22+} + Si$	Desorption	$30 { m keV}$	$\operatorname{Exp}$
$\mathrm{Xe}^{22+} + \mathrm{H} + \mathrm{Si}$	Desorption	$30 { m keV}$	$\operatorname{Exp}$
$Xe^{6+} + Si$	Sputtering	$30 { m keV}$	$\operatorname{Exp}$
$\mathrm{Xe}^{6+} + \mathrm{H} + \mathrm{Si}$	Sputtering	$30 { m keV}$	$\operatorname{Exp}$
$Xe^{10+} + Si$	Sputtering	30  keV	Exp

	$\mathbf{X}\mathbf{e}^{10+} + \mathbf{H} + \mathbf{S}\mathbf{i}$	Sputtering	$30 { m keV}$	Exp
	$Xe^{11+} + Si$	Sputtering	30  keV	Exp
	$Xe^{11+} + H + Si$	Sputtering	30  keV	Exp
	$\mathbf{Xe}^{14+} + \mathbf{Si}$	Sputtering	30  keV	$\operatorname{Exp}$
	$\mathbf{X}\mathbf{e}^{14+} + \mathbf{H} + \mathbf{S}\mathbf{i}$	Sputtering	30  keV	$\operatorname{Exp}$
	$Xe^{19+} + Si$	Sputtering	30  keV	$\operatorname{Exp}$
	$Xe^{19+} + H + Si$	Sputtering	30  keV	$\operatorname{Exp}$
	$Xe^{20+} + Si$	Sputtering	30  keV	$\operatorname{Exp}$
	$\mathbf{Xe}^{20+} + \mathbf{H} + \mathbf{Si}$	Sputtering	30  keV	$\operatorname{Exp}$
	$Xe^{22+} + Si$	Sputtering	30  keV	$\operatorname{Exp}$
	$\mathrm{Xe}^{22+} + \mathrm{H} + \mathrm{Si}$	Sputtering	$30 { m keV}$	Exp
1398.	A. H. Dogar, A. Qayyum Study of the cascading atoms and ions. Nucl. Instrum. Methods	g effect on photon emission from Phys. Res. B 248, 259 (2006)	m sputtered excited carbon	
	$Ar^+ + C$	Sputtering	10  keV	Exp
	Light emission from B Nucl. Instrum. Methods Kr <sup>+</sup> + Be	e and BeO surfaces bombarded Phys. Res. B 249, 153 (2006) Surface Interactions	d by 5 keV $Kr^+$ ions. 5 keV	Exp
	$\mathrm{Kr^{+}+BeO}$	Surface Interactions	5  keV	Exp
	$Kr^+ + Be$	Sputtering	5  keV	Exp
	$\mathrm{Kr^{+}+BeO}$	Sputtering	5  keV	Exp
1400.	Study of $SiO_2$ surface resolution Rutherford Nucl. Instrum. Methods	sputtering by a 250-550 keV backscattering measurements. Phys. Res. B 249, 421 (2006)	$He^+$ ion beam during high-	
	$\mathrm{He^{+}}$ + $\mathrm{SiO}_{2}$	Sputtering	$250\text{-}550~\mathrm{keV}$	Exp
1401.	Y. Morimoto, Y. Tanaka, Low energy ion induc oxide films. Nucl. Instrum. Methods	A. Ide-Ektessabi ed secondary electron emissio Phys. Res. B 249, 440 (2006)	n coefficient of magnesium	
	$Ne^+ + MgO$	Secondary Electron Emission	0-2000  eV	Exp
1402.	Y. Hirohata, T. Yamada, Deuterium and helium blanket in a fusion rea	Y. Yamauchi, T. Hino, T. Nagasak retentions of V-4Cr-4Ti alloy unctor.	a, T. Muroga used as first wall of breeding	
	J. Nucl. Mater. 348, 33 (	2000)		
	J. Nucl. Mater. 348, 33 ( $H^+ + Ti$	Trapping, Detrapping	$1.7-5.0 { m keV}$	Exp
	J. Nucl. Mater. 348, 33 ( $H^+ + Ti$ $H^+ + V$	Trapping, Detrapping Trapping, Detrapping	1.7-5.0 keV 1.7-5.0 keV	Exp Exp
	J. Nucl. Mater. 348, 33 ( $H^+ + Ti$ $H^+ + V$ $H^+ + Cr$	Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping	1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV	Exp Exp Exp
	J. Nucl. Mater. 348, 33 ( $H^+ + Ti$ $H^+ + V$ $H^+ + Cr$ $He^+ + Ti$	Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping	1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV	Exp Exp Exp Exp
	J. Nucl. Mater. 348, 33 ( $H^+ + Ti$ $H^+ + V$ $H^+ + Cr$ $He^+ + Ti$ $He^+ + V$	Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping	1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV	Exp Exp Exp Exp Exp
	J. Nucl. Mater. 348, 33 ( $H^+ + Ti$ $H^+ + V$ $H^+ + Cr$ $He^+ + Ti$ $He^+ + V$ $He^+ + Cr$	Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping	1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV	Exp Exp Exp Exp Exp Exp
	J. Nucl. Mater. 348, 33 ( $H^+ + Ti$ $H^+ + V$ $H^+ + Cr$ $He^+ + Ti$ $He^+ + V$ $He^+ + Cr$ $D^+ + Ti$	Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping	1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV	Exp Exp Exp Exp Exp Exp Exp
	J. Nucl. Mater. 348, 33 ( $H^+ + Ti$ $H^+ + V$ $H^+ + Cr$ $He^+ + Ti$ $He^+ + V$ $He^+ + Cr$ $D^+ + Ti$ $D^+ + V$	Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping	1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV 1.7-5.0 keV	Exp Exp Exp Exp Exp Exp Exp

379

1403. R. M. Van Ginhoven, A. Chartier, C. Meis, W. J. Weber, L. R. Corrales Theoretical study of helium insertion and diffusion in 3C-SiC. J. Nucl. Mater. 348, 51 (2006)

	$egin{array}{ll} \mathbf{H}^+ + \mathbf{Ti} \ \mathbf{H}^+ + \mathbf{V} \ \mathbf{H}^+ + \mathbf{Cr} \ \mathbf{He}^+ + \mathbf{SiC} \end{array}$	Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping		Th Th Th Th
1404.	M. A. Munoz-Marquez, G. S wietz, T. J. Wood, C. Boney Energy loss in medium perimental study of the Phys. Rev. B 72, 075415 (20	S. Parkinson, D. P. Woodruff, A. 7, S. P. Tear, P. Bailey, T.C.Q. No energy ion scattering: A con model system Y on Si(111). 2005)	Hentz, P. L. Grande, G. Schi- bakes nbined theoretical and ex-	
	$egin{array}{ll} \mathbf{H}^+ + \mathbf{Si} \ \mathbf{H}^+ + \mathbf{Y} \end{array}$	Reflection Reflection	100 keV 100 keV	${ m E/T} { m E/T}$
1405.	L. G. Glazov, S. Tougaard <b>Electron backscattering</b> Phys. Rev. B 72, 085406 (20	from surfaces: Azimuth-resol	ved distributions.	
	e + Al e + Au	Reflection Reflection	300-2000 eV 300-2000 eV	Th Th
1406.	HP. Winter, S. Lederer, H. V Kinetic electron emissio probe of the Compton p Phys. Rev. B 72, 161402 (20	Winter, C. Lemell, J. Burgdorfer n induced by grazing scatter rofile near the Fermi edge. 005)	ring of slow atoms: Local	
	Ne + Al Ar + Al	Secondary Electron Emission Secondary Electron Emission	3-5 keV 3-5 keV	Exp Exp
1407.	M. Commisso, M. Minniti, A Kinetic electron excitation Phys. Rev. B 72, 165419 (200	A. Sindona, A. Bonanno, A. Oliva on in the interaction of slow ( 005)	A, R. A. Baragiola, P. Riccardi $Kr^+$ ions with Al surfaces.	
	$Kr^+ + Al$	Secondary Electron Emission	1-8 keV	Exp
1408.	Y. Ekinci, J. P. Toennies Elastic and rotationally surface. Phys. Rev. B 72, 205430 (20	inelastic diffraction of $D_2$ motor $005)$	blecules from the LiF(001)	
	$\mathbf{D}_2 + \mathbf{LiF}$	Reflection	300  deg K	Exp
1409.	V. Tuboltsev, P. Jaklanen, M Composition dependence Phys. Rev. B 72, 205434 (20	M. Kolodyazhnaya, J. Raisanen e of $Si_{1-x}Ge_x$ sputter yield. 005)		
	$f Ar^+ + Si \ Ar^+ + Ge$	Sputtering Sputtering	3 keV 3 keV	${ m E/T} { m E/T}$
1410.	B. D. Teolis, R. A. Vidal, J. Mechanisms of $O_2$ sputter Phys. Rev. B 72, 245422 (20)	Shi, R. A. Baragiola ering from water ice by keV i 005)	ons.	
	$Ar^+ + H_2O$	Sputtering	100  keV	Exp

1411.	Z. Sroubek, X. Chen, J. A. Ion formation and kinet metal particles on metal Phys. Rev. B 73, 045427 (20	Yarmoff sic electron emission during surfaces. 006)	the impact of slow atomic	
	$egin{array}{lll} {f Na^+} + {f Ru} \ {f Na^+} + {f Au} \end{array}$	Secondary Electron Emission Sputtering	50 eV 50 eV	$\begin{array}{c} Exp\\ Exp \end{array}$
1412.	M. Tan, B. V. King Population inversion of r and NiAl(110). Phys. Rev. B 73, 075414 (20	netastable Ni atoms sputtere 006)	<b>d from Ni(100),</b> Ni <sub>3</sub> Al(100),	
	$Ar^+ + Ni$	Sputtering	4  keV	Exp
	$Ar^+ + NiAl$	Sputtering	4  keV	Exp
	$Ar + Ni_3AI$	Sputtering	4 keV	Exp
1413.	X. Chen, Z. Sroubek, J. A. <b>Formation of multiply ch</b> Phys. Rev. B 73, 132408 (24)	Yarmoff narged Al ions by direct reco 006)	il.	
	$Si^+ + Al$	Sputtering	1-5  keV	$\mathrm{E}/\mathrm{T}$
1414.	S. Prawer, S. Rubanov, S. M Spatial extent of band b secondary electron emiss Phys. Rev. B 73, 153202 (20	I. Hearne, D. N. Jamieson, R. Ka bending in diamond due to is sion: Experiment and theory. 006)	lish on impact as measured by	
	e + C	Secondary Electron Emission	1-30  keV	Exp
	e + Ga	Secondary Electron Emission	1-30  keV	Exp
1415.	G. A. Grieves, T. M. Orland <b>The importance of pores</b> <b>low temperature ice.</b> Surf. Sci. 593, 180 (2005)	lo s in the electron stimulated p	production of $D_2$ and $O_2$ in	
	$e + H_2O$	Desorption	100 eV	Exp
1416.	L. Markowski Electron-stimulated desc energy distributions of p Surf. Sci. 593, 187 (2005)	orption from alkali halide su positive alkali ions.	rfaces: Yield and kinetic-	
	e + LiF e + NaCl	Desorption Desorption	300-600 eV 300-600 eV	Exp Exp
1417.	B. V. Yakshihnskiy, T. E. M. <b>Temperature-dependent</b> <b>lunar sample.</b> Surf. Sci. 593, 202 (2005)	Iadey <b>DIET of alkalis from</b> $SiO_2$	films: Comparison with a	
	K + Na	Adsorption, Desorption	$300 \deg K; 200 eV$	Exp
	$\mathbf{K} + \mathbf{SiO}_2$	Adsorption, Desorption	300 deg K; 200 eV	Exp
	$e + Na + SiO_2$ $e + K + SiO_2$	Desorption	300 deg K; 200 eV 300 deg K; 200 eV	Exp Evp
	$e + Ba + SiO_2$	Desorption	300 deg K; 200 eV	Exp Exp
	, , , , , , , , , , , , , , , , , , , ,	· · · ·	······································	г,

1418.	P. E. Trevisanutto, P. V. S Hess <b>A mechanism of photo</b> <b>crystals.</b> Surf. Sci. 593, 210 (2005)	Sushko, A. L. Shluger, K o-induced desorption	. M. Beck, M. Henyk, A. G. Joly, W. P. of oxygen atoms from MgO nano-	
	$h\nu + MgO$	Desorption	$4.7 \mathrm{~eV}$	E/T
1419.	K. Wettergren, B. Kasemo Photodesorption of NC Surf. Sci. 593, 235 (2005)	o, D. Chakarov <b>) from graphite(0001)</b>	surface mediated by silver clusters.	,
	$egin{array}{l} { m h} u + { m C} \ { m h} u + { m NO} + { m C} \end{array}$	Desorption Desorption	$3.5 { m eV}$ $3.5 { m eV}$	$\begin{array}{c} Exp\\ Exp \end{array}$
1420.	G. Comtet, G. Dujardin Electronic processes pro on Si(111)7x7. Surf. Sci. 593, 256 (2005)	roducing $O^+$ ion phot	odesorption from oxygen adsorbed	l
	$egin{array}{l} \mathbf{h} u + \mathbf{Si} \ \mathbf{h} u + \mathbf{O} + \mathbf{Si} \end{array}$	Desorption Desorption	$\begin{array}{c} 108  \mathrm{eV} \\ 108  \mathrm{eV} \end{array}$	Exp Exp
1421.	T. Tachibana, Y. Yamauch Photodesorption of ion solids. Surf. Sci. 593, 264 (2005)	ni, T. Miura, T. Hirayam nized water clusters fi	a, M. Sakurai, I. Arakawa rom water physisorbed on rare gas	;
	$\begin{array}{l} \mathbf{h}\nu + \mathbf{H}_{2}\mathbf{O} + \mathbf{N}\mathbf{e} \\ \mathbf{h}\nu + \mathbf{H}_{2}\mathbf{O} + \mathbf{A}\mathbf{r} \\ \mathbf{h}\nu + \mathbf{H}_{2}\mathbf{O} + \mathbf{K}\mathbf{r} \\ \mathbf{h}\nu + \mathbf{H}_{2}\mathbf{O} + \mathbf{X}\mathbf{e} \end{array}$	Desorption Desorption Desorption	6-1000 eV 6-1000 eV 6-1000 eV 6-1000 eV	Exp Exp Exp Exp
1422.	A. Nambu, E. Kobayashi, Isotope effects in $H^+(I)$ of condensed $H_2O$ ( $D_2O$ Surf. Sci. 593, 269 (2005)	M. Mori, K. K. Okudaira D <sup>+</sup> ) <b>desorption induce</b> )).	a, N. Ueno, K. Mase ad by $4a_1$ ;- 0 1s resonant transition	L
	$ \begin{aligned} \mathbf{h} \boldsymbol{\nu} &+ \mathbf{H}_2 \mathbf{O} \\ \mathbf{h} \boldsymbol{\nu} &+ \mathbf{D}_2 \mathbf{O} \end{aligned} $	Desorption Desorption	$525-555 \ { m eV}$ $525-555 \ { m eV}$	Exp Exp
1423.	SI. Nagaoka, K. Mase Ion desorption caused face. Surf. Sci. 593, 276 (2005)	by N 1s core-level pho	${ m otoexcitation}$ of $N_2O$ on Si(100) sur-	
	$egin{array}{l} \mathbf{h}  u + \mathbf{SiO}_2 \ \mathbf{h}  u + \mathbf{N}_2 \mathbf{O} + \mathbf{SiO}_2 \end{array}$	Desorption Desorption	390-450 eV 390-450 eV	$\operatorname{Exp}$
1424.	S. Takahashi, K. Nagata, J <b>DIET in highly charge</b> Surf. Sci. 593, 318 (2005)	M. Tona, M. Sakurai, N. d ion interaction with	Nakamura, C. Yamada, S. Ohtani silicon surfaces.	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Desorption Desorption Desorption Desorption	520-1000 keV 520-1000 keV 520-1000 keV 520-1000 keV 520-1000 keV	Exp Exp Exp Exp Exp

	$egin{array}{llllllllllllllllllllllllllllllllllll$	Desorption Desorption Desorption Sputtering Sputtering Sputtering Sputtering Sputtering Sputtering Sputtering Sputtering Sputtering	520-1000 keV 520-1000 keV 520-1000 keV 520-1000 keV 520-1000 keV 520-1000 keV 520-1000 keV 520-1000 keV 520-1000 keV 520-1000 keV	Exp Exp Exp Exp Exp Exp Exp Exp Exp
1425. Y. D ຍາ St	. Baba, T. Sekiguchi, I. Shi esorption of cluster ion scitation. urf. Sci. 593, 324 (2005)	imoyama ns from frozen gases followin	ng high-density electronic	
	$egin{array}{lll} { m He}^+ + { m Ar} \ { m He}^+ + { m CH}_4 \ { m He}^+ + { m N}_2 \end{array}$	Sputtering Sputtering Sputtering	0-10 keV 0-10 keV 0-10 keV	E/T E/T E/T
1426. T. E Si Su	. Ito, I. Bolotin, R. Zhang, lectron-ion/atom coinci iH(100)-(2 x 1) surface. urf. Sci. 594, 54 (2005)	B. Makarenko, B. Bahrim, J. W. idence measurements of 3 ke	Rabalais $\mathbf{V} He^+$ interacting with a	
	$\mathrm{He^{+}+SiH}$ $\mathrm{He^{+}+SiH}$	Reflection Secondary Electron Emission	3 keV 3 keV	Exp Exp
1427. В. <b>В</b> Su	. Bahrim, B. Makarenko, J and gap effect on $H^-$ ic urf. Sci. 594, 62 (2005)	. W. Rabalais on survival near Cu surfaces.		
	$egin{array}{lll} {f H}^+ + {f Cu} \ {f H}^- + {f Cu} \end{array}$	Reflection Neutraliz., Ioniz., Dissoc.	6 eV; 5 keV 6 eV; 5 keV	E/T $E/T$
1428. Y G dy m Su	. Rosandi, H. M. Urbassek razing incidence impacy ynamics study of sputte pobility. urf. Sci. 600, 1260 (2006)	ct of ions on an adatom-cov ring, surface-damage formatio	vered surface: Molecular- on and ion-induced adatom	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Reflection Sputtering	5 keV 5 keV	$_{ m Th}$
1429. A U m Sเ	. J. Nelson, T. E. Felter, K ranium passivation by ass spectrometry study urf. Sci. 600, 1319 (2006)	. J. Wu, C. Evans, J. L. Ferreira, $C^+$ implantation: A photoen	W. J. Siekhaus, W. McLean mission and secondary ion	
	$C^+ + U$	Chemical Reactions	33  keV	Exp
1430. V E st Sເ	. N. Ageev, Yu. A. Kuznet lectron stimulated deso sen. nrf. Sci. 600, 2163 (2006)	sov, T. E. Madey rption of cesium atoms from	germanium-covered tung-	

	e + Ge e + W	Sputtering Sputtering	0-150 eV 0-150 eV	Exp Exp
	e + Cs + Ge	Sputtering	0.150  eV 0.150  eV	Exp
	e + Cs + W	Sputtering	0-150  eV	Exp
1431.	E. A. Garcia, C. Gonzalez I Ion fractions in the sca surfaces. Surf. Sci. 600, 2195 (2006)	Pascual, P. G. Bolcatto, M.C.G. F attering of hydrogen on diffe	Passeggi, E. C. Goldberg erent reconstructed silicon	
	H + Si	Reflection	1-4  keV	$\mathrm{Th}$
1432.	W. Zheng, A. Gallagher <b>Hydrogen dissociation o</b> Surf. Sci. 600, 2207 (2006)	n high-temperature tungsten		
	$H_2 + W$	Neutraliz., Ioniz., Dissoc.	$4.5 \mathrm{~eV}$	Exp
1433.	G. F. Liu, J. A. Yarmoff Charge exchange betwee Surf. Sci. 600, 2293 (2006)	en low energy alkali ions and	cerium oxide surfaces.	
	$\mathrm{Na^{+}+CeO_{2}}$	Reflection	1-4.5 keV	Exp
1434.	F. J. Kontur, J. C. Lancast The dynamics of $He^+$ is resolved studies. Surf. Sci. 600, 2543 (2006)	er, F. B. Dunning on neutralization at a xenor	n film: Energy- and spin-	
	$\mathrm{He^{+}}$ + Xe $\mathrm{He^{+}}$ + Xe	Reflection Secondary Electron Emission	10-500 eV 10-500 eV	Exp Exp
1435.	M. Tan, B. V. King Deexcitation of sputtered Surf. Sci. 600, 2771 (2006)	ed metastable aluminum atom	15.	
	$f Ar^+ + NiAl \ Ar^+ + Ni_3Al$	Sputtering Sputtering	4  keV 4  keV	Exp Exp
1436.	A. M. Borisov, E. S. Mashk Effect of radiation dama pyrolytic graphite. Vacuum 80, 295 (2005)	ova, A. S. Nemov, E. S. Parilis ge on ion-induced electron em	nission from highly oriented	
	$\mathbf{N}_{2}{}^{+}+\mathbf{C}$	Secondary Electron Emission	$30 \ \mathrm{keV}$	Exp
1437.	M. Rosler, N. Pauly, A. Du Influence of plasmon-ass emission from metals. Vacuum 80, 554 (2006)	bus, R. Diez Muino, M. Alducin isted charge exchange proces	ses on ion-induced electron	
	$\mathrm{H^{+}}+\mathrm{Mg}$	Secondary Electron Emission	10-100 eV	$\mathrm{Th}$
1438.	H. Gnaser, R. Golser Verification of long-lived ion mass spectrometry. Phys. Rev. A 73, 021202 (2	molecular hydrogen anions (F	$H_n^{-}, D_n^{-}, \mathbf{n=2,3}$ ) by secondary	-

$\mathrm{Cs^{+}+TiH_{2}}$	Sputtering	14.5  keV	Exp
$\mathrm{Cs^{+}+TiD_{2}}$	Sputtering	14.5  keV	$\operatorname{Exp}$
$\mathrm{Cs^{+}} + \mathrm{H_{2}} + \mathrm{H}$	Sputtering	14.5  keV	Exp

1439. C. C. Montanari, J. E. MiragliaStopping power for swift dressed ions.Phys. Rev. A 73, 024901 (2006)

He + Al	Neutraliz., Ioniz., Dissoc.	1-10,000  keV/u	$\mathrm{Th}$
He + Zn	Neutraliz., Ioniz., Dissoc.	1-10,000  keV/u	$\mathrm{Th}$
$\mathrm{He^{+}}+\mathrm{Al}$	Neutraliz., Ioniz., Dissoc.	1-10,000  keV/u	$\mathrm{Th}$
$\mathrm{He^{+}}$ + Zn	Neutraliz., Ioniz., Dissoc.	1-10,000  keV/u	Th

1440. M. B. Sahana, P. Skog, Gy. Vikor, R.T.R. Kumar, R. Schuch Guiding of highly charged ions by highly ordered SiO<sub>2</sub> nanocapillaries. Phys. Rev. A 73, 040901 (2006)

	$Ne^{7+} + SiO_2$	Reflection	$7 { m keV}$	Exp
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1441. J. Sjakste, A. G. Borisov, J. P. Gauyacq Ionization of Rydberg atoms colliding with a metal surface.

Phys. Rev. A 73, 042903 (2006)

Xe + Al	Neutraliz., Ioniz., Dissoc.	0.005-0.01 a.u.	Th
$Xe^* + Al$	Neutraliz., Ioniz., Dissoc.	0.005-0.01 a.u.	Th

1442. B. Obreshkov, U. Thumm Neutralization of H<sup>-</sup> near vicinal metal surfaces. Phys. Rev. A 74, 012901 (2006)

$H^- + Na$	Neutraliz., Ioniz., Dissoc.	$1 \mathrm{keV}$	$\mathrm{Th}$
$H^- + Al$	Neutraliz., Ioniz., Dissoc.	$1 \mathrm{keV}$	$\mathrm{Th}$
$H^- + Cu$	Neutraliz., Ioniz., Dissoc.	1  keV	$\mathrm{Th}$

1443. H. Watanabe, S. Takahashi, M. Tona, N. Yoshiyasu, N. Nakamura, M. Sakurai, C. Yamada, S. Ohtani
Dissipation of potential energy through x-ray emission in slow highly charged ion-surface collisions.

Phys. Rev. A 74, 042901 (2006)

$I^{34+-53+} + Si$	Surface Interactions	119-186 keV	Exp
$I^{34+-53+} + Si$	Neutraliz., Ioniz., Dissoc.	119-186 $\rm keV$	Exp

1444. J.-C. Karam, J. Grucker, M. Boustimi, G. Vassilev, J. Reinhardt, C. Mainos, V. Bocvarski, J. Robert, J. Baudon, F. Perales Surface-induced vibrational excitation of metastable nitrogen molecules travers-

ing a micro-slip copper grating: A probe of surface profiles. J. Phys. B 39, 1937 (2006)

$N_2 + Cu$	Reflection	$150 { m MeV}$	Exp
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1445. S. Lederer, H. Winter

Energy loss of 100-keV hydrogen atoms during grazing scattering from Cu(111). Phys. Rev. A 73, 054901 (2006)

$H^+ + Cu$	Reflection	100  keV	$\operatorname{Exp}$
$H^+ + Cu$	Secondary Electron Emission	100  keV	Exp

1446. P. Traeskelin, K. Nordlund, J. Keinonen

H, He, Ne, Ar-bombardment of amorphous hydrocarbon structures.

J. Nucl. Mater. 357, 1 (2006)

$\mathbf{H} + \mathbf{C}$	с ·		TTI
H + C	Sputtering	5-10 eV	1 n
He + C	Sputtering	5-10  eV	$\mathrm{Th}$
Ne + C	Sputtering	5-10  eV	$\mathrm{Th}$
Ar + C	Sputtering	5-10  eV	$\mathrm{Th}$
H + C	Trapping, Detrapping	5-10  eV	$\mathrm{Th}$
He + C	Trapping, Detrapping	5-10  eV	$\mathrm{Th}$
Ne + C	Trapping, Detrapping	5-10  eV	$\mathrm{Th}$
Ar + C	Trapping, Detrapping	5-10  eV	$\mathrm{Th}$

1447. L. I. Vergara, F. W. Meyer, H. F. Krause, P. Traeskelin, K. Nordlund, E. Salonen Methane production from ATJ graphite by slow atomic and molecular D ions: Evidence for projectile molecule-size-dependent yields at low energies. J. Nucl. Mater. 357, 9 (2006)

$H^+ + C$	Sputtering	5-100  eV	Exp
$\mathbf{H}_{2}^{+} + \mathbf{C}$	Sputtering	5-100  eV	$\operatorname{Exp}$
$H_3^+ + C$	Sputtering	5-100  eV	$\operatorname{Exp}$
$D^+ + C$	Sputtering	5-100  eV	$\operatorname{Exp}$
$\mathbf{D}_2^+ + \mathbf{C}$	Sputtering	5-100  eV	$\operatorname{Exp}$
$\mathbf{D}_3^+ + \mathbf{C}$	Sputtering	5-100  eV	$\operatorname{Exp}$

1448. A. D. Quastel, J. W. Davis, A. A. Haasz, R. G. Macaulay-Newcombe
Effect of post - D<sup>+</sup> - irradiation time delay and pre-TDS heating on D retention
in single crystal tungsten.
J. Nucl. Mater. 359, 8 (2006)

$\mathbf{H}^+ + \mathbf{W}$	Trapping, Detrapping	500  eV	Exp
$\mathbf{D}^+ + \mathbf{W}$	Trapping, Detrapping	500  eV	$\operatorname{Exp}$

1449. H. T. Lee, A. A. Haasz, J. W. Davis, R. G. Macaulay-Newcombe Hydrogen and helium trapping in tungsten under single and sequential irradiations.
J. Nucl. Mater. 360, 196 (2006)

$\mathbf{H}^+ + \mathbf{W}$	Trapping, Detrapping	500  eV	Exp
$He^+ + W$	Trapping, Detrapping	500  eV	Exp
$\mathbf{D}^+ + \mathbf{W}$	Trapping, Detrapping	500  eV	Exp

1450. J. H. Liang, M. Mayer, J. Roth, M. Balden, W. Eckstein
Hydrogen isotopic effects on the chemical erosion of graphite induced by ion irradiation.
J. Nucl. Mater. 363-365, 184 (2006)

$H^+ + C$	Sputtering	10-1000  eV	Th
$D^+ + C$	Sputtering	10-1000  eV	$\mathrm{Th}$
$T^+ + C$	Sputtering	$10-1000 \ eV$	$\mathrm{Th}$

1451. A. V. Golubeva, M. Mayer, J. Roth, V. A. Kurnaev, O. V. Ogorodnikova Deuterium retention in rhenium-doped tungsten. J. Nucl. Mater. 363-365, 893 (2006)

$\mathbf{H}^+ + \mathbf{W}$	Trapping, Detrapping	200  eV	Exp
$\mathrm{H^{+}}+\mathrm{Re}$	Trapping, Detrapping	200  eV	Exp
$D^+ + W$	Trapping, Detrapping	200  eV	Exp
$D^+ + Re$	Trapping, Detrapping	200  eV	Exp

1452. H. T. Lee, A. A. Haasz, J. W. Davis, R. G. Macaulay-Newcombe, D. G. Whyte, G. M. Wright Hydrogen and helium trapping in tungsten under simultaneous irradiations. J. Nucl. Mater. 363-365, 898 (2006)

$\mathbf{H}^+ + \mathbf{W}$	Trapping, Detrapping	500  eV	Exp
$He^+ + W$	Trapping, Detrapping	500  eV	Exp
$D^+ + W$	Trapping, Detrapping	500  eV	Exp

1453. E. Igarashi, Y. Nishikawa, T. Nakahata, A. Yoshikawa, M. Oyaidzu, Y. Oya, K. Okuno Dependence of implantation temperature on chemical behavior of energetic deuterium implanted into tungsten carbide.

J. Nucl. Mater. 363-365, 910 (2006)

$H_2^+ + C$	Trapping, Detrapping	$1 \ \mathrm{keV}$	Exp
$\mathbf{H}_{2}^{+} + \mathbf{W}$	Trapping, Detrapping	1  keV	Exp
$\mathbf{D}_2^+ + \mathbf{C}$	Trapping, Detrapping	1  keV	Exp
$\mathbf{D}_{2}^{+} + \mathbf{W}$	Trapping, Detrapping	1  keV	Exp
$\mathbf{D}_2{}^+ + \mathbf{W}\mathbf{C}$	Trapping, Detrapping	$1 {\rm ~keV}$	Exp

1454. H. Miyauchi, A. Yoshikawa, M. Oyaidzu, Y. Oya, A. Sagara, N. Noda, K. Okuno Ion fluence dependence on chemical behavior of energetic deuterium implanted into oxygen-contained boron film. J. Nucl. Mater. 363-365, 925 (2006)

$\mathbf{H_2}^+ + \mathbf{B}$	Trapping, Detrapping	1  keV	$\operatorname{Exp}$
$\mathbf{D}_2{}^+ + \mathbf{B}$	Trapping, Detrapping	$1 \mathrm{keV}$	Exp

1455. Y. Oya, H. Miyauchi, T. Suda, Y. Nishikawa, T. Oda, K. Okuno, S. Tanaka Effects of helium implantation on hydrogen isotope retention behavior in SiC. J. Nucl. Mater. 363-365, 933 (2006)

$\mathrm{He^{+}}+\mathrm{SiC}$	Trapping, Detrapping	1-1.3  keV	Exp
$\mathbf{H}_{2}^{+} + \mathbf{C}$	Trapping, Detrapping	1-1.3  keV	Exp
$\mathbf{H}_{2}^{+} + \mathbf{Si}$	Trapping, Detrapping	1-1.3  keV	Exp
$\mathbf{D}_2^+ + \mathbf{C}$	Trapping, Detrapping	1-1.3  keV	Exp
$\mathbf{D}_2^+ + \mathbf{Si}$	Trapping, Detrapping	1-1.3  keV	Exp
$\mathbf{D}_2^+ + \mathbf{SiC}$	Trapping, Detrapping	1-1.3  keV	Exp

1456. Y. Yamauchi, Y. Hirohata, T. Hino

Deuterium retention and desorption behavior in oxidized ferritic steel. J. Nucl. Mater. 363-365, 984 (2006)

$\mathbf{H}_{2}^{+} + \mathbf{Fe}$	Trapping, Detrapping	$1.7 \ \mathrm{keV}$	Exp
$\mathbf{H}_{2}{}^{+}+\mathbf{SS}$	Trapping, Detrapping	$1.7 \ \mathrm{keV}$	$\operatorname{Exp}$
$\mathbf{D}_2^+ + \mathbf{Fe}$	Trapping, Detrapping	$1.7 \ \mathrm{keV}$	$\operatorname{Exp}$
$\mathbf{D}_2{}^+ + \mathbf{S}\mathbf{S}$	Trapping, Detrapping	$1.7 \ \mathrm{keV}$	Exp

1457. I. I. Arkhipov, S. L. Kanashenko, V. M. Sharapov, R. Kh. Zalavutdinov, A. E. Gorodetsky Deuterium trapping in ion-damaged tungsten single crystal. J. Nucl. Mater. 363-365, 1168 (2006)

$He^+ + W$	Trapping, Detrapping	12-20  keV	Exp
$\mathbf{H}_{2}{}^{+}+\mathbf{W}$	Trapping, Detrapping	12-20  keV	Exp
$\mathbf{D}_2{}^+ + \mathbf{W}$	Trapping, Detrapping	12-20  keV	$\operatorname{Exp}$

1458. M. Balden, C. Adelhelm, E. de Juan Pardo, J. Roth

Chemical erosion by deuterium impact on carbon films doped with nanometersized carbide crystallites.

J. Nucl. Mater. 363-365, 1173 (2006)

$\mathbf{H}_{2}^{+} + \mathbf{C}$	Sputtering	90-3000  eV	$\operatorname{Exp}$
$\mathbf{D}_2^+ + \mathbf{C}$	Sputtering	90-3000  eV	Exp

1459. I. Bizyukov, K. Krieger, N. Azarenkov, Ch. Linsmeier, S. Levchuk Tungsten sputtering and accumulation of implanted carbon and deuterium by simultaneous bombardment with D and C ions.

J. Nucl. Mater. 363-365, 1184 (2006)

$\mathbf{H}_{3}^{+} + \mathbf{W}$	Sputtering	9-12  keV	Exp
$\mathbf{D}_3^+ + \mathbf{W}$	Sputtering	9-12  keV	Exp
$\mathbf{C}_2{}^- + \mathbf{W}$	Sputtering	9-12  keV	Exp
$\mathbf{H}_{3}^{+} + \mathbf{W}$	Trapping, Detrapping	9-12  keV	Exp
$\mathbf{D}_3^+ + \mathbf{W}$	Trapping, Detrapping	9-12  keV	Exp
$C_2^- + W$	Trapping, Detrapping	9-12  keV	Exp

1460. T. Ono, K. Shibata, T. Kenmotsu, T. Muramoto, Z. Li, T. Kawamura Extended incident-angle dependence formula for physical sputtering. J. Nucl. Mater. 363-365, 1266 (2006)

$H^+ + C$	+ + C Sputtering	0.2- $1.0  keV$	$\mathrm{Th}$
$H^+ + Fe$	Sputtering	0.2-1.0  keV	$\mathrm{Th}$
$\mathbf{H}^+ + \mathbf{W}$	Sputtering	0.2-1.0  keV	$\mathrm{Th}$
$D^+ + C$	Sputtering	0.2-1.0  keV	$\mathrm{Th}$
$D^+ + Fe$	Sputtering	0.2-1.0  keV	$\mathrm{Th}$
$D^+ + W$	Sputtering	0.2-1.0  keV	$\mathrm{Th}$

1461. H. Yamaoka, N. Tanaka, Y. Matsumoto, M. Nishiura, K. Tsumori, S. Takeuchi, H. Sugawara, K. Shinto, A. Okamoto, M. Sasao, M. Wada

Particle reflections of low energy light ions from a vanadium alloy (V-4Cr-4Ti). J. Nucl. Mater. 363-365, 1304 (2006)

H + Ti	Reflection	0.7-2  keV	E/T
H + V	Reflection	0.7-2  keV	É/T
H + Cr	Reflection	0.7-2  keV	E/T
He + Ti	Reflection	0.7-2  keV	E/T
He + V	Reflection	0.7-2  keV	E/T
He + Cr	Reflection	0.7-2  keV	E/T
O + Ti	Reflection	0.7-2  keV	E/T
O + V	Reflection	0.7-2  keV	E/T
O + Cr	Reflection	0.7-2  keV	E/T

1462. D. M. Duffy, A. M. Rutherford Including the effects of electronic stopping and electron-ion interactions in radiation damage simulations.

J. Nucl. Mater. 19, 016207 (2007)

10  keV	Th
	10  keV

1463. A. Jablonski, F. Salvat

Solid state effect in simulations of electron elastic backscattering. Nucl. Instrum. Methods Phys. Res. B 251, 371 (2006)

e + Al	Reflection	200-1000  eV	$\mathrm{Th}$
e + Cu	Reflection	200-1000  eV	$\mathrm{Th}$
e + Ag	Reflection	200-1000  eV	$\mathrm{Th}$
e + Au	Reflection	$200\text{-}1000~\mathrm{eV}$	$\mathrm{Th}$

1464.	M. Cholewa, H. O. Moser, L. Huang, S. P. Lau, J. Yoo, S. J. An, GC. Yi, G. Xingyu, A.T.S. Wee, A. Bettiol, F. Watt, B. Fischer Secondary electron emission properties of III-nitride/ZnO coaxial heterostruc- tures under ion and X-ray bombardment. Nucl. Instrum. Methods Phys. Res. B 254, 55 (2007)			
	$egin{array}{lll} { m H}^+ + { m CsI} \ { m H}^+ + { m GaN} \ { m H}^+ + { m ZnO} \ { m C}^+ + { m CsI} \ { m C}^+ + { m GaN} \ { m C}^+ + { m GaN} \ { m C}^+ + { m ZnO} \end{array}$	Secondary Electron Emission Secondary Electron Emission Secondary Electron Emission Secondary Electron Emission Secondary Electron Emission Secondary Electron Emission	2-48 MeV 2-48 MeV 2-48 MeV 2-48 MeV 2-48 MeV 2-48 MeV	Exp Exp Exp Exp Exp Exp
1465.	M. A. Karolewski <b>The initial sputtering of Cu(100) by 1 keV</b> $O_2$ <b>projectiles.</b> Nucl. Instrum. Methods Phys. Res. B 254, 59 (2007)			
	$\mathbf{O}_2^+ + \mathbf{Cu}$	Sputtering	1 keV	$\mathrm{Th}$
1466.	66. V. I. Shulga Comparative study of silicon and germanium sputtering by 1-20 keV Ar ions. Nucl. Instrum. Methods Phys. Res. B 254, 200 (2007)			
	$f Ar^+ + Si \ Ar^+ + Ge$	Sputtering Sputtering	1-20 keV 1-20 keV	Th Th
1467.	M. Timonova, BJ. Lee Sputter erosion of S thermostats. Nucl. Instrum. Method	e, B. J. Thijsse Si(001) using a new silicon MEA s Phys. Res. B 255, 195 (2007)	AM potential and different	
	Ar + Si	Sputtering	500  eV	$\mathrm{Th}$
1468.	S. J. Stuart, P. S. Krstic, T. A. Embry, C. O. Reinhold Methane production by deuterium impact at carbon surfaces. Nucl. Instrum. Methods Phys. Res. B 255, 202 (2007)			
	$egin{array}{lll} {f H}_2 + {f C} \ {f D}_2 + {f C} \ {f H}_2 + {f C} \ {f H}_2 + {f C} \ {f D}_2 + {f C} \end{array}$	Chemical Reactions Chemical Reactions Sputtering Sputtering	7.5-60 eV 7.5-60 eV 7.5-60 eV 7.5-60 eV	Th Th Th Th
1469.	S. Zimmermann, H. M. Urbassek Sputtering of Au by cluster impact. Nucl. Instrum. Methods Phys. Res. B 255, 208 (2007)			
	Au + Au	Sputtering	$0.16\text{-}64~\mathrm{keV}$	$\mathrm{Th}$
1470.	T. Muramoto, T. Kenmotsu <b>MD simulation of sputtering on surface index and surface roughness dependence.</b> Nucl. Instrum. Methods Phys. Res. B 255, 214 (2007)			
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Sputtering Sputtering	0.1-5.0 keV 0.1-5.0 keV	Th Th
1471.	T. Okazawa, K. Shibuya Charge states of mea surfaces. Nucl. Instrum. Method	a, T. Nishimura, Y. Kido dium energy He ions scattered f s Phys. Res. B 256, 1 (2007)	rom single and poly-crystal	
	$\mathrm{He^{+} + Ni} \mathrm{He^{+} + Cu}$	Reflection Reflection	80-120 keV 80-120 keV	Exp Exp
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1472.	D. Valdes, R. C. Monrea Hybridization effects surface. Nucl. Instrum. Methods	d, V. A. Esaulov on the Auger neutralization p Phys. Res. B 256, 6 (2007)	process of $He^+$ on Ag(110)	
	$\mathrm{He^{+}} + \mathrm{Ag} \ \mathrm{He^{+}} + \mathrm{Ag}$	Reflection Neutraliz., Ioniz., Dissoc.	1-2 keV 1-2 keV	$_{ m Th}$
1473.	N. V. Novikov, Ya. A. T Energy and charge dis at grazing incidence. Nucl. Instrum. Methods	Peplova, V. V. Bondurko stributions of fast nitrogen ions of Phys. Res. B 256, 21 (2007)	reflected from metal surface	
	$N^+ + Pt$	Reflection	1 MeV	Th
1474.	M. Boudjema, K. Belgha Characteristic velocit tered from a polycrys Nucl. Instrum. Methods	anem, R. Zemih, M. Richard-Viard, y of inner-shell charge exchange stalline Ni surface. 5 Phys. Res. B 256, 30 (2007)	C. Benazeth e of low energy Ne ions scat-	
	$egin{array}{lll} {f Ne^+ + Ni} \ {f Ne^+ + Ni} \end{array}$	Reflection Neutraliz., Ioniz., Dissoc.	2-12 keV 2-12 keV	Exp Exp
1475.	J. C. Lancaster, F. J. Ko Neutralization of low Nucl. Instrum. Methods	ontur, G. K. Walters, F. B. Dunning -energy $He^+$ ions at a magnesiu Phys. Res. B 256, 37 (2007)	m surface.	
	$egin{array}{ll} \mathrm{He^+} + \mathrm{Mg} \ \mathrm{He^+} + \mathrm{Mg} \ \mathrm{He^+} + \mathrm{Mg} \end{array}$	Reflection Secondary Electron Emission Neutraliz., Ioniz., Dissoc.	15-60 eV 15-60 eV 15-60 eV	Exp Exp Exp
1476.	N. Pauly, A. Dubus, M. Backward and forwar on thin carbon foils: Nucl. Instrum. Methods	Roesler <b>d electron emission induced by</b> <b>Influence of charge changing pr</b> Phys. Res. B 256, 41 (2007)	helium projectiles incident ocesses.	
	$egin{array}{ll} { m He} + { m C} \ { m He}^+ + { m C} \ { m He}^{2+} + { m C} \end{array}$	Secondary Electron Emission Secondary Electron Emission Secondary Electron Emission	0.2-2.0 MeV 0.2-2.0 MeV 0.2-2.0 MeV	Th Th Th
1477.	H. R. Dunham, S. Weth Ionization of xenon F Nucl. Instrum. Methods	ekam, J. C. Lancaster, F. B. Dunnin <b>Aydberg atoms at Si(100) surfac</b> Phys. Res. B 256, 46 (2007)	es.	
	Xe + Si Xe + Si	Neutraliz., Ioniz., Dissoc. Sputtering	300 deg K 300 deg K	Exp Exp
1478.	Z. L. Miskovic, YN. W. Dynamics of fast mol retical developments. Nucl. Instrum. Methods	ang, YH. Song ecular ions in solids and plasma Phys. Res. B 256, 57 (2007)	s: A review of recent theo-	
	$\mathbf{N}_{2}{}^{+}+\mathbf{C}$	Secondary Electron Emission		$\mathrm{Th}$

1479. M. Kato, R. Souda

Elastic and inelastic collision of low energy proton scattering from rare gas solids. Nucl. Instrum. Methods Phys. Res. B 256, 71 (2007)

$H^+ + Ar$	Reflection	50-500  eV	E/T
$H^+ + Kr$	Reflection	50-500  eV	E/T
$H^+ + Xe$	Reflection	50-500  eV	E/T

1480. J. A. Scheer, P. Wahlstroem, P. Wurz

Scattering of light molecules from  $Al_2O_3$  surfaces. Nucl. Instrum. Methods Phys. Res. B 256, 76 (2007)

$\mathrm{He^+} + \mathrm{Al_2O_3}$	Reflection	390-1210  eV	Exp
$\mathbf{C}^+ + \mathbf{Al}_2\mathbf{O}_3$	Reflection	390-1210  eV	Exp
$\mathbf{O}^+ + \mathbf{Al}_2\mathbf{O}_3$	Reflection	390-1210  eV	Exp
$Ne^+ + Al_2O_3$	Reflection	$390-1210 {\rm ~eV}$	$\operatorname{Exp}$
$\mathbf{H}_{2}^{+} + \mathbf{Al}_{2}\mathbf{O}_{3}$	Reflection	390-1210  eV	Exp

1481. N. Bundaleski, G. Gligoric, N. Ivanovic, Z. Ristic Inelastic energy losses of He<sup>+</sup> ions singly scattered from polycrystalline chromium. Nucl. Instrum. Methods Phys. Res. B 256, 86 (2007)

$\mathrm{He^{+}}+\mathrm{Cr}$	Reflection	$0.7-2.0 {\rm ~keV}$	Exp
$\mathrm{He^{+}}+\mathrm{Cr}$	Neutraliz., Ioniz., Dissoc.	0.7-2.0  keV	Exp

1482. S.-I. Kitazawa, S. Yamamoto, M. Asano, Y. Saitoh, S. Ishiyama
Radiation-induced luminescence from TiO<sub>2</sub> by 10, 20 and 30 keV oxygen ion irradiations.
Nucl. Instrum. Methods Phys. Res. B 256, 233 (2007)

$O^+ + TiO_2$	Surface Interactions	10-30 keV	Exp
0 1 1102	Surface interactions	10 00 10 1	- Line

1483. M. Kumar, S. A. Khan, F. Singh, A. Tripathi, D. K. Avasthi, A. C. Pandey Influence of grain size on electronic sputtering of LiF thin films. Nucl. Instrum. Methods Phys. Res. B 256, 328 (2007)

$Ag^{25+} + LiF$	Sputtering	$120 { m MeV}$	Exp
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1484. N. Matsunami, M. Sataka, S. Okayasu, M. Tazawa Electronic sputtering of nitrides by high-energy ions. Nucl. Instrum. Methods Phys. Res. B 256, 333 (2007)

Sputtering	$55-200 { m MeV}$	Exp
Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
Sputtering	$55-200 { m MeV}$	Exp
Sputtering	$55-200 { m MeV}$	Exp
Sputtering	$55-200 { m MeV}$	Exp
Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
Sputtering	$55-200 { m MeV}$	Exp
	Sputtering Sputtering	Sputtering55-200 MeVSputtering55-200 MeV

${f Ar^+ + SiO_2}$	Sputtering	$55-200 { m MeV}$	Exp
$Ar^+ + SrTiO_3$	Sputtering	$55-200 { m MeV}$	Exp
$Ar^+ + MgO$	Sputtering	$55-200 { m MeV}$	Exp
$Ar^+ + ZrO_2$	Sputtering	$55-200 { m MeV}$	Exp
$Ar^+ + AlN$	Sputtering	$55-200 { m MeV}$	Exp
$Ar^+ + CeO_2$	Sputtering	$55-200 { m MeV}$	Exp
$Ar^+ + ZnO$	Sputtering	$55-200 { m MeV}$	Exp
$\mathbf{Ar^+} + \mathbf{Y}_2\mathbf{O}_3$	Sputtering	$55-200 { m MeV}$	Exp
$\mathbf{Ar^+} + \mathbf{MgAl}_2\mathbf{O}_4$	Sputtering	$55-200 { m MeV}$	Exp
$Ni^+ + Al_2O_3$	Sputtering	$55-200 { m MeV}$	Exp
${f Ni^+}+{f Si_3N_4}$	Sputtering	$55-200 { m MeV}$	Exp
$Ni^+ + TiO_2$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
$Ni^+ + SiO_2$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
${ m Ni^+}+{ m SrTiO}_3$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
${ m Ni^+}+{ m MgO}$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
$Ni^+ + ZrO_2$	Sputtering	$55-200 { m MeV}$	Exp
$Ni^+ + AlN$	Sputtering	$55-200 { m MeV}$	Exp
$Ni^+ + CeO_2$	Sputtering	$55-200 { m MeV}$	Exp
$Ni^+ + ZnO$	Sputtering	$55-200 { m MeV}$	Exp
$Ni^+ + Y_2O_3$	Sputtering	$55-200 { m MeV}$	Exp
${f Ni^+}+{f MgAl_2O_4}$	Sputtering	$55-200 { m MeV}$	Exp
$\mathbf{Xe^+} + \mathbf{Al}_2\mathbf{O}_3$	Sputtering	$55-200 { m MeV}$	Exp
$\mathbf{Xe^+} + \mathbf{Si}_3\mathbf{N}_4$	Sputtering	$55-200 { m MeV}$	Exp
${f Xe^+}+{f TiO_2}$	Sputtering	$55-200 { m MeV}$	Exp
${f Xe^+ + SiO_2}$	Sputtering	$55-200 { m MeV}$	Exp
${f Xe^+ + SrTiO_3}$	Sputtering	$55-200 { m MeV}$	Exp
${ m Xe^+}+{ m MgO}$	Sputtering	$55-200 { m MeV}$	Exp
${f Xe^+ + ZrO_2}$	Sputtering	$55-200 { m MeV}$	Exp
$Xe^+ + AlN$	Sputtering	$55-200 { m MeV}$	Exp
$\mathbf{Xe^+} + \mathbf{CeO}_2$	Sputtering	$55-200 { m MeV}$	Exp
$Xe^+ + ZnO$	Sputtering	$55-200 { m MeV}$	Exp
$\mathbf{Xe^+} + \mathbf{Y}_2\mathbf{O}_3$	Sputtering	$55-200 { m MeV}$	$\operatorname{Exp}$
${f Xe^+ + MgAl_2O_4}$	Sputtering	$55-200 { m MeV}$	Exp
E. B. Boyko, A. S. Kamy Interaction of fast hyd dence. Nucl. Instrum. Methods	shan, F. F. Komarov, A. H <b>1rogen ions with silicon</b> Phys. Res. B 256, 359 (20	E. Lagutin <b>1 surface at glancing angles of</b> 07)	inci-

$H^+ + Si$ Sputtering 380 keV	
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1486. A. M. Borisov, E. S. Mashkova, A. S. Nemov, Yu. S. Virgiliev Sputtering of HOPG under high-dose ion irradiation. Nucl. Instrum. Methods Phys. Res. B 256, 363 (2007)

1485.

30  keV	Exp
	30  keV

Exp

1487. HP. Winter, F. Aumayr, C. Lemell, J. Burgdorfer, S. Lederer, H. Winter Kinetic electron emission by grazing atom scattering from clean flat metal surfaces. Nucl. Instrum. Methods Phys. Res. B 256, 455 (2007)

He + Al	Secondary Electron Emission	3-16  keV	Exp
Ne + Al	Secondary Electron Emission	3-16 keV	Exp
Ar + Al	Secondary Electron Emission	3-16  keV	Exp

1488. E. Sideras-Haddad, T. Schenkel, D. B. Rebuli, A. Persaud, S. Shrivastava, D. H. Schneider, B. Mwakikunga

	Electron emission and defect formation in the interaction of slow, highly charged ions with diamond surfaces. Nucl. Instrum. Methods Phys. Res. B 256, 464 (2007)				
	$\frac{\mathbf{P}^{5+\_13+}+\mathbf{C}}{\mathbf{X}\mathbf{e}^{34+\_44+}+\mathbf{C}}$	Secondary Electron Emission Secondary Electron Emission	35-400  keV 35-400  keV	Exp Exp	
1489.	M. Commisso, M. Minniti, . <b>The role of atomic collisi</b> <b>ions.</b> Nucl. Instrum. Methods Ph	A. Sindona, A. Bonanno, A. Oliva ons in kinetic electron emissio ys. Res. B 256, 474 (2007)	a, R. A. Baragiola, P. Riccardi on from Al surfaces by slow		
	$egin{array}{l} {f Na^+} + {f Al} \ {f Kr^+} + {f Al} \end{array}$	Secondary Electron Emission Secondary Electron Emission	474 keV 474 keV	Th Th	
1490.	A. Dubus, N. Pauly, M. Roc Electron transport effect Nucl. Instrum. Methods Ph	esler t <b>s in ion induced electron em</b> ys. Res. B 256, 478 (2007)	ission.		
	$H^+ + Al$	Secondary Electron Emission	$25\text{-}3000~\mathrm{keV}$	$\mathrm{Th}$	
1491.	P. Iza, L. S. Farenzena, E. I Effects of projectile track Nucl. Instrum. Methods Ph	F. da Silveira <b>c charging on the</b> $H^-$ <b>secondar</b> sys. Res. B 256, 483 (2007)	ry ion velocity distribution.		
	$\mathbf{N}^+ + \mathbf{H}_2 \mathbf{O}$	Sputtering	$1.7 { m MeV}$	$\mathrm{E}/\mathrm{T}$	
1492.	T. S. Wang, Y. T. Zhao, H.	B. Peng, S. W. Wang, Y. Fang, I	D. J. Ding, G. Q. Xiao		

Potential sputtering of target ions by  $Ar^{q+}$ ,  $Pb^{q+}$  projectiles from a silicon surface. Nucl. Instrum. Methods Phys. Res. B 256, 497 (2007)

$Ar^+ + Si$	Sputtering	$160-400 {\rm ~keV}$	Exp
$Ar^{11+} + Si$	Sputtering	160-400  keV	Exp
$Ar^{13+} + Si$	Sputtering	160-400  keV	Exp
$Ar^{15+} + Si$	Sputtering	160-400  keV	Exp
$Ar^{16+} + Si$	Sputtering	160-400  keV	Exp
$Pb^{4+} + Si$	Sputtering	160-400  keV	Exp
$\mathbf{Pb}^{20+} + \mathbf{Si}$	Sputtering	160-400  keV	Exp
$\mathbf{P}\mathbf{b}^{24+} + \mathbf{S}\mathbf{i}$	Sputtering	160-400  keV	$\operatorname{Exp}$
$\mathbf{Pb}^{30+} + \mathbf{Si}$	Sputtering	160-400  keV	Exp
$\mathbf{P}\mathbf{b}^{32+} + \mathbf{S}\mathbf{i}$	Sputtering	160-400  keV	Exp
$\mathbf{P}\mathbf{b}^{35+} + \mathbf{S}\mathbf{i}$	Sputtering	160-400  keV	Exp

1493. V. V. Bobkov, S. P. Gokov, V. V. Gritsyna, V. T. Gritsyna, D. I. Shevchenko, S. S. Alimov Mechanisms of formation of sputtered particles in excited states at  $Ar^+$  ion bombardment of oxide targets.

Nucl. Instrum. Methods Phys. Res. B 256, 501 (2007)

$Ar^+ + Al_2O_3$	Sputtering	20  keV	Exp
$Ar^+ + MgO$	Sputtering	20  keV	Exp

<sup>1494.</sup> G. Lanzano, E. De Filippo, S. Hagmann, H. Rothard, C. Volant In-flight emission of projectile Auger electrons from highly energetic heavy ions (20 MeV/u; E; 100 MeV/u) colliding with carbon foils. Nucl. Instrum. Methods Phys. Res. B 256, 510 (2007)

$Ni^{14+} + C$	Secondary Electron Emission	$20-100 { m MeV/u}$	$\operatorname{Exp}$
$Ni^{19+} + C$	Secondary Electron Emission	20-100  MeV/u	Exp
$\mathbf{Kr}^{32+} + \mathbf{C}$	Secondary Electron Emission	20-100  MeV/u	$\operatorname{Exp}$
$Kr^{34+} + C$	Secondary Electron Emission	20-100  MeV/u	$\operatorname{Exp}$

1495. N. N. Andrianova, A. M. Borisov, E. S. Mashkova, A. S. Nemov, E. S. Parilis, A. I. Sorokin, Yu. S. Virgiliev
Ion-induced electron emission of glassy carbons. Nucl. Instrum. Methods Phys. Res. B 256, 515 (2007)

$Ar^+ + C$	Secondary Electron Emission	30  keV	Exp
$N_2^+ + C$	Secondary Electron Emission	30  keV	Exp

1496. W. Meissl, M. C. Simon, J. R. Crespo Lopez-Urrutia, H. Tawara, J. Ullrich, HP. Winter, F. Aumayr

Highly charged ion-induced potential electron emission from clean Au(111): Dependence on the projectile angle of incidence.

Nucl. Instrum. Methods Phys. Res. B 256, 520  $\left(2007\right)$ 

$Ar^{11+} + Au$	Secondary Electron Emission	2.2- $4.2  keV/amu$	$\operatorname{Exp}$
$Ar^{17+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$
$\mathbf{X}\mathbf{e}^{26+} + \mathbf{A}\mathbf{u}$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$
$Xe^{32+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$
$Xe^{36+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$
$\mathbf{Xe}^{40+} + \mathbf{Au}$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$
$\mathbf{Xe}^{44+} + \mathbf{Au}$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$
$Xe^{48+} + Au$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$
$\mathbf{X}\mathbf{e}^{50+} + \mathbf{A}\mathbf{u}$	Secondary Electron Emission	2.2-4.2  keV/amu	$\operatorname{Exp}$

1497. K. Nakajima, S. Yamasaki, M. Suzuki, K. Kimura Secondary ion emission from a KCl(001) surface by grazing-angle incidence of swift heavy ions.

Nucl. Instrum. Methods Phys. Res. B 256, 524 (2007)

$O^{2+} + KCl$	Reflection	$3 { m MeV}$	Exp
$O^{2+} + KCl$	Sputtering	$3 { m MeV}$	Exp

1498. H. Ogawa, N. Fujimoto, T. Ohata, M. Nagano, K. Ishii, N. Sakamoto, T. Kaneko
Dependence of secondary electron emission on the emergent angle of 1 MeV/u
H<sup>+</sup>, He<sup>2+</sup> and Li<sup>3+</sup> penetrating a thin carbon foil.
Nucl. Instrum. Methods Phys. Res. B 256, 532 (2007)

$H^+ + C$	Secondary Electron Emission	1 MeV/amu	Exp
$He^{2+} + C$	Secondary Electron Emission	1 MeV/amu	Exp
$Li^{3+} + C$	Secondary Electron Emission	1 MeV/amu	Exp

1499. C. S. Lee, W. Ip, S. H. Liu, G. Y. Hsu, S. Lee

# Light emission of sputtered particles induced by ion bombardment on waterenriched molecular ices.

Nucl. Instrum. Methods Phys. Res. B 256, 626 (2007)

$\mathrm{He^{+}} + \mathrm{H_{2}O}$	Reflection	15  keV	Exp
$\mathrm{He^{+}}+\mathrm{CH}_{4}$	Reflection	15  keV	Exp
$He^+ + NH_3$	Reflection	15  keV	Exp
$\mathbf{N}^+ + \mathbf{H}_2 \mathbf{O}$	Reflection	15  keV	Exp
$N^+ + CH_4$	Reflection	15  keV	Exp
$N^+ + NH_3$	Reflection	15  keV	Exp

	$Ar^+ + H_2O$	Reflection	15  keV	Exp
	$\mathbf{Ar^+} + \mathbf{CH}_4$	Reflection	15  keV	Exp
	$\mathbf{Ar^+} + \mathbf{NH}_3$	Reflection	15  keV	Exp
	$\mathbf{H_3}^+ + \mathbf{H_2O}$	Reflection	15  keV	Exp
	$\mathbf{H}_{3}^{+} + \mathbf{C}\mathbf{H}_{4}$	Reflection	15  keV	Exp
	$\mathbf{H}_{3}^{+} + \mathbf{N}\mathbf{H}_{3}$	Reflection	15  keV	Exp
	$\mathbf{N}_2{}^+ + \mathbf{H}_2\mathbf{O}$	Reflection	15  keV	Exp
	$\mathbf{N}_2{}^+ + \mathbf{C}\mathbf{H}_4$	Reflection	15  keV	Exp
	$\mathbf{N}_2^+ + \mathbf{N}\mathbf{H}_3$	Reflection	15  keV	Exp
	$\mathrm{He^{+}} + \mathrm{H_{2}O}$	Sputtering	15  keV	Exp
	$\mathrm{He^{+}}+\mathrm{CH}_{4}$	Sputtering	15  keV	Exp
	$He^+ + NH_3$	Sputtering	15  keV	Exp
	$N^+ + H_2O$	Sputtering	15 keV	Exp
	$N^+ + CH_4$	Sputtering	15 keV	Exp
	$\mathbf{N}^+ + \mathbf{N}\mathbf{H}_3$	Sputtering	15 keV	Exp
	$Ar' + H_2O$	Sputtering	15 keV	Exp
	$\mathbf{Ar}^+ + \mathbf{CH}_4$	Sputtering	15 keV	Exp
	$Ar^+ + NH_3$	Sputtering	15 keV	Exp
	$\mathbf{H}_{3}$ + $\mathbf{H}_{2}\mathbf{O}$	Sputtering	15 keV	Exp
	$\mathbf{H}_{3}$ ' + $\mathbf{C}\mathbf{H}_{4}$	Sputtering	15  keV	Exp
	$\mathbf{H}_{3}$ + $\mathbf{N}\mathbf{H}_{3}$	Sputtering	15 KeV	Exp E
	$\mathbf{N}_2 + \mathbf{H}_2 \mathbf{O}$ $\mathbf{N}_1 + \mathbf{O} \mathbf{H}_2$	Sputtering	15 KeV 15 keV	Exp
	$\mathbf{N}_2^+ + \mathbf{C}\mathbf{H}_4$ $\mathbf{N}_2^+ + \mathbf{N}\mathbf{H}_2$	Sputtering	15 keV 15 keV	Exp Evn
	112 + 1113	Spattering	15 KeV	Ехр
	tering spectra. Nucl. Instrum. Methods P He <sup>+</sup> + Si	hys. Res. B 256, 631 (2007) Reflection	270 keV	Th
	$\mathrm{He^{+}}$ + Ta	Reflection	270  keV	$\mathrm{Th}$
	$\mathrm{He^{+}}$ + $\mathrm{ZrO}_{2}$	Reflection	270  keV	$\mathrm{Th}$
1501.	L. G. Glazov, I. Pazsit Invariant-embedding an from surfaces. Nucl. Instrum. Methods P	d cognate kinetic descriptions hys. Res. B 256, 638 (2007)	of particle reflection/emission	
	e + Au	Reflection	100-4000  eV	$\mathrm{Th}$
1502.	A. Sindona, S. A. Rudi, S. Fermi edge singularities faces. Nucl. Instrum. Methods P	Maletta, R. A. Baragiola, G. Falcos <b>in ion-induced electron emis</b> hys. Res. B 257, 438 (2007)	one, P. Riccardi sion from plane metal sur-	
	$Ar^+ + Al$	Secondary Electron Emission	130-1000 $eV$	Th
1503.	D. Emfietzoglou, H. Nikjoo A comparison of secon water in the liquid and Nucl. Instrum. Methods P	o, A. Pathak, N. Sathish dary electron spectra from pr solid phases. hys. Res. B 257, 609 (2007)	roton-impact ionization on	
	$\mathrm{H^{+}} + \mathrm{H_{2}O}$	Secondary Electron Emission	$1 { m MeV}$	$\mathrm{Th}$
1504.	M. Minniti, M. Commisso, <b>The role of Al-Auger</b> el <b>slow</b> $Ne^+$ and $Na^+$ ions Nucl. Instrum. Methods P	A. Sindona, P. Barone, A. Bonan lectrons in kinetic electron en hys. Res. B 257, 618 (2007)	no, A. Oliva, P. Riccardi nission from Al surfaces by	

	$egin{array}{l} {f Ne^+} + {f Al} \ {f Na^+} + {f Al} \end{array}$	Secondary Electron Emission Secondary Electron Emission	$1.0-10 { m ~keV}$ $1.0-10 { m ~keV}$	Exp Exp
1505.	Q. Ran, D. Matsiev, D Direct translation-t of absolute vibration Nucl. Instrum. Method	9. J. Auerbach, A. M. Wodtke o-vibrational energy transfer of l nal excitation probabilities. ds Phys. Res. B 258, 1 (2007)	HCl on gold: Measurement	
	HCl + Au	Reflection	$0.59\text{-}1.37\;\mathrm{eV}$	Exp
1506.	S. Wethekam, H. Wint Study on interaction Nucl. Instrum. Method	er <b>ns of He atoms and ions with an</b> ds Phys. Res. B 258, 7 (2007)	Al(111) surface.	
	He + Al	Reflection	$0-20 \ \mathrm{keV}$	Exp
	$\mathrm{He^{+}} + \mathrm{Al}$	Reflection	0-20  keV	Exp
1507.	P. Rousseau, H. Khem Auger rates on NaC length. Nucl. Instrum. Method	liche, P. Roncin Cl(001), effect of the final state an ds Phys. Res. B 258, 13 (2007)	nd modeling via an effective	
	$He^+ + NaCl$	Reflection	1000  eV	Exp
	$F^+ + NaCl$	Reflection	1000 eV	Exp
	$Ne^+ + NaCl$	Reflection	1000  eV	Exp
	${ m He^+} + { m NaCl}$	Neutraliz., Ioniz., Dissoc.	1000  eV	Exp
	$\mathbf{F}^+ + \mathbf{NaCl}$	Neutraliz., Ioniz., Dissoc.	1000  eV	Exp
	${ m Ne^+} + { m NaCl}$	Neutraliz., Ioniz., Dissoc.	1000  eV	Exp
1508.	S. N. Markin, D. Prim <b>Neutralization of lo</b> Nucl. Instrum. Method	etzhofer, J. E. Valdes, E. Taglauer, P. w energy $He^+$ ions by Cu in the ds Phys. Res. B 258, 18 (2007)	Bauer Auger regime.	
	$\mathrm{He^{+}+Cu}$ $\mathrm{He^{+}+Cu}$	Reflection Neutraliz., Ioniz., Dissoc.	1.9-3.0 keV 1.9-3.0 keV	Exp Exp
1509.	M. S. Gravielle, J. E. M Axial grazing collisi Nucl. Instrum. Method	Miraglia <b>ons with insulator surfaces.</b> ds Phys. Res. B 258, 21 (2007)		
	$H^+ + LiF$	Reflection	100  keV	$^{\mathrm{Th}}$
	$H^+ + LiF$	Secondary Electron Emission	100  keV	$\mathrm{Th}$
1510.	M. Kato, R. Souda Energy spectrum s similarity to asymm Nucl. Instrum. Method	hape of low energy ion scatteri etric spectrum shape observed in ds Phys. Res. B 258, 28 (2007)	ng from insulators and its core level XPS from metals.	
	$\mathbf{H}^+ + \mathbf{Ar}$	Reflection	500  eV	$\mathrm{Th}$
1511.	S. P. Chenakin, R. Kol Influence of screenin Nucl. Instrum. Method	larova, S. N. Markin, D. Primetzhofer, <b>ng and electronic stopping on LE</b> ds Phys. Res. B 258, 32 (2007)	, P. Bauer IS spectra.	
	$\mathrm{He^{+}+Cu}$	Reflection	1-100  keV	Th
1512.	D. Primetzhofer, S. N. On the surface sens	Markin, R. Kolarova, M. Draxler, R. <b>itivity of angular scans in LEIS</b> .	Beikler, E. Taglauer, P. Bauer	

Nucl. Instrum. Methods Phys. Res. B 258, 36 (2007)

	$\mathrm{He^{+}}+\mathrm{Cu}$	Reflection	$1.8\text{-}88.0\;\mathrm{keV}$	Exp
1513.	K. Khalal-Kouache, A. C. C Monte Carlo simulation $He^+$ ions by an amorpho Nucl. Instrum. Methods Ph	Chami, M. Boudjema, C. Benazeth of charge exchange processes ous silicon surface. ys. Res. B 258, 40 (2007)	in the scattering of 4 keV	
	$He^+ + Si$	Reflection	4  keV	$\mathrm{Th}$
1514.	R. Sandoval, F. A. Gutierrez Surface-plasmon-assisted Nucl. Instrum. Methods Ph	z, H. Jouin <b>d electron capture in</b> $H^+/Mg$ ys. Res. B 258, 44 (2007)	and $H^+/Al$ collisions.	
	$\mathrm{H^{+}}+\mathrm{Mg}$	Reflection		$\mathrm{Th}$
	$H^+ + Al$	Reflection		$\mathrm{Th}$
	$\mathrm{H^{+}}+\mathrm{Mg}$	Neutraliz., Ioniz., Dissoc.		Th
	$H^+ + Al$	Neutraliz., Ioniz., Dissoc.		Th
1515.	S. Wethekam, H. Winter Effect of thermal vibratic from crystal surfaces. Nucl. Instrum. Methods Ph	ons and their correlations on g ys. Res. B 258, 48 (2007)	grazing scattering of atoms	
	He + Al	Reflection		Th
1516.	F. B. Dunning, S. Wethekan Charge transfer rates for surfaces. Nucl. Instrum. Methods Ph	n, H. R. Dunham, J. C. Lancaster or xenon Rydberg atoms at ys. Res. B 258, 61 (2007)	r metal and semiconductor	
	Xe + Au	Neutraliz., Ioniz., Dissoc.	300  deg K	Exp
1517.	S. Lederer, H. Winter, HP. V Energy loss and electron atoms from an Al(111) s Nucl. Instrum. Methods Ph	Winter n emission during grazing so surface. ys. Res. B 258, 87 (2007)	cattering of fast noble gas	
	He + Al	Beflection	1 2-12 keV	$\mathbf{T}\mathbf{h}$
	Ne + Al	Reflection	1.2-12  keV	Th
	Ar + Al	Reflection	1.2-12  keV	Th
	He + Al	Secondary Electron Emission	$1.2-12 { m keV}$	$\mathrm{Th}$
	Ne + Al	Secondary Electron Emission	$1.2-12 { m keV}$	$\mathrm{Th}$
	Ar + Al	Secondary Electron Emission	1.2-12  keV	Th
1518.	H. Rothard, R. Moshammer Differential multi-electro penetrating carbon foils. Nucl. Instrum. Methods Ph	y. Res. B 258, 91 (2007)	n, S. Hagmann, T.J.M. Zouros <b>bighly charged gold ions</b>	
	$Au^{24+} + Al$	Secondary Electron Emission	$11 { m MeV/u}$	Exp
1519.	M. Minniti, M. Commisso, A	A. Sindona, A. Bonanno, A. Oliva	, P. Riccardi	
	Electron emission in the Nucl. Instrum. Methods Ph	interaction of 300 eV $Na^+$ ic ys. Res. B 258, 96 (2007)	ons with Al surfaces.	

1520. F. Haranger, Ph. Boduch, H. Lebius, L. Maunoury, H. Rothard, B. Ban-d'Etat Electron yields from uranium dioxide under impact of slow Xe ions. Nucl. Instrum. Methods Phys. Res. B 258, 99 (2007)

$Xe^{10+} + UO_2$	Secondary Electron Emission	$0.03-81 \mathrm{~keV}$	Exp
$Xe^{15+} + UO_2$	Secondary Electron Emission	$0.03-81 \mathrm{~keV}$	Exp
$Xe^{25+} + UO_2$	Secondary Electron Emission	$0.03-81 \mathrm{~keV}$	Exp
$Xe^{10+} + UO_2$	Sputtering	$0.03-81 \mathrm{~keV}$	Exp
$Xe^{15+} + UO_2$	Sputtering	$0.03-81 \mathrm{~keV}$	Exp
$\mathbf{X}\mathbf{e}^{25+} + \mathbf{UO}_2$	Sputtering	$0.03-81 \mathrm{~keV}$	Exp

1521. F. J. Kontur, J. C. Lancaster, F. B. Dunning

Electron ejection by  $He^+$  ion impact at rare-gas films: Energy- and spin-resolved studies.

Nucl. Instrum. Methods Phys. Res. B 258, 104 (2007)

$\mathrm{He^{+}} + \mathrm{Ar}$	Secondary Electron Emission	10-500  eV	$\operatorname{Exp}$
$\mathrm{He^{+}}+\mathrm{Kr}$	Secondary Electron Emission	10-500  eV	$\operatorname{Exp}$
$\mathrm{He^{+}} + \mathrm{Xe}$	Secondary Electron Emission	10-500  eV	$\operatorname{Exp}$

1522. A. M. Borisov, E. S. Mashkova

Ion beam-induced electron emission from carbon-based materials. Nucl. Instrum. Methods Phys. Res. B 258, 109 (2007)

$N_2^+ + C$	Secondary Electron Emission	30  keV	Exp

1523. Y. Zhao, G. Xiao, X. Zhang, Z. Yang, Y. Zhang, W. Zhan, X. Chen, F. Li
X-ray emission of hollow atoms formed by highly charged argon and xenon ions below a beryllium surface.
Nucl. Instrum. Methods Phys. Res. B 258, 121 (2007)

$Ar^{16+-18+} + Be$	Surface Interactions	204-450  keV	Exp
$Xe^{28+-30+} + Be$	Surface Interactions	$204\text{-}450~\mathrm{keV}$	Exp
$Ar^{16+18+} + Be$	Neutraliz., Ioniz., Dissoc.	$204\text{-}450~\mathrm{keV}$	Exp
$Xe^{28+-30+} + Be$	Neutraliz., Ioniz., Dissoc.	204-450  keV	Exp

1524. M. Unipan, A. Robin, R. Morgenstern, R. Hoekstra Investigation of spin-polarized surfaces with multiple electron capture spectroscopy. Nucl. Instrum. Methods Phys. Res. B 258, 125 (2007)

$He^{2+} + Fe$	Secondary Electron Emission	100  eV	Exp
$\mathrm{He}^{2+} + \mathrm{Ni}$	Secondary Electron Emission	100  eV	Exp

1525. B. Solleder, C. Lemell, K. Tokesi, J. Burgdorfer Electron emission by  $N^{6+}$  ions scattered at a magnetized iron surface. Nucl. Instrum. Methods Phys. Res. B 258, 130 (2007)

$N^{6+} +$	Ni	Secondary Electron Emission	Th

1526. M. Tona, H. Watanabe, S. Takahashi, N. Nakamura, N. Yoshiyasu, M. Sakurai, C. Yamada, S. Ohtani
Potential sputtering from a Si surface by very highly charged ion impact. Nucl. Instrum. Methods Phys. Res. B 258, 163 (2007)

$\mathbf{I}^{50+} + \mathbf{Si}$	Sputtering	150  keV	$\operatorname{Exp}$
$\mathbf{I}^{50+} + \mathbf{SiO}_2$	Sputtering	150  keV	$\operatorname{Exp}$

1527.	Y. Sakuma, N. Shinde, M. <b>Effect of residual oxyge</b> Nucl. Instrum. Methods F	Kato, S. Yagi, K. Soda en in Si(111)-7 x 7 surface on Phys. Res. B 258, 230 (2007)	$Si^+$ and $Si^{2+}$ sputter yields.	
	Ar + Si	Sputtering	11  keV	Exp
1528.	F. W. Meyer, H. Zhang, L Chemical sputtering o atomic and molecular I Nucl. Instrum. Methods F	. I. Vergara, H. F. Krause <b>f room temperature ATJ gra</b> <b>D ions.</b> Phys. Res. B 258, 264 (2007)	aphite and HOPG by slow	
	$egin{array}{lll} {f H}^+ + {f C} \ {f H}_2^+ + {f C} \ {f H}_3^+ + {f C} \ {f D}^+ + {f C} \ {f D}_2^+ + {f C} \ {f D}_3^+ + {f C} \end{array}$	Sputtering Sputtering Sputtering Sputtering Sputtering Sputtering	5-300 eV 5-300 eV 5-300 eV 5-300 eV 5-300 eV 5-300 eV	Exp Exp Exp Exp Exp Exp
1529.	M. Reinelt, Ch. Linsmeier Enhanced room tempe titanium and tantalum Nucl. Instrum. Methods F	erature erosion of ultra-thin by deuterium ions. Phys. Res. B 258, 270 (2007)	carbon films on beryllium,	
	$egin{array}{lll} \mathbf{H}_3^+ + \mathbf{C} \ \mathbf{D}_3^+ + \mathbf{C} \end{array}$	Sputtering Sputtering	1-1.3 eV 1-1.3 eV	Exp Exp
1530.	C. O. Reinhold, P. S. Krst <b>Time scales of chemica</b> Nucl. Instrum. Methods F	ic, S. J. Stuart <b>l sputtering of carbon.</b> Phys. Res. B 258, 274 (2007)		
	$egin{array}{ll} \mathbf{H} + \mathbf{C} \ \mathbf{H}_2 + \mathbf{C} \ \mathbf{D} + \mathbf{C} \ \mathbf{D}_2 + \mathbf{C} \end{array}$	Sputtering Sputtering Sputtering Sputtering	7.5-60 eV 7.5-60 eV 7.5-60 eV 7.5-60 eV	Exp Exp Exp Exp
1531.	W. Schustereder, B. Rasul Sticking coefficient and tungsten surfaces. Nucl. Instrum. Methods F	, N. Endstrasser, F. Zappa, V. Gr SIMS of hydrocarbons on fus Phys. Res. B 258, 278 (2007)	ill, P. Scheier, T. D. Maerk ion relevant plasma-sprayed	
	$\mathbf{CH}_{3}^{+} + \mathbf{W} \\ \mathbf{CD}_{3}^{+} + \mathbf{W}$	Adsorption, Desorption Adsorption, Desorption	0-100 eV 0-100 eV	$\operatorname{Exp}$
1532.	A. Lawicki, B. Pranszke, A Balmer line emission fr on a tungsten surface. Nucl. Instrum. Methods F	A. Kowalski, Ch. Ottinger om low-energy impact of $H^+$ , Phys. Res. B 259, 861 (2007)	$H_2^+$ and $H_3^+$ ions in a beam	
	$egin{array}{lll} \mathbf{H}^+ + \mathbf{W} \ \mathbf{H}_2^+ + \mathbf{W} \ \mathbf{H}_3^+ + \mathbf{W} \end{array}$	Reflection Reflection Reflection	30-1000 eV 30-1000 eV 30-1000 eV	Exp Exp Exp
1533.	A. Hentz, G. S. Parkinson Schiwietz, P. Bailey, T.C. Inelastic energy loss in	, A. J. Window, P. D. Quinn, D. Q. Noakes a <b>100-keV</b> H <sup>+</sup> scattering from	P. Woodruff, P. L. Grande, G. a single atoms: Theory and	

**experiment for K, Rb, and Cs.** Phys. Rev. B 74, 125408 (2006)

$H^+ + K$	Reflection	100  keV	E/T
$\mathrm{H^{+}}+\mathrm{Rb}$	Reflection	100  keV	E/T
$\mathrm{H^{+}}+\mathrm{Cs}$	Reflection	100  keV	E/T

1534. A. Sarasola, V. M. Silkin, A. Arnau

Role of surface states in Auger neutralization of  $He^+$  ions on Ag surfaces. Phys. Rev. B 75, 045104 (2007)

$egin{array}{lll} { m He^+} + { m Ag} \ { m He^+} + { m Ag} \end{array}$	Reflection Neutraliz., Ioniz., Dissoc.	${ m E/T} { m E/T}$

1535. M. Minniti, M. Commisso, A. Sindona, E. Sicilia, A. Bonanno, P. Barone, R. A. Baragiola, P. Riccardi

Kinetic electron emission from Al surfaces by slow ions. Phys. Rev. B 75, 045424 (2007)

$Na^+ + Al$	Secondary Electron Emission	150-4000  eV	Exp
$Na^+ + Al$	Neutraliz., Ioniz., Dissoc.	150-4000  eV	Exp

1536. M. Fama, B. D. Teolis, D. A. Bahr, R. A. Baragiola Role of electron capture in ion-induced electronic sputtering of insulators. Phys. Rev. B 75, 100101 (2007)

$\mathbf{H}^+ + \mathbf{O}_2$	Sputtering	25-240  keV	Exp
	1 0		1

1537. D. Valdes, J. M. Blanco, V. A. Esaulov, R. C. Monreal Azimuth-dependent Auger neutralization of He<sup>+</sup> on Ag(111) and (110) surfaces. Phys. Rev. B 75, 165404 (2007)

$\mathrm{He^{+}}+\mathrm{Ag}$	Reflection	4  keV	$\mathrm{Th}$
$\mathrm{He^{+}}+\mathrm{Ag}$	Neutraliz., Ioniz., Dissoc.	4  keV	$\mathrm{Th}$

Exp

1538. Y. Hatano, A. Livshits, A. Busnyuk, M. Nomura, K. Hasizume, M. Sugisaki, Y. Nakamura, N. Ohyabu, K. Watanabe Kinetics of dissociative absorption of hydrogen through Nb surface covered by oxygen.

Phys. Scr. T108, 14 (2004)

1539. V. Kh. Alimov

#### Deuterium retention in pure and mixed plasma facing materials. Phys. Scr. T108, 46 (2004)

$H^+ + Be$	Chemical Reactions	3-10  keV	Exp
$H^+ + C$	Chemical Reactions	3-10  keV	Exp
$\rm H^+ + BeO$	Chemical Reactions	3-10  keV	Exp
$H^+ + WO_3$	Chemical Reactions	3-10  keV	Exp
$H^+ + WC$	Chemical Reactions	3-10  keV	Exp
$D^+ + Be$	Chemical Reactions	3-10  keV	Exp
$D^+ + C$	Chemical Reactions	3-10  keV	Exp
$\mathrm{D^{+}+BeO}$	Chemical Reactions	3-10  keV	Exp
$D^+ + WO_3$	Chemical Reactions	3-10  keV	Exp
$D^+ + WC$	Chemical Reactions	3-10  keV	Exp
$H^+ + Be$	Trapping, Detrapping	3-10  keV	Exp
$H^+ + C$	Trapping, Detrapping	3-10  keV	Exp
$\rm H^+ + BeO$	Trapping, Detrapping	3-10  keV	Exp

$H^+ + WO_3$	Trapping, Detrapping	3-10  keV	Exp
$H^+ + WC$	Trapping, Detrapping	3-10  keV	Exp
$\mathrm{D^{+}+Be}$	Trapping, Detrapping	3-10  keV	Exp
$D^+ + C$	Trapping, Detrapping	3-10  keV	Exp
$\mathrm{D^{+}+BeO}$	Trapping, Detrapping	3-10  keV	Exp
$D^+ + WO_3$	Trapping, Detrapping	3-10  keV	Exp
$D^+ + WC$	Trapping, Detrapping	3-10  keV	Exp

1540. L. Begrambekov, O. Buzhinsky, A. Gordeev, E. Miljaeva, P. Leitkin, P. Shigin TDS investigation of hydrogen retention in graphites and carbon based materials. Phys. Scr. T108, 72 (2004)

$H_2^+ + C$	Trapping, Detrapping	200  eV	Exp
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1541. T. M. Orlando, D. Oh, M. T. Sieger, C. D. Lane Electron collisions with complex targets: Diffraction effects in stimulated desorption. Phys. Scr. T110, 256 (2004)

e + Si	Desorption	20-30  eV	Exp
e + Cl	Desorption	20-30  eV	$\operatorname{Exp}$
e + Cl + Si	Desorption	20-30  eV	Exp

1542. M. T. Suter, P. U. Andersson, J.B.C. Pettersson Molecular beam studies of carbon monoxide interactions with water ice. Phys. Scr. T110, 350 (2004)

$CO + H_2O$	Desorption	0.1-0.9  eV	Exp
$CO + H_2O$	Reflection	0.1-0.9  eV	Exp

1543. B. Ban-d'Etat, F. Haranger, Ph. Boduch, S. Bouffard, H. Lebius, L. Maunoury, J. Y. Pacquet, H. Rothard, C. Clerc, F. Garrido, L. Thome, R. Hellhammer, Z. Pesic, N. Stolterfoht Potential and kinematic sputtering of  $UO_2$  by slow highly charged ions. Phys. Scr. T110, 389 (2004)

$\mathbf{X}\mathbf{e}^{10+} + \mathbf{U}\mathbf{O}_2$	Sputtering	8-81  keV	Exp
$\mathbf{X}\mathbf{e}^{15+} + \mathbf{UO}_2$	Sputtering	8-81  keV	Exp
$\mathbf{X}\mathbf{e}^{25+} + \mathbf{UO}_2$	Sputtering	$8-81 \mathrm{~keV}$	Exp

1544. C. Diaz, H. F. Busnengo, P. Riviere, F. Martin, A. Salin, P. Nieto, D. Farias Theoretical and experimental study of the scattering of  $H_2$  from Pd(111). Phys. Scr. T110, 394 (2004)

$H_2 + Pd$	Reflection	$100\text{-}150~\mathrm{MeV}$	$\mathrm{E}/\mathrm{T}$
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1545. M. S. Gravielle Grazing ion-surface collisions. Phys. Scr. T110, 398 (2004)

$H^+ + Al$	Secondary Electron Emission	100  keV	Exp
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<sup>1546.</sup> F. W. Meyer, H. F. Krause, V. A. Morozov, C. R. Vane, L. I. Vergara Site-specific neutralization of slow multicharged ions incident on solid surfaces. Phys. Scr. T110, 403 (2004)

$\mathbf{F}^{7+} + \mathbf{Au}$	Reflection	4-5  keV	Exp
$\mathbf{F}^{7+} + \mathbf{RbI}$	Reflection	4-5  keV	Exp
$Ne^{8+} + Au$	Reflection	4-5  keV	Exp
$Ne^{8+} + RbI$	Reflection	4-5  keV	Exp
$Ar^{2+} + Au$	Reflection	4-5  keV	Exp
$Ar^{2+} + RbI$	Reflection	4-5  keV	Exp
$Ar^{11+} + Au$	Reflection	4-5  keV	Exp
$Ar^{11+} + RbI$	Reflection	4-5  keV	Exp
$\mathbf{F}^{7+} + \mathbf{Au}$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp
$\mathbf{F}^{7+} + \mathbf{RbI}$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp
$Ne^{8+} + Au$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp
$Ne^{8+} + RbI$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp
$Ar^{2+} + Au$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp
$Ar^{2+} + RbI$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp
$Ar^{11+} + Au$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp
$Ar^{11+} + RbI$	Neutraliz., Ioniz., Dissoc.	4-5  keV	Exp

1547. A. A. Haasz, J. W. Davis

Erosion of carbon in dual-beam experiments: An overview. Phys. Scr. T111, 68 (2004)

H + C	Sputtering	$100-300   {\rm eV}$	Exp
$H^+ + C$	Sputtering	100-300  eV	$\operatorname{Exp}$
$\mathrm{He^{+}}+\mathrm{C}$	Sputtering	100-300  eV	$\operatorname{Exp}$
$C^+ + C$	Sputtering	100-300  eV	$\operatorname{Exp}$
$O^+ + C$	Sputtering	100-300  eV	$\operatorname{Exp}$
$Ar^+ + C$	Sputtering	100-300  eV	$\operatorname{Exp}$
$D^+ + C$	Sputtering	100-300  eV	$\operatorname{Exp}$

1548. M. Balden, E. de Juan Pardo, H. Maier, P. Starke, U. Fantz Chemical erosion behaviour of doped graphites under hydrogen impact: A comparison of ion beam experiments and planar inductively coupled RF plasmas. Phys. Scr. T111, 123 (2004)

$H^+ + C$	Sputtering	$30  \mathrm{eV}$	Exp
$\mathrm{H^{+}}+\mathrm{SiC}$	Sputtering	$30 \ \mathrm{eV}$	Exp
$\mathbf{H}^+ + \mathbf{TiC}_4$	Sputtering	$30 \ \mathrm{eV}$	$\operatorname{Exp}$
$\mathbf{H}^+ + \mathbf{VC}_4$	Sputtering	$30 \ \mathrm{eV}$	$\operatorname{Exp}$
$\mathbf{H}^+ + \mathbf{W} \mathbf{C}_4$	Sputtering	$30 \ \mathrm{eV}$	$\operatorname{Exp}$
$\mathrm{H^{+}}+\mathrm{ZrC}_{4}$	Sputtering	$30 \ \mathrm{eV}$	$\operatorname{Exp}$
$D^+ + C$	Sputtering	$30 \ \mathrm{eV}$	Exp
$D^+ + SiC$	Sputtering	$30 \ \mathrm{eV}$	$\operatorname{Exp}$
$\mathbf{D}^+ + \mathbf{TiC}_4$	Sputtering	$30 \ \mathrm{eV}$	$\operatorname{Exp}$
$\mathbf{D}^+ + \mathbf{V}\mathbf{C}_4$	Sputtering	$30 \ \mathrm{eV}$	$\operatorname{Exp}$
$\mathbf{D}^+ + \mathbf{W} \mathbf{C}_4$	Sputtering	$30 \ \mathrm{eV}$	Exp
$\mathbf{D}^+ + \mathbf{ZrC}_4$	Sputtering	$30 \ \mathrm{eV}$	Exp

# 1549. E. Salonen

Overview of the atomistic modeling of the chemical erosion of carbon. Phys. Scr. T111, 133  $\left(2004\right)$ 

$H^+ + C$	Sputtering	2-5  keV	E/T
$D^+ + C$	Sputtering	2-5  keV	E/T

### 1550. D. A. Alman, D. N. Ruzic

Molecular dynamics simulation of hydrocarbon reflection and dissociation coefficients from fusion-relevant carbon surfaces. Phys. Scr. T111, 145 (2004)

C + C	Reflection	0.01-10  eV	$\mathrm{Th}$
CH + C	Reflection	0.01-10  eV	$\mathrm{Th}$
$\mathbf{CH}_2 + \mathbf{C}$	Reflection	0.01-10  eV	$\mathrm{Th}$
$CH_3 + C$	Reflection	0.01-10  eV	$\mathrm{Th}$
$\mathbf{CH}_4 + \mathbf{C}$	Reflection	0.01-10  eV	$\mathrm{Th}$
$\mathbf{C}_2\mathbf{H}_2 + \mathbf{C}$	Reflection	0.01-10  eV	$\mathrm{Th}$
$\mathbf{C}_2 + \mathbf{C}$	Reflection	0.01-10  eV	$\mathrm{Th}$
$C_2H + C$	Reflection	0.01-10  eV	$\mathrm{Th}$
$C_2H_3 + C$	Reflection	0.01-10  eV	Th

## 1551. W. Jacob, C. Hopf, M. Schlueter

Chemical sputtering of carbon materials due to combined bombardment by ions and atomic hydrogen.

Phys. Scr. T124, 32 (2006)

Sputtering	10-1000  eV	E/T
Sputtering	10-1000  eV	E/T
	Sputtering Sputtering Sputtering Sputtering Sputtering	Sputtering         10-1000 eV           Sputtering         10-1000 eV

#### 1552. J. Roth

Status of knowledge of chemical erosion of carbon and critical issues for extrapolation to ITER.

Phys. Scr. T124, 37 (2006)

C + C	Adsorption, Desorption	$1 - 10^4 {\rm eV}$	Exp
CH + C	Adsorption, Desorption	$1 - 10^4 {\rm \ eV}$	Exp
$\mathbf{CH}_2 + \mathbf{C}$	Adsorption, Desorption	$1 - 10^4 {\rm \ eV}$	Exp
$CH_3 + C$	Adsorption, Desorption	$1 - 10^4 {\rm \ eV}$	Exp
$CH_4 + C$	Adsorption, Desorption	$1 - 10^4 {\rm \ eV}$	Exp
$C_2H_5 + C$	Adsorption, Desorption	$1 - 10^4 {\rm \ eV}$	Exp
$C_2H + C$	Adsorption, Desorption	$1 - 10^4 {\rm ~eV}$	Exp
$C_2H_3 + C$	Adsorption, Desorption	$1-10^4 {\rm ~eV}$	Exp
$H^+ + C$	Sputtering	$1-10^4 {\rm ~eV}$	Exp
$D^+ + C$	Sputtering	$1 - 10^4 {\rm ~eV}$	Exp

#### 1553. F. W. Meyer, L. I. Vergara, H. F. Krause

Recent ORNL measurements of chemical sputtering of ATJ graphite by slow atomic and molecular D ions.

Phys. Scr. T124, 44 (2006)

$H^+ + C$	Sputtering	3-13  eV	Exp
${ m H_2}^+ + { m C}$	Sputtering	3-13  eV	Exp
$H_3^+ + C$	Sputtering	3-13  eV	Exp
$D^+ + C$	Sputtering	3-13  eV	Exp
$\mathbf{D}_2^+ + \mathbf{C}$	Sputtering	3-13  eV	Exp
$\mathbf{D}_3^+ + \mathbf{C}$	Sputtering	3-13  eV	Exp

#### 1554. K. Nordlund

Atomistic simulations of plasma-wall interactions in fusion reactors. Phys. Scr. T124, 53 (2006)

$H^+ + C$	Sputtering	1-100 eV	$\mathrm{Th}$
$D^+ + C$	Sputtering	1-100  eV	$\mathrm{Th}$

# 1555. J. Marian, L. A. Zepeda-Ruiz, G. H. Gilmer, E. M. Bringa, T. Rognlien Simulations of carbon sputtering in amorphous hydrogenated samples. Phys. Scr. T124, 65 (2006)

$\mathrm{H^{+}+C}$	Sputtering	$10-150 {\rm ~eV}$	$\mathrm{Th}$
$D^+ + C$	Sputtering	10-150  eV	$\mathrm{Th}$
$T^+ + C$	Sputtering	$10-150 {\rm ~eV}$	$\mathrm{Th}$

1556. V. Kh. Alimov, J. Roth

Hydrogen isotope retention in plasma-facing materials: Review of recent experimental results.

Phys. Scr. T128, 6 (2007)

$H^+ + C$	Surface Interactions	$150-1500 {\rm ~eV}$	Exp
$\mathbf{H}^+ + \mathbf{W}$	Surface Interactions	$150\text{-}1500\;\mathrm{eV}$	Exp
$D^+ + C$	Surface Interactions	$150\text{-}1500\;\mathrm{eV}$	$\operatorname{Exp}$
$D^+ + W$	Surface Interactions	$150\text{-}1500\;\mathrm{eV}$	$\operatorname{Exp}$
$H^+ + C$	Trapping, Detrapping	$150\text{-}1500\;\mathrm{eV}$	Exp
$\mathbf{H}^+ + \mathbf{W}$	Trapping, Detrapping	$150\text{-}1500\;\mathrm{eV}$	Exp
$D^+ + C$	Trapping, Detrapping	$150\text{-}1500\;\mathrm{eV}$	Exp
$D^+ + W$	Trapping, Detrapping	$150\text{-}1500\;\mathrm{eV}$	$\operatorname{Exp}$

1557. F. W. Meyer, P. S. Krstic, L. I. Vergara, H. F. Krause, C. O. Reinhold, S. J. Stuart Low energy chemical sputtering of ATJ graphite by atomic and molecular deuterium ions.
Phys. 50 (2007)

Phys. Scr. T128, 50 (2007)

$H^+ + C$	Sputtering	$5-180  \mathrm{eV}$	E/T
$\mathbf{H}_{2}^{+} + \mathbf{C}$	Sputtering	$5-180  {\rm eV}$	É/T
$H_3^+ + C$	Sputtering	$5-180  {\rm eV}$	É/T
$D^+ + C$	Sputtering	5-180  eV	E/T
$\mathbf{D}_2^+ + \mathbf{C}$	Sputtering	$5-180  {\rm eV}$	E/T
$D_3^+ + C$	Sputtering	$5-180  {\rm eV}$	E/T

1558. K. Heinola, T. Ahlgren, E. Vainonen-Ahlgren, J. Likonen, J. Keinonen Deuterium irradiation-induced defect concentrations in tungsten. Phys. Scr. T128, 91 (2007)

$\mathbf{H}^+ + \mathbf{W}$	Trapping, Detrapping	5-30  keV	Exp
$D^+ + W$	Trapping, Detrapping	5-30  keV	Exp

1559. W. M. Shu, A. Kawasuso, Y. Miwa, E. Wakai, G.-N. Luo, T. Yamanishi
Microstructure dependence of deuterium retention and blistering in the nearsurface region of tungsten exposed to high flux deuterium plasmas of 38 eV at 315 K.
Phys. Ser. T128, 96 (2007)

Phys. Scr. T128, 96 (2007)

$\mathbf{H}_{2}^{+} + \mathbf{W}$	Trapping, Detrapping	$76  \mathrm{eV}$	Exp
$\mathbf{D}_2{}^+ + \mathbf{W}$	Trapping, Detrapping	$76  \mathrm{eV}$	Exp

1560. M. Reinelt, Ch. Linsmeier

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Temperature programmed desorption of 1 keV deuterium implanted into clean beryllium.
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Phys. Scr. T128, 111 (2007)

$\mathrm{H^{+}}+\mathrm{Be}$	Trapping, Detrapping	$1 {\rm ~keV}$	Exp
$\mathrm{D^{+}+Be}$	Trapping, Detrapping	$1 {\rm ~keV}$	Exp

1561. M. Balden, C. Adelhelm

Characterization and erosion of metal-containing carbon films. Phys. Scr. T128, 121 (2007)

	$egin{array}{lll} { m H_3}^+ + { m C} \ { m D_3}^+ + { m C} \end{array}$	Sputtering Sputtering	30-600 eV 30-600 eV	$\begin{array}{c} Exp\\ Exp \end{array}$
1562.	K.O.E. Henriksson, K. Voert Sticking of atomic hydro, Surf. Sci. 600, 3167 (2006)	ler, S. Dreissigacker, K. Nordlund gen on the tungsten (001) su	d, J. Keinonen <b>rface.</b>	
	H + W	Adsorption, Desorption	$3x10^{-3} - 10 \text{ eV}$	$\mathrm{Th}$
1563.	SG. Wang, DB. Cao, YV $CH_4$ dissociation on Ni se Surf. Sci. 600, 3226 (2006)	V. Li, J. Wang, H. Jiao urfaces: Density functional tl	heory study.	
	$CH_4 + Ni$	Neutraliz., Ioniz., Dissoc.		$\mathrm{Th}$
1564.	I. Nakamura, Y. Kobayashi, Adsorption behavior and Surf. Sci. 600, 3235 (2006)	H. Hamada, T. Fujitani reaction properties of NO a	nd CO on Rh (111).	
	m CO + Rh NO + Rh	Adsorption, Desorption Adsorption, Desorption		${ m E/T} { m E/T}$
1565.	A. Al-Halabi, P. C. Sanfelix, <b>Protons colliding with ice</b> Surf. Sci. 600, 4247 (2006)	S. Holloway, GJ. Kroes, G. R. e: Bouncing, sticking, splash	Darling ing.	
	$\mathrm{H^{+}}$ + $\mathrm{H_{2}O}$	Adsorption, Desorption	0-4 eV	$\mathrm{Th}$
	$\mathrm{H^{+}+H_{2}O}\ \mathrm{H^{+}+H_{2}O}$	Desorption Sputtering	0-4 eV 0-4 eV	Th Th
1566.	M. Dapor Energy loss spectra of log by silicon dioxide. Surf. Sci. 600, 4728 (2006)	w primary energy $(E_0 \leq 1 \text{ ke})$	V) electrons backscattered	
	$\mathbf{e} + \mathbf{SiO}_2$	Reflection	$250\text{-}1000~\mathrm{eV}$	Th
1567.	E. Molinari, M. Tomellini On the role of electron-he at metal surfaces. Surf. Sci. 601, 1 (2007)	ble pair excitation in the kine	tics of atom recombination	
	$\begin{array}{l} \mathrm{H} + \mathrm{Pt} \\ \mathrm{H} + \mathrm{D} + \mathrm{Ni} \\ \mathrm{H} + \mathrm{D} + \mathrm{Pt} \\ \mathrm{H}^+ + \mathrm{Ni} \\ \mathrm{H} + \mathrm{Pt} \\ \mathrm{H} + \mathrm{D} + \mathrm{Ni} \\ \mathrm{H} + \mathrm{D} + \mathrm{Pt} \\ \mathrm{H} + \mathrm{N} + \mathrm{Ni} \end{array}$	Neutraliz., Ioniz., Dissoc. Neutraliz., Ioniz., Dissoc. Neutraliz., Ioniz., Dissoc. Neutraliz., Ioniz., Dissoc. Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping Trapping, Detrapping		Th T
1568.	B. Obreshkov, U. Thumm "Step-up" versus "step-d on free-electron vicinal m Surf. Sci. 601, 622 (2007)	lown" scattering asymmetry i netal surfaces.	in the neutralization of $H^-$	
	$egin{array}{ll} \mathrm{H}^- + \mathrm{Cu} \ \mathrm{H}^- + \mathrm{Cu} \end{array}$	Reflection Neutraliz., Ioniz., Dissoc.	50 eV 50 eV	Th Th

1569. A. Sindona, S. A. Rudi, S. Maletta, R. A. Baragiola, G. Falcone, P. Riccardi Auger electron emission from metals induced by low energy ion be Effect of the band structure and Fermi edge singularity. Surf. Sci. 601, 1205 (2007)			cone, P. Riccardi v energy ion bombardment: rity.	
	$Ar^+ + Al$	Secondary Electron Emission	130-1000 $eV$	$\mathrm{Th}$
1570.	M. Kurahashi, X. Sun, Y. Low energy secondary servation of He* spin Surf. Sci. 601, 1371 (200	7. Yamauchi y electrons ejected by metastab dependence. )7)	ele helium (He*) beam: Ob-	
	He + Fe	Secondary Electron Emission		Exp
1571.	K. Yamamoto, T. Shibat Secondary electron en Vacuum 81, 788 (2007)	ta, N. Ogiwara, M. Kinsho mission yields from the J-PARC	C RCS vacuum components.	
	e + TiN	Secondary Electron Emission	$0.5-5.0 \mathrm{keV}$	Exp
1572. Suharyanto, S. Michizo Secondary electron of Vacuum 81, 799 (2007)		o, Y. Saito, Y. Yamano, S. Kobayas mission of TiN-coated alumina	hi ceramics.	
	$\mathbf{e} + \mathbf{Al}_2 \mathbf{O}_3$ $\mathbf{e} + \mathbf{TiN}$	Secondary Electron Emission Secondary Electron Emission	0.5-5.0 keV 0.5-5.0 keV	Exp
1573.	M. Terasawa <b>Coulomb explosion fo</b> Vacuum 81, 142 (2006)	ollowing electronic excitation in	ion-solid interaction.	
	$Xe^{15+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$Xe^{15+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$Xe^{15+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$Xe^{15+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$Xe^{27+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$Xe^{27+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$\mathrm{Xe}^{27+} + \mathrm{Ni}$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$Xe^{27+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$Xe^{28+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$Xe^{28+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$Xe^{28+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
	$Xe^{28+} + Cu$	Sputtering	$300 \text{ keV} \cdot 80 - 10^4 \text{ keV}$	Evn

$Xe^{27+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{27+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{28+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{28+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{28+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{28+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{31+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{31+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{31+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{31+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{35+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{35+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{35+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{35+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{40+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{40+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{40+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{40+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{44+} + Al$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{44+} + Si$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{44+} + Ni$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp
$Xe^{44+} + Cu$	Sputtering	$300 \text{ keV}; 80 - 10^4 \text{ keV}$	Exp

1574. A. A. Almulhem				
Calculation of neutral fraction for ion neutralization at metal surfaces by bulk-				
plasmon excitation	on.			
Vacuum 81, 150 (20	06)			
			<b>m</b> 1	
$\mathbf{H}^+ + \mathbf{A}\mathbf{I}$	Neutraliz., Ioniz., Dissoc.	0.1-0.5  keV	Th	
$\mathbf{H}^+ + \mathbf{Al}$	Sputtering	0.1- $0.5  keV$	Th	
<ul> <li>1575. K. Pyszniak, A. Drozdziel, M. Turek, A. Wojtowicz, J. Sielanko</li> <li>Secondary ion emission from Ti and Si targets induced by medium energy Ar<sup>+</sup></li> <li>ion bombardment – Experiment and computer simulation.</li> <li>Vacuum 81, 1145 (2007)</li> </ul>				

$Ar^+ + Si$	Sputtering	20-30  keV	E/T
$Ar^+ + Ti$	Sputtering	20-30 keV	E/T

1576. Lj. D. Nedeljkovic, N. N. Nedeljkovic, D. K. Bozanic Ionization distances of multiply charged Rydberg ions approaching solid surfaces. Phys. Rev. A 74, 032901 (2006)

$C^{5+} + Al$	Neutraliz., Ioniz., Dissoc.	$v=10^{-5}$ - 1 a.u.	$\mathrm{Th}$
$N^{6+} + Al$	Neutraliz., Ioniz., Dissoc.	$v=10^{-5}$ - 1 a.u.	$\mathrm{Th}$
$O^{7+} + Al$	Neutraliz., Ioniz., Dissoc.	$v=10^{-5}$ - 1 a.u.	$\mathrm{Th}$
$Ar^{17+} + Al$	Neutraliz., Ioniz., Dissoc.	$v=10^{-5}$ - 1 a.u.	$\mathrm{Th}$

# 3.4 Data Collection, Bibliographic and Progress Report

1577. J. Woodall, M. Agundez, A. J. Markwick-Kemper, T. J. Millar The UMIST database for astrochemistry 2006. Astron. Astrophys. 466, 1196 (2007)

A + A + Al Data Collection, Bibliography	Th
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# 3.5 Fusion Research of General Interest

1578. O. Novotny, R. Plasil, A. Pysanenko, I. Korolov, J. Glosik
The recombination of D<sub>3</sub><sup>+</sup> and D<sub>5</sub><sup>+</sup> ions with electrons in deuterium containing plasma.
J. Phys. B 39, 2561 (2006)

$\mathbf{e} + \mathbf{H}_3^+ + \mathbf{A} \mathbf{l}$	Fusion Research of Gen. Interest 130-300 K	Exp
$\mathbf{e} + \mathbf{D}_3^+ + \mathbf{Al}$	Fusion Research of Gen. Interest 130-300 K	Exp
$\mathbf{e} + \mathbf{H}_5^+ + \mathbf{Al}$	Fusion Research of Gen. Interest 130-300 K	Exp
$\mathbf{e} + \mathbf{D}_5^+ + \mathbf{A} \mathbf{l}$	Fusion Research of Gen. Interest 130-300 ${\rm K}$	Exp

# 3.6 Particle Beam-Matter Interactions

1579. M. N. Faraggi, M. S. Gravielle, M. Alducin, J. I. Juaristi, V. M. Silkin Band-structure-based collisional model for electronic excitations in ion-surface collisions. Phys. Rev. A 72, 012901 (2005)

$\mathbf{H}^+ + \mathbf{Al} + \mathbf{Al}$ Part. Beam-Matter Interaction 100 keV	Th
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1580.	<ul> <li>P. L. Grande, A. Hentz, G. Schiwietz, D. Starodub, E. Garfunkel, T. Gustafsson</li> <li>Observation of collective inner-shell effects for protons backscattered from the</li> <li>Al(110) surface.</li> <li>Phys. Rev. A 72, 012902 (2005)</li> </ul>		
	$H^+ + Al + Al$	Part. Beam-Matter Interaction 98 keV	$\mathrm{E}/\mathrm{T}$
1581.	YH. Song, YN. Wang, Z. Vicinage effects in energy heavy molecular ions fro Phys. Rev. A 72, 012903 (2)	L. Miskovic y loss and electron emission during grazing scattering of m a solid surface. 005)	
	$\mathbf{N_{2}^{+}+C+Al}$	Part. Beam-Matter Interaction $100-400 \text{ keV/u}$	Th
1582.	G. A. Bocan, J. E. Miraglia <b>Plasmon decay mechanis</b> Phys. Rev. A 72, 042903 (2)	ems in proton-solid collisions. 005)	
	$H^+ + Na + Al$	Part. Beam-Matter Interaction 1-13 v(a.u.)	Th
	$H^+ + Mg + Al$	Part. Beam-Matter Interaction 1-13 v(a.u.)	Th
	$H^+ + K + Al$	Part. Beam-Matter Interaction 1-13 v(a.u.)	Th
1583.	O. N. Rosmej, A. Blazevic, Efremov, V. E. Fortov, A. F Charge state and stoppin Phys. Rev. A 72, 052901 (2) $Ca^{15+} + SiO_2 + Al$ $Ca^{16+} + SiO_2 + Al$	<ul> <li>S. Korostiy, R. Bock, D.H.H. Hoffmann, S. A. Pikuz Jr., V. P. ertman, T. Mutin, T. A. Pikuz, A. Ya. Faenov</li> <li>ag dynamics of fast heavy ions in dense matter.</li> <li>2005)</li> <li>Part. Beam-Matter Interaction 11.4 MeV/u</li> <li>Part. Beam-Matter Interaction 11.4 MeV/u</li> </ul>	Exp Exp
	$\mathbf{Ca}^{17+} + \mathbf{SiO}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction 11.4 MeV/u	Exp
	$\mathrm{Ca}^{18+}+\mathrm{SiO}_2+\mathrm{Al}$	Part. Beam-Matter Interaction $11.4 \text{ MeV/u}$	$\operatorname{Exp}$
	$\mathrm{Ca}^{19+}+\mathrm{SiO}_2+\mathrm{Al}$	Part. Beam-Matter Interaction $11.4 \text{ MeV/u}$	Exp
1584.	S. Heredia-Avalos, R. Garcia Calculated energy loss o Phys. Rev. A 72, 052902 (2)	a-Molina, J. M. Fernandez-Varea, I. Abril f swift He, Li, B, and N ions in $SiO_2$ , $Al_2O_3$ , and $ZrO_2$ . 005)	
	$He^+ + Al_2O_3 + Al$	Part. Beam-Matter Interaction 10-5000 keV/amu	E/T
	$\mathrm{He^{+}+SiO_{2}+Al}$	Part. Beam-Matter Interaction 10-5000 keV/amu	$\dot{E/T}$
	$\mathrm{He^{+}}+\mathrm{ZrO}_{2}+\mathrm{Al}$	Part. Beam-Matter Interaction 10-5000 keV/amu	E/T
	$\mathbf{L}\mathbf{i}^{2+} + \mathbf{A}\mathbf{l}_2\mathbf{O}_3 + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction $10-5000 \text{ keV/amu}$	E/T
	$\mathrm{Li}^{2+} + \mathrm{SiO}_2 + \mathrm{Al}$	Part. Beam-Matter Interaction $10-5000 \text{ keV/amu}$	E/T
	$\mathrm{Li}^{2+} + \mathrm{ZrO}_2 + \mathrm{Al}$	Part. Beam-Matter Interaction 10-5000 keV/amu	E/T
	$\mathbf{B}^{4+} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}$	Part. Beam-Matter Interaction $10-5000 \text{ keV/amu}$	E/T
	$\mathbf{B}^{4+}+\mathbf{SiO}_{2}+\mathbf{Al}$	Part. Beam-Matter Interaction 10-5000 keV/amu	E/T
	$\mathbf{B}^{4+} + \mathbf{ZrO}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction $10-5000 \text{ keV/amu}$	E/T
	$\mathbf{N}^{6+}_{0} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}_2$	Part. Beam-Matter Interaction $10-5000 \text{ keV/amu}$	E/T
	$\mathbf{N}^{6+} + \mathbf{SiO}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction 10-5000 keV/amu	E/T

$\mathbf{B}^{4+}+\mathbf{SiO}_{2}+\mathbf{Al}$	Part. Beam-Matter Interaction	10-5000 keV/amu	E/T
$\mathbf{B}^{4+} + \mathbf{ZrO}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	10-5000  keV/amu	E/T
$\mathbf{N}^{6+} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}$	Part. Beam-Matter Interaction	10-5000  keV/amu	E/T
$\mathbf{N}^{6+} + \mathbf{SiO}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	10-5000  keV/amu	E/T
$\mathbf{N}^{6+} + \mathbf{ZrO}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	10-5000  keV/amu	E/T

1585. V. P. Shevelko, H. Tawara, O. V. Ivanov, T. Miyoshi, K. Noda, Y. Sato, A. V. Subbotin, I. Yu. Tolstikhina Target density effects in collisions of fast ions with solid targets.

J. Phys. B 38, 2675 (2005)

$\mathbf{C}^{4+-6+} + \mathbf{C} + \mathbf{Al}$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T
$Ne^{8+-10+} + C + Al$	Part. Beam-Matter Interaction	100-40,000  keV/u	E/T

	$\begin{array}{l} {\rm Mg^{10+-12+} + C + Al} \\ {\rm Si^{12+-14+} + C + Al} \\ {\rm Ar^{13+-18+} + C + Al} \\ {\rm Fe^{19+-26+} + C + Al} \end{array}$	Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction	100-40,000 keV/u 100-40,000 keV/u 100-40,000 keV/u 100-40,000 keV/u	E/T E/T E/T E/T
1586.	I. B. Smirnov Modeling of ionization p Nucl. Instrum. Methods Ph	produced by fast charged part ays. Res. A 554, 474 (2005)	icles in gases.	
	e + Ar + Al	Part. Beam-Matter Interaction	$10^2 - 10^5 \text{ eV}$	$\mathrm{E}/\mathrm{T}$
1587.	M. Bianconi, N. P. Barrada <b>The stopping cross-secti</b> Nucl. Instrum. Methods Ph	s, L. Correra on of aluminum for He ions. nys. Res. B 239, 127 (2005)		
	$\mathrm{He^{+}}+\mathrm{Al}+\mathrm{Al}$	Part. Beam-Matter Interaction	$0.1\text{-}3.0~\mathrm{MeV}$	Exp
1588.	C. Pascual-Izarra, N. P. Ba Experimental stopping f range of 40-1250 keV/nu Nucl. Instrum. Methods Ph	rradas, G. Garcia, A. Climent-Fon forces for He, C, O, Al and Si fuction. hys. Res. B 239, 135 (2005)	t ions in $Al_2O_3$ in the energy	
	$\mathrm{He^{+}}+\mathrm{Al}_{2}\mathrm{O}_{3}+\mathrm{Al}$	Part. Beam-Matter Interaction	40-1250  keV/amu	Exp
	$\mathbf{C}^+ + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}_3$	Part. Beam-Matter Interaction	40-1250 keV/amu	$\operatorname{Exp}$
	$O^+ + Al_2O_3 + Al_3$	Part. Beam-Matter Interaction	40-1250 keV/amu	Exp E
	$AI' + AI_2O_3 + AI$ $Si^+ + AI_2O_2 + AI$	Part. Beam-Matter Interaction	40-1250 keV/amu	Exp Evp
	$\mathbf{SI}^{*} + \mathbf{AI}_2\mathbf{O}_3 + \mathbf{AI}_2$	Fait. Deam-Matter Interaction	40-1250 kev/amu	Exp
1589.	S. Mammeri, S. Ouichaoui, Sputtering yields, range	R. Zemih, H. Ammi, M. Abdessela and range straggling in Al fol	am, A. C. Chami lowing $Kr^+$ ions bombard-	
	ment in the energy rang Nucl. Instrum. Methods Ph	ge (20-160) keV. ays. Res. B 240, 162 (2005)	-	
	ment in the energy rang Nucl. Instrum. Methods Ph $Kr^+ + Al + Al$	ge (20-160) keV. hys. Res. B 240, 162 (2005) Part. Beam-Matter Interaction	20-160 keV	Exp
1590.	ment in the energy rang Nucl. Instrum. Methods Ph Kr <sup>+</sup> + Al + Al J. Oddershede, J. R. Sabin, Comparison of shell corr power. Nucl. Instrum. Methods Ph	<ul> <li>ge (20-160) keV.</li> <li>ays. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>ays. Res. B 241, 144 (2005)</li> </ul>	20-160 keV e formulations of stopping	Exp
1590.	<ul> <li>ment in the energy rang Nucl. Instrum. Methods Ph</li> <li>Kr<sup>+</sup> + Al + Al</li> <li>J. Oddershede, J. R. Sabin, Comparison of shell compower.</li> <li>Nucl. Instrum. Methods Ph</li> <li>He + He Z= ?-? + Al</li> </ul>	ge (20-160) keV. hys. Res. B 240, 162 (2005) Part. Beam-Matter Interaction R. Cabrera-Trujillo rections in the Bohr and Beth hys. Res. B 241, 144 (2005) Part. Beam-Matter Interaction	20-160 keV e formulations of stopping 25-500 eV	Exp Th
1590.	<ul> <li>ment in the energy range Nucl. Instrum. Methods PH</li> <li>Kr<sup>+</sup> + Al + Al</li> <li>J. Oddershede, J. R. Sabin,</li> <li>Comparison of shell correspondence</li> <li>Nucl. Instrum. Methods PH</li> <li>He + He Z= ?-? + Al</li> <li>He<sup>2+</sup> + He + Al</li> </ul>	<ul> <li>ge (20-160) keV.</li> <li>ays. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>ays. Res. B 241, 144 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>Part. Beam-Matter Interaction</li> </ul>	20-160 keV e formulations of stopping 25-500 eV 25-500 eV	Exp Th Th
1590.	ment in the energy rang Nucl. Instrum. Methods Pf $Kr^+ + Al + Al$ J. Oddershede, J. R. Sabin, Comparison of shell corr power. Nucl. Instrum. Methods Pf He + He Z= ?-? + Al He <sup>2+</sup> + He + Al He <sup>2+</sup> + Ne + Al	<ul> <li>ge (20-160) keV.</li> <li>hys. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>hys. Res. B 241, 144 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>Part. Beam-Matter Interaction</li> <li>Part. Beam-Matter Interaction</li> <li>Part. Beam-Matter Interaction</li> </ul>	20-160 keV e formulations of stopping 25-500 eV 25-500 eV 25-500 eV	Exp Th Th Th
1590.	ment in the energy rang Nucl. Instrum. Methods Pf $Kr^+ + Al + Al$ J. Oddershede, J. R. Sabin, Comparison of shell corr power. Nucl. Instrum. Methods Pf He + He Z=?-? + Al He <sup>2+</sup> + He + Al He <sup>2+</sup> + Ne + Al He <sup>2+</sup> + Ar + Al	<ul> <li>ge (20-160) keV.</li> <li>hys. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>hys. Res. B 241, 144 (2005)</li> <li>Part. Beam-Matter Interaction</li> </ul>	20-160 keV e formulations of stopping 25-500 eV 25-500 eV 25-500 eV 25-500 eV	Exp Th Th Th Th Th
1590.	ment in the energy rang Nucl. Instrum. Methods Pf $Kr^+ + Al + Al$ J. Oddershede, J. R. Sabin, Comparison of shell corr power. Nucl. Instrum. Methods Pf He + He Z= ?-? + Al He <sup>2+</sup> + He + Al He <sup>2+</sup> + Ne + Al He <sup>2+</sup> + Ar + Al Ne + He Z= ?-? + Al Al + He Z= ?-? + Al	<ul> <li>ge (20-160) keV.</li> <li>hys. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>hys. Res. B 241, 144 (2005)</li> <li>Part. Beam-Matter Interaction</li> </ul>	20-160 keV e formulations of stopping 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV	Exp Th Th Th Th Th Th Th
1590. 1591.	ment in the energy range Nucl. Instrum. Methods PH $Kr^+ + Al + Al$ J. Oddershede, J. R. Sabin, Comparison of shell corr power. Nucl. Instrum. Methods PH He + He Z= ?-? + Al He <sup>2+</sup> + He + Al He <sup>2+</sup> + Ne + Al He <sup>2+</sup> + Ar + Al Ne + He Z= ?-? + Al Al + He Z= ?-? + Al J. Y. Hsu, Y. C. Yu, J. H. H Experimental stopping <sup>10</sup> B/ <sup>11</sup> B ions. Nucl. Instrum. Methods PH	<ul> <li>ge (20-160) keV.</li> <li>hys. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>hys. Res. B 241, 144 (2005)</li> <li>Part. Beam-Matter Interaction</li> </ul>	20-160 keV e formulations of stopping 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV	Exp Th Th Th Th Th Th
1590. 1591.	ment in the energy rang Nucl. Instrum. Methods Pf $Kr^+ + Al + Al$ J. Oddershede, J. R. Sabin, Comparison of shell corr power. Nucl. Instrum. Methods Pf He + He Z= ?-? + Al He <sup>2+</sup> + He + Al He <sup>2+</sup> + Ne + Al He <sup>2+</sup> + Ar + Al Ne + He Z= ?-? + Al Al + He Z= ?-? + Al Al + He Z= ?-? + Al S. Y. Hsu, Y. C. Yu, J. H. I Experimental stopping <sup>10</sup> B/ <sup>11</sup> B ions. Nucl. Instrum. Methods Pf He <sup>+</sup> + Al + Al	<ul> <li>ge (20-160) keV.</li> <li>hys. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>hys. Res. B 241, 144 (2005)</li> <li>Part. Beam-Matter Interaction</li> </ul>	20-160 keV e formulations of stopping 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV	Exp Th Th Th Th Th Th Th
1590. 1591.	ment in the energy rang Nucl. Instrum. Methods Ph $Kr^+ + Al + Al$ J. Oddershede, J. R. Sabin, Comparison of shell corr power. Nucl. Instrum. Methods Ph He + He Z= ?-? + Al He <sup>2+</sup> + He + Al He <sup>2+</sup> + Ne + Al He <sup>2+</sup> + Ar + Al Ne + He Z= ?-? + Al Al + He Z= ?-? + Al Al + He Z= ?-? + Al S. Y. Hsu, Y. C. Yu, J. H. I Experimental stopping <sup>10</sup> B/ <sup>11</sup> B ions. Nucl. Instrum. Methods Ph He <sup>+</sup> + Al + Al He <sup>+</sup> + Ag + Al	<ul> <li>ge (20-160) keV.</li> <li>hys. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>hys. Res. B 241, 144 (2005)</li> <li>Part. Beam-Matter Interaction</li> </ul>	20-160 keV e formulations of stopping 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV 25-500 eV	Exp Th Th Th Th Th Th Th Exp Exp
1590. 1591.	ment in the energy range Nucl. Instrum. Methods PH $Kr^+ + Al + Al$ J. Oddershede, J. R. Sabin, Comparison of shell correspondent Nucl. Instrum. Methods PH He + He Z= ?-? + Al $He^{2+} + He + Al$ $He^{2+} + He + Al$ $He^{2+} + Ar + Al$ $He^{2+} + Ar + Al$ Al + He Z= ?-? + Al Al + He Z= ?-? + Al J. Y. Hsu, Y. C. Yu, J. H. H Experimental stopping $^{10}B/^{11}B$ ions. Nucl. Instrum. Methods PH $He^+ + Al + Al$ $He^+ + Al + Al$ $Li^+ + Al + Al$	<ul> <li>ge (20-160) keV.</li> <li>hys. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>hys. Res. B 241, 144 (2005)</li> <li>Part. Beam-Matter Interaction</li> </ul>	20-160 keV e formulations of stopping 25-500 eV 25-500 eV	Exp Th Th Th Th Th Th Th Exp Exp Exp
1590. 1591.	ment in the energy rang Nucl. Instrum. Methods Pf $Kr^+ + Al + Al$ J. Oddershede, J. R. Sabin, Comparison of shell corr power. Nucl. Instrum. Methods Pf He + He Z= ?-? + Al $He^{2+} + He + Al$ $He^{2+} + He + Al$ $He^{2+} + Ne + Al$ $He^{2+} + Ar + Al$ Ne + He Z= ?-? + Al Al + He Z= ?-? + Al Al + He Z= ?-? + Al J. Y. Hsu, Y. C. Yu, J. H. I Experimental stopping $^{10}B/^{11}B$ ions. Nucl. Instrum. Methods Pf $He^+ + Al + Al$ $He^+ + Ag + Al$ $Li^+ + Ag + Al$	<ul> <li>ge (20-160) keV.</li> <li>hys. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>hys. Res. B 241, 144 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>Chang, K. M. Chen</li> <li>forces in aluminum and silver</li> <li>hys. Res. B 241, 155 (2005)</li> <li>Part. Beam-Matter Interaction</li> </ul>	20-160 keV e formulations of stopping 25-500 eV 25-500	Exp Th Th Th Th Th Th Th Exp Exp Exp Exp
1590.	ment in the energy rang Nucl. Instrum. Methods Pf $Kr^+ + Al + Al$ J. Oddershede, J. R. Sabin, Comparison of shell corr power. Nucl. Instrum. Methods Pf He + He Z= ?-? + Al $He^{2+} + He + Al$ $He^{2+} + He + Al$ $He^{2+} + Ar + Al$ Ne + He Z= ?-? + Al Al + He Z= ?-? + Al Bl + He Z= ?-? + Al $He^+ + Al + Al$ $He^+ + Al + Al$ $He^+ + Al + Al$ $Li^+ + Ag + Al$ $B^+ + Al + Al$	<ul> <li>ge (20-160) keV.</li> <li>nys. Res. B 240, 162 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>R. Cabrera-Trujillo</li> <li>rections in the Bohr and Beth</li> <li>nys. Res. B 241, 144 (2005)</li> <li>Part. Beam-Matter Interaction</li> <li>Ciang, K. M. Chen</li> <li>forces in aluminum and silver</li> <li>nys. Res. B 241, 155 (2005)</li> <li>Part. Beam-Matter Interaction</li> </ul>	20-160 keV e formulations of stopping 25-500 eV 25-500 e	Exp Th Th Th Th Th Th Th Th Exp Exp Exp Exp Exp

1592. J. Y. Hsu, J. H. Liang, Y. C. Yu, K. M. Chen Energy straggling of He, Li, and B isotopes in aluminum and silver. Nucl. Instrum. Methods Phys. Res. B 241, 160 (2005)

$H^+ + Al + Al$	Part. Beam-Matter Interaction	$0.1-1.5 \mathrm{MeV/amu}$	Exp
$\mathrm{H^{+}}+\mathrm{Ag}+\mathrm{Al}$	Part. Beam-Matter Interaction	$0.1-1.5 \mathrm{MeV/amu}$	Exp
$Li^+ + Al + Al$	Part. Beam-Matter Interaction	$0.1-1.5 \mathrm{MeV/amu}$	Exp
$Li^+ + Ag + Al$	Part. Beam-Matter Interaction	$0.1-1.5 \mathrm{MeV/amu}$	Exp
$B^+ + Al + Al$	Part. Beam-Matter Interaction	$0.1-1.5 \mathrm{MeV/amu}$	Exp
$\mathbf{B}^+ + \mathbf{A}\mathbf{g} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	0.1-1.5  MeV/amu	Exp

1593. Y. Zhang, W. J. Weber, A. Razpet, G. Possnert

Electronic stopping powers for Be, Ca and Ti in SiC. Nucl. Instrum. Methods Phys. Res. B 242, 82 (2005)

$\mathrm{Be^{+}}+\mathrm{SiC}+\mathrm{Al}$	Part. Beam-Matter Interaction	40-680  keV/u	E/T
$Ca^+ + SiC + Al$	Part. Beam-Matter Interaction	40-680  keV/u	E/T
$Ti^+ + SiC + Al$	Part. Beam-Matter Interaction	40-680  keV/u	E/T

1594. A. E. Stuchbery, A. N. Wilson, P. M. Davidson Equilibrium charge-state distributions for S and Si ions emerging from iron and

gadolinium targets with velocities near their K-shell electron velocity.

Nucl. Instrum. Methods Phys. Res. B 243, 265 (2005)

$Si^+ + Fe + Al$	Part. Beam-Matter Interaction	$84-237 { m MeV}$	$\operatorname{Exp}$
${ m Si^+}+{ m Ga}+{ m Al}$	Part. Beam-Matter Interaction	$84-237 { m MeV}$	Exp
$S^+ + Fe + Al$	Part. Beam-Matter Interaction	$84-237 { m MeV}$	Exp
$S^+ + Ga + Al$	Part. Beam-Matter Interaction	$84-237 { m MeV}$	Exp

1595. A. L'Hoir, L. Adoui, F. Barrue, A. Billebaud, F. Bosch, A. Brauning-Demian, H. Brauning, A. Cassimi, M. Chevallier, C. Cohen, D. Dauvergne, C. E. Demonchy, L. Giot, R. Kirsch, A. Gumberidze, C. Kozhuharov, D. Liesen, W. Mittig, P. H. Mokler, S. Pita, J.-C. Poizat, C. Ray, P. Roussel-Chomaz, H. Rothard, J.-P. Rozet, Th. Stoehlker, M. Tarisien, E. Testa, S. Toleikis, M. Toulemonde, D. Vernhet

Ion slowing down and charge exchange at small impact parameters selected by channeling: Superdensity effects.

Nucl. Instrum. Methods Phys. Res. B 245, 1 (2005)

$\mathrm{Pb}^{56+} + \mathrm{Si} + \mathrm{Al}$	Part. Beam-Matter Interaction	29  MeV/u	E/T
$\mathbf{U}^{91+} + \mathbf{Si} + \mathbf{Al}$	Part. Beam-Matter Interaction	$29 { m MeV/u}$	E/T

1596. F. Gruener, F. Bell

First-principles-simulation of both charge state and stopping power of swift heavy ions in solids.

Nucl. Instrum. Methods Phys. Res. B 245, 15 (2005)

$Ni^{13+} + C + Al$	Part. Beam-Matter Interaction	1 MeV/u	Th
$Ni^{17+} + C + Al$	Part. Beam-Matter Interaction	1  MeV/u	$\mathrm{Th}$
$Ni^{22+} + C + Al$	Part. Beam-Matter Interaction	1  MeV/u	Th

1597. A. Fettouhi, H. Geissel, A. Schinner, P. Sigmund
Stopping of high-Z ions at intermediate velocities.
Nucl. Instrum. Methods Phys. Res. B 245, 22 (2005)

$Xe^+ + C + Al$	Part. Beam-Matter Interaction	$0.1 - 10^3 { m MeV/u}$	Th
$Au^+ + C + Al$	Part. Beam-Matter Interaction	$0.1 - 10^3 \text{ MeV/u}$	Th
$Pb^+ + C + Al$	Part. Beam-Matter Interaction	$0.1 - 10^3 \text{ MeV/u}$	Th
$U^+ + C + Al$	Part. Beam-Matter Interaction	$0.1 - 10^3 { m MeV/u}$	Th

1598. L. L. Balashova, A. A. Sokolik
Alignment dependence of the stopping effective charge of swift excited ions in the degenerate electron gas.
Nucl. Instrum. Methods Phys. Res. B 245, 28 (2005)

He + C + Al	Part. Beam-Matter Interaction	Th
$Li^+ + C + Al$	Part. Beam-Matter Interaction	Th

1599. A. Fettouhi, H. Weick, M. Portillo, F. Becker, D. Boutin, H. Geissel, R. K. Knoebel, J. Kurcewicz, W. Kurcewicz, J. Kurpeta, Yu. Litvinov, R. J. Livesay, D. J. Morrissey, G. Muenzenberg, J. A. Nolen, H. Ogawa, N. Sakamoto, C. Scheidenberger, J. Stadlmann, M. Winkler, N. Yao

Gas-solid effect in mean charge and slowing down of uranium ions at 60.2 and 200  $\rm MeV/u.$ 

Nucl. Instrum. Methods Phys. Res. B 245, 32 (2005)

$U^{81+} + B + Al$	Part. Beam-Matter Interaction	60-200  MeV/u	Exp
$\mathbf{U}^{81+} + \mathbf{C} + \mathbf{Al}$	Part. Beam-Matter Interaction	$60-200 { m MeV/u}$	Exp
$\mathbf{U}^{81+} + \mathbf{Ne} + \mathbf{Al}$	Part. Beam-Matter Interaction	60-200  MeV/u	Exp
$\mathbf{U}^{81+} + \mathbf{Si} + \mathbf{Al}$	Part. Beam-Matter Interaction	60-200  MeV/u	Exp
$\mathbf{U}^{81+} + \mathbf{Cl} + \mathbf{Al}$	Part. Beam-Matter Interaction	60-200  MeV/u	Exp
$U^{81+} + Ti + Al$	Part. Beam-Matter Interaction	$60-200 { m MeV/u}$	Exp
$\mathbf{U}^{81+} + \mathbf{Cu} + \mathbf{Al}$	Part. Beam-Matter Interaction	$60-200 { m MeV/u}$	Exp
$\mathbf{U}^{81+} + \mathbf{Br} + \mathbf{Al}$	Part. Beam-Matter Interaction	$60-200 { m MeV/u}$	Exp
$\mathbf{U}^{81+} + \mathbf{Pd} + \mathbf{Al}$	Part. Beam-Matter Interaction	$60-200 { m MeV/u}$	Exp
$\mathbf{U}^{81+} + \mathbf{Xe} + \mathbf{Al}$	Part. Beam-Matter Interaction	$60-200 { m MeV/u}$	Exp
$\mathbf{U}^{81+} + \mathbf{Au} + \mathbf{Al}$	Part. Beam-Matter Interaction	$60-200 { m MeV/u}$	Exp

1600. A. Blazevic, H. G. Bohlen, W. von Oertzen, V. V. Balashov, A. V. Stysin
 Charge-state resolved energy spectra of swift <sup>22</sup>Ne ions passing through thin carbon foils.
 Nucl. Instrum. Methods Phys. Res. B 245, 41 (2006)

 $Ne^{7+-10+} + C + Al$  Part. Beam-Matter Interaction 2 MeV/u Th

1601. A. Itoh, M. Kaneda, S. Satoh, K. Ishii, H. Tsuchida Energy loss of swift protons in liquid water and ethanol. Nucl. Instrum. Methods Phys. Res. B 245, 76 (2006)

$\mathbf{H}^+ + \mathbf{H}_2\mathbf{O} + \mathbf{A}\mathbf{I}$ Part. Beam-Matter Inte	action 1.7-2.0 MeV Exp
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 M. A. Gagliardi, A. W. Hunt Monte Carlo simulations of slow-positron production from normal and glancing incident targets. Nucl. Instrum. Methods Phys. Res. B 245, 347 (2006)

$\mathbf{e} + \mathbf{Al} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.01-10 { m MeV}$	Th
e + Si + Al	Part. Beam-Matter Interaction	0.01-10  MeV	$\mathrm{Th}$

1603. M. Lindenblatt, E. Pehlke, A. Duvenbeck, B. Rethfeld, A. Wucher Kinetic excitation of solids: The concept of electronic friction. Nucl. Instrum. Methods Phys. Res. B 246, 333 (2006)

H + Al + Al Part. Beam-Matter Interaction	2-10 eV	Th
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#### 1604. H. Paul

A comparison of recent stopping power tables for light and medium-heavy ions with experimental data, and applications to radiotherapy dosimetry. Nucl. Instrum. Methods Phys. Res. B 247, 166 (2006)

	$\mathrm{H^{+}} + \mathrm{H_{2}O} + \mathrm{Al}$	Part. Beam-Matter Interaction	$0.025\text{-}1000 \; \mathrm{MeV/u}$	E/T
	$\mathrm{H^{+}}+\mathrm{N}_{2}+\mathrm{Al}$	Part. Beam-Matter Interaction	0.025-1000  MeV/u	$\dot{E}/T$
	$\mathbf{H}^+ + \mathbf{O}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	0.025-1000  MeV/u	E/T
	$Li^+ + Ag + Al$	Part. Beam-Matter Interaction	0.025-1000  MeV/u	E/T
	$Li^+ + H_2O + Al$	Part. Beam-Matter Interaction	0.025-1000  MeV/u	É/T
	$Li^+ + N_2^- + Al$	Part. Beam-Matter Interaction	0.025-1000  MeV'/u	E/T
	$Li^{+} + O_{2}^{2} + Al$	Part. Beam-Matter Interaction	0.025-1000  MeV/u	E/T
	$C^{+} + C + Al$	Part Beam-Matter Interaction	0.025 - 1000  MeV/u	E/T
	$A^+ + A + Al$	Part. Beam-Matter Interaction	0.025-1000  MeV/u	E/T
1605.	A. D. Fertman, T. Yu. Mut V. I. Pershin, I. V. Roudsko <b>Stopping power measure</b> Nucl. Instrum. Methods Ph	in, M. M. Basko, A. A. Golubev, Toy, B. Yu. Sharkov ements for 100-keV/u Cu ions sys. Res. B 247, 199 (2006)	Г. V. Kulevoy, R. P. Kuybeda, in hydrogen and nitrogen.	
	$\mathrm{Cu}^+ + \mathrm{H}_2 + \mathrm{Al}$	Part. Beam-Matter Interaction	100 keV/u	E/T
	$\mathbf{C}\mathbf{u}^+ + \mathbf{N}_2 + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	100  keV/u	E/T
1606.	H. Paul, A. Schinner Statistical analysis of sto Nucl. Instrum. Methods Ph	ppping data for protons and a ys. Res. B 249, 1 (2006)	lphas in compounds.	
	$\mathrm{H^{+}} + \mathrm{H_{2}O} + \mathrm{Al}$	Part. Beam-Matter Interaction	$10^{-3} - 1 \text{ MeV}$	E/T
1607.	R. Garcia-Molina, I. Abril, Allotropic effects on the foils. Nucl. Instrum. Methods Ph	C. D. Denton, S. Heredia-Avalos energy loss of swift $H^+$ and $H$ sys. Res. B 249, 6 (2006)	$e^+$ ion beams through thin	
	$H^+ + C + Al$	Part. Beam-Matter Interaction	10-10,000 $\rm keV/amu$	$\mathrm{Th}$
1608.	V. Kuzmin Range parameters of hea tials. Nucl. Instrum. Methods Ph	avy ions in carbon calculated v ays. Res. B 249, 13 (2006)	with first-principles poten-	
	$Au^+ + C + Al$	Part. Beam-Matter Interaction	1-1000  keV	Th
1609.	Y. Zhang, J. Jensen, G. Pos Electronic stopping force Nucl. Instrum. Methods Ph	ssnert, D. A. Grove, D. E. McCrea es of heavy ions in metal oxid bys. Res. B 249, 18 (2006)	ady, B. W. Arey, W. J. Weber es.	
	$He^+ + ZrO_2 + Al$	Part. Beam-Matter Interaction	0-1500  keV/amu	E/T
	$He^+ + Ta_2O_5 + Al$	Part. Beam-Matter Interaction	0-1500  keV/amu	E/T
	$He^+ + Nb_2O_5 + Al$	Part. Beam-Matter Interaction	0-1500  keV/amu	$E'_T$
	$C^+ + ZrO_2 + Al$	Part. Beam-Matter Interaction	0-1500  keV/amu	E/T
	$F^+ + Ta_2O_5 + Al$	Part. Beam-Matter Interaction	0-1500  keV/amu	E/T
	$\mathbf{F}^+ + \mathbf{N}\mathbf{b}_2\mathbf{O}_5 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0-1500  keV/amu	E/T
				-, -

1610. S. Damache, S. Ouichaoui, D. Moussa, A. Dib

Effects of the projectile electronic structure on stopping parameters for nickel. Nucl. Instrum. Methods Phys. Res. B 249, 22 (2006)

$\mathrm{H^{+}+Ni+Al}$	Part. Beam-Matter Interaction	$0.166-2.72 \; { m MeV/amu}$	Exp
$He^{2+} + Ni + Al$	Part. Beam-Matter Interaction	$0.166-2.72 { m MeV/amu}$	Exp
$D^+ + Ni + Al$	Part. Beam-Matter Interaction	$0.166-2.72 { m MeV/amu}$	Exp

1611. D. Emfietzoglou, H. Nikjoo, A. Pathak

Electronic cross sections for proton transport in liquid water based on opticaldata models.

Nucl. Instrum. Methods Phys. Res. B 249, 26 (2006)

$\mathbf{H}^+$	+ H <sub>2</sub> O $+$ Al	Part. Beam-Matter Interaction	50-10,000  keV	$\mathrm{Th}$
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1612. J. C. Moreno-Marin, I. Abril, S. Heredia-Avalos, R. Garcia-Molina

Electronic energy loss of swift  $H^+$  and  $He^+$  ions in solids with material science applications.

Nucl. Instrum. Methods Phys. Res. B 249, 29 (2006)

$H^+ + Ti + Al$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$H^+ + Fe + Al$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$\mathrm{H^{+}+Ge+Al}$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$H^+ + Pd + Al$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$H^+ + LiF + Al$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$\mathbf{H}^+ + \mathbf{Si}_3 \mathbf{N}_4 + \mathbf{Al}$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$\mathrm{He^{+}}$ + Ti + Al	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$\mathrm{He^{+}+Fe}+\mathrm{Al}$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$\mathrm{He^{+}+Ge+Al}$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$\mathrm{He^{+}} + \mathrm{Pd} + \mathrm{Al}$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$\mathrm{He^{+}} + \mathrm{LiF} + \mathrm{Al}$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$
$\mathrm{He^{+}}+\mathrm{Si}_{3}\mathrm{N}_{4}+\mathrm{Al}$	Part. Beam-Matter Interaction	1-10,000  keV/amu	$\mathrm{Th}$

1613. S. Amadon, W. A. Lanford

He stopping power and straggle in Al, Ti, Co, Cu, Ag, Ta and Au from 1.5 to 4 MeV.

Nucl. Instrum. Methods Phys. Res. B 249, 34 (2006)

Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	Exp
Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	Exp
Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	Exp
Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	Exp
Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	Exp
Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	Exp
Part. Beam-Matter Interaction	$1.5-4.0 { m MeV}$	Exp
	Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction	Part. Beam-Matter Interaction1.5-4.0 MeVPart. Beam-Matter Interaction1.5-4.0 MeV

1614. J.A.M. Pereira

Extension of the Brandt-Kitagawa model for Hartree-Fock electronic densities. Nucl. Instrum. Methods Phys. Res. B 249, 38 (2006)

$Li^+ + Al + Al$	Part. Beam-Matter Interaction	Th
$O^+ + Al + Al$	Part. Beam-Matter Interaction	Th

1615. K. Takahiro, K. Kawatsura, B. Tsuchiya, S. Nagata
 Difference in stopping cross section factor for <sup>4</sup>He ions between polycrystalline diamond and glassy carbon.
 Nucl. Instrum. Methods Phys. Res. B 249, 43 (2006)

$\mathrm{He^{+}} + \mathrm{C} + \mathrm{Al}$	Part. Beam-Matt	er Interaction	$1.4-4.0 \mathrm{MeV}$	Exp
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1616. Y. C. Yu, J. Y. Hsu, J. H. Liang, K. M. Chen Energy loss straggling of energetic <sup>3</sup>He and <sup>6</sup>Li ions into polymer foils. Nucl. Instrum. Methods Phys. Res. B 249, 47 (2006)

$\mathrm{He^{+}} + \mathrm{H} + \mathrm{Al}$	Part. Beam-Matter Interaction	$1.1-4.8 { m MeV}$	Exp
$\mathrm{He^{+}+C+Al}$	Part. Beam-Matter Interaction	$1.1-4.8 { m MeV}$	$\operatorname{Exp}$
$Li^+ + H + Al$	Part. Beam-Matter Interaction	$1.1-4.8 { m MeV}$	Exp
$Li^+ + C + Al$	Part. Beam-Matter Interaction	$1.1-4.8 { m MeV}$	Exp

1617. J. Perkowski, J. Andrzejewski, A. Climent-Font, G. Knyazheva, V. Lyapin, T. Malkiewicz, A. Munoz-Martin, W. H. Trzaska
Stopping power measurement of <sup>4</sup>8Ca in a broad energy range in solid absorbers. Nucl. Instrum. Methods Phys. Res. B 249, 55 (2006)

$Ca^+ + C + Al$	Part. Beam-Matter Interaction	$5-250 { m MeV}$	Exp
$\mathrm{Ca^{+}+Ni+Al}$	Part. Beam-Matter Interaction	5-250  MeV	Exp
$Ca^+ + Au + Al$	Part. Beam-Matter Interaction	$5-250 { m MeV}$	Exp

1618. S. P. Chenakin, S. N. Markin, E. Steinbauer, M. Draxler, P. Bauer Electronic stopping of hydrogen ions deduced from TOF-LEIS spectra. Nucl. Instrum. Methods Phys. Res. B 249, 58 (2006)

$H^+ + Au + Al$	Part. Beam-Matter Interaction	$0.33-10 { m keV}$	$\operatorname{Exp}$
$D^+ + Au + Al$	Part. Beam-Matter Interaction	0.33-10  keV	Exp

1619. E. Strub, W. Bohne, J. Roehrich

Determination of the energy loss of various elements in metal foils with the TOF-ERDA setup at the ISL Berlin.

Nucl. Instrum. Methods Phys. Res. B 249, 62 (2006)

$He^{2+} + Fe + Al$	Part. Beam-Matter Interaction	$6-86 { m MeV}$	Exp
$He^{2+} + Ag + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$He^{2+} + Au + Al$	Part. Beam-Matter Interaction	$6-86 { m MeV}$	Exp
$B^+ + Fe + Al$	Part. Beam-Matter Interaction	$6-86 { m MeV}$	Exp
$\mathbf{B}^+ + \mathbf{A}\mathbf{g} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	$6-86 { m MeV}$	Exp
$\mathbf{B}^+ + \mathbf{A}\mathbf{u} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$O^+ + Fe + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$O^+ + Ag + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$O^+ + Au + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$Al^+ + Fe + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$Al^+ + Ag + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$Al^+ + Au + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$Si^+ + Fe + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
${f Si^+}+{f Ag}+{f Al}$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$Si^+ + Au + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$Cu^+ + Fe + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$\mathrm{Cu^{+}}+\mathrm{Ag}+\mathrm{Al}$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
$Cu^+ + Au + Al$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
${ m Ba^+}+{ m Fe}+{ m Al}$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	$\operatorname{Exp}$
$\mathrm{Ba^{+}}+\mathrm{Ag}+\mathrm{Al}$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
${f Ba^+}+{f Au}+{f Al}$	Part. Beam-Matter Interaction	$6-86 {\rm ~MeV}$	Exp
${ m Au^+ + Fe} + { m Al}$	Part. Beam-Matter Interaction	$6-86 { m MeV}$	Exp
$Au^+ + Ag + Al$	Part. Beam-Matter Interaction	$6-86 { m MeV}$	$\operatorname{Exp}$
$Au^+ + Au + Al$	Part. Beam-Matter Interaction	$6-86 { m MeV}$	Exp

1620. R. Gonzalez-Arrabal, V. A. Khodyrev, N. Gordillo, G. Garcia, D. O. Boerma **The Coulomb explosion of swift**  $C_2^+$  **molecules under channeling conditions.** Nucl. Instrum. Methods Phys. Res. B 249, 65 (2006)

$C^+ + Si + Al$	Part. Beam-Matter Interaction	1.8 MeV/amu	Exp
$\mathbf{C}_{2}^{+} + \mathbf{Si} + \mathbf{Al}$	Part. Beam-Matter Interaction	1.8 MeV/amu	Exp

1621.	H. Amekura, O. A. Plaksin, N. Umeda, K. Kono, N. Kishimoto, Ch. Buchal Concentration profiles of Zn ions implanted with 60 keV for nanoparticle forma- tion in silica glass. Vacuum 80, 802 (2006)			
	$\mathrm{Zn^{+}+SiO_{2}+Al}$	Part. Beam-Matter Interaction	60  keV	Exp
1622.	C. C. Montanari, J. E. Mira <b>Stopping power for swift</b> Phys. Rev. A 73, 024901 (20	glia <b>dressed ions.</b> 006)		
	$egin{array}{lll} \mathrm{He}+\mathrm{Al}+\mathrm{Al}\ \mathrm{He}+\mathrm{Zn}+\mathrm{Al}\ \mathrm{He}^++\mathrm{Al}+\mathrm{Al}\ \mathrm{He}^++\mathrm{Zn}+\mathrm{Al}\ \mathrm{He}^++\mathrm{Zn}+\mathrm{Al} \end{array}$	Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction	1-10,000 keV/u 1-10,000 keV/u 1-10,000 keV/u 1-10,000 keV/u	Th Th Th Th
1623.	E. Lamour, B. Gervais, JP. Production and transpos solid collisions. Phys. Rev. A 73, 042715 (20	. Rozet, D. Vernhet rt of long-lifetime excited sta 006)	tes in preequilibrium ion-	
	$Ar^{18+} + C + Al$	Part. Beam-Matter Interaction	$13.6 \ {\rm MeV/u}$	Exp
1624.	C. D. Archubi, J. C. Eckard Angular effects in the ent through thin Al and Au Phys. Rev. A 73, 042901 (20	t, G. H. Lantschner, N. R. Arista nergy loss of slow protons and films. 006)	d helium ions transmitted	
	$H^+ + Al + Al$	Part. Beam-Matter Interaction	10 keV	Exp
	H' + Au + Al $Ho^+ \perp Al \perp Al$	Part. Beam-Matter Interaction	10 keV	Exp
	$He^+ + Au + Al$ $He^+ + Au + Al$	Part. Beam-Matter Interaction	10  keV	Exp
1625.	B. Sundaravel, C. David, A. K.G.M. Nair, B. Viswanatha <b>Charge-state dependence</b> Phys. Rev. A 73, 042902 (20	K. Balamurugan, S. Rajagopalan, an e <b>of energy loss of MeV dime</b> 2006)	A. K. Tyagi, B. K. Panigrahi, rs in GaAs(100).	
	$C^+ + GaAs + Al$	Part. Beam-Matter Interaction	0.5-1 MeV	Exp
	$O^+ + GaAs + Al$	Part. Beam-Matter Interaction	0.5-1 MeV	Exp
	$\mathbf{O}_{2}^{+} + \mathbf{GaAs} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.5-1 { m MeV}$	$\operatorname{Exp}$
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Part. Beam-Matter Interaction Part. Beam-Matter Interaction	0.5-1 MeV 0.5-1 MeV	$\operatorname{Exp}$
1626.	<ul> <li>A. J. Garcia, J. E. Miraglia</li> <li>Influence of surface cha surfaces.</li> <li>Phys. Rev. A 74, 012902 (20)</li> </ul>	nneling in the stopping of p	protons colliding with LiF	
	$H^+ + LiF + Al$	Part. Beam-Matter Interaction	100-400 $\rm keV$	$\mathrm{Th}$
1627.	D. M. Duffy, A. M. Rutherfo Including the effects of e ation damage simulation J. Nucl. Mater. 19, 016207 (	ord lectronic stopping and electro s. (2007)	on-ion interactions in radi-	
	$Fe^+ + Fe + Al$	Part. Beam-Matter Interaction	10  keV	$\mathrm{Th}$

1628. D. Y. Smith, M. Inokuti, W. Karstens, E. Shiles Mean excitation energy for the stopping power of light elements. Nucl. Instrum. Methods Phys. Res. B 250, 1 (2006)

$\mathrm{H^{+}+C+Al}$	Part. Beam-Matter Interaction	E/T
$H^+ + Al + Al$	Part. Beam-Matter Interaction	E/T
$\mathrm{H^{+}}+\mathrm{Si}+\mathrm{Al}$	Part. Beam-Matter Interaction	E/T

1629. Y. Zhang, W. J. Weber, D. A. Grove, J. Jensen, G. Possnert
Electronic stopping powers for heavy ions in niobium and tantalum pentoxides.
Nucl. Instrum. Methods Phys. Res. B 250, 62 (2006)

$\mathrm{He^{+}}+\mathrm{Ta}_{2}\mathrm{O}_{5}+\mathrm{Al}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T
$\mathrm{He^{+}} + \mathrm{Nb}_{2}\mathrm{O}_{5} + \mathrm{Al}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T
$\mathbf{Li^+} + \mathbf{Ta}_2\mathbf{O}_5 + \mathbf{Al}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T
$Li^+ + Nb_2O_5 + Al$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T
$\mathrm{Be^{+}+Ta_{2}O_{5}+Al}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T
$\mathbf{Be^+} + \mathbf{Nb}_2\mathbf{O}_5 + \mathbf{Al}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T
$\mathbf{O}^+ + \mathbf{Ta}_2\mathbf{O}_5 + \mathbf{Al}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T
$\mathbf{O}^+ + \mathbf{N}\mathbf{b}_2\mathbf{O}_5 + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	100-1300  keV/amu	E/T

1630. T. Miyoshi, K. Noda, Y. Sato, H. Tawara, I. Yu, I. Yu. Tolstikhina, V. P. Shevelko Evaluation of excited nl-state distributions of fast exit ions after penetrating through solid foils. Part 1: Charge-state fractions for 4.3 MeV/u projectiles with atomic numbers Z = 6-26 passing through carbon foils. Nucl. Instrum. Methods Phys. Res. B 251, 79 (2006)

$\mathbf{C}^{2+} + \mathbf{C} + \mathbf{Al}$	Part. Beam-Matter Interaction	$4.3 \; \mathrm{MeV/amu}$	$\operatorname{Exp}$
$O^{3+} + C + Al$	Part. Beam-Matter Interaction	$4.3 \; \mathrm{MeV/amu}$	$\operatorname{Exp}$
$Ne^{4+} + C + Al$	Part. Beam-Matter Interaction	$4.3 \; \mathrm{MeV/amu}$	$\operatorname{Exp}$
$\mathrm{Mg}^{5+} + \mathrm{C} + \mathrm{Al}$	Part. Beam-Matter Interaction	$4.3 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$\mathbf{Si}^{5+} + \mathbf{C} + \mathbf{Al}$	Part. Beam-Matter Interaction	$4.3 \mathrm{MeV/amu}$	$\operatorname{Exp}$
$Ar^{8+} + C + Al$	Part. Beam-Matter Interaction	$4.3 \; \mathrm{MeV/amu}$	$\operatorname{Exp}$
$Ca^{6+} + C + Al$	Part. Beam-Matter Interaction	4.3  MeV/amu	$\operatorname{Exp}$
$Fe^{9+} + C + Al$	Part. Beam-Matter Interaction	4.3 MeV/amu	Exp

1631. T. Miyoshi, K. Noda, Y. Sato, H. Tawara, I. Yu. Tolstikhina, V. P. Shevelko Evaluation of excited nl-state distributions of fast exit ions after penetrating through solid foils. Part 2: Determination of the nl-state distribution fractions of exit ions.

Nucl. Instrum. Methods Phys. Res. B 251, 89 (2006)

 $Ar^{13+-18+} + C + Al$  Part. Beam-Matter Interaction 4.3-20 MeV/amu E/T

1632. T.D.M. Weijers-Dall, H. Timmers, K. Stenstroem, P. Persson, A. Pergiegiaj, X. Wang, M. Graczyk, T. Osipowicz, M. Q. Ren, D. J. O'Connor, H. J. Whitlow
Measurements of the stopping forces for heavy ions in Ge, Ag and Au using novel 'polka-dot' detectors.
Nucl. Instrum. Methods Phys. Res. B 251, 352 (2006)

Part. Beam-Matter Interaction	$0-60 { m MeV}$	$\operatorname{Exp}$
Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp
Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp
Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp
Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp
Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp
Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp
Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp
Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp
Part. Beam-Matter Interaction	$0-60 {\rm ~MeV}$	Exp
	Part. Beam-Matter Interaction Part. Beam-Matter Interaction	Part. Beam-Matter Interaction0-60 MeVPart. Beam-Matter Interaction0-60 MeV

1633. D. Mancusi, L. Sihver, K. Gustafsson, C. La Tessa, S. B. Guetersloh, C. J. Zeitlin, J. Miller, L. H. Heilbronn, K. Niita, T. Sato, H. Nakashima, T. Murakami, Y. Iwata PHITS - benchmark of partial charge-changing cross sections for intermediatemass systems.

Nucl. Instrum. Methods Phys. Res. B 254, 30 (2007)

$Ar^+ + C + Al$	Part. Beam-Matter Interaction	400 MeV/amu	E/T
$Ar^+ + Al + Al$	Part. Beam-Matter Interaction	$400 { m MeV/amu}$	E/T
$Ar^+ + Cu + Al$	Part. Beam-Matter Interaction	$400 { m MeV/amu}$	E/T
$Ar^+ + Sn + Al$	Part. Beam-Matter Interaction	$400 { m MeV/amu}$	E/T
$Ar^+ + Pb + Al$	Part. Beam-Matter Interaction	$400 { m MeV/amu}$	E/T

1634. J. Miranda, J. C. Pineda

Chemical effects in the stopping cross sections of protons in rare earth fluorides. Nucl. Instrum. Methods Phys. Res. B 254, 39 (2007)

$\mathbf{H^{+} + NdF_{3} + Al}$	Part. Beam-Matter Interaction	$0.5-0.7 { m MeV}$	Exp
$\mathrm{H^{+}+SmF_{3}+Al}$	Part. Beam-Matter Interaction	$0.5-0.7 { m MeV}$	Exp
$\mathrm{H^{+}+GdF_{3}+Al}$	Part. Beam-Matter Interaction	$0.5-0.7 { m MeV}$	Exp
$H^+ + HoF_3 + Al$	Part. Beam-Matter Interaction	$0.5-0.7 { m MeV}$	Exp

1635. M. Dapor, L. Calliari, M. Filippi

Computational and experimental study of  $\pi$  and  $\pi + \sigma$  plasmon loss spectra for low energy (;1000 eV) electrons impinging on highly oriented pyrolitic graphite (HOPG).

Nucl. Instrum. Methods Phys. Res. B 255, 276 (2007)

$$\mathbf{e} + \mathbf{C} + \mathbf{A}\mathbf{I}$$
 Part. Beam-Matter Interaction 500 eV Th

1636. M. Imai, M. Sataka, K. Kawatsura, K. Takahiro, K. Komaki, H. Shibata, H. Sugai, K. Nishio Charge state evolution of 2 MeV/u sulfur ion passing through thin carbon foil. Nucl. Instrum. Methods Phys. Res. B 256, 11 (2007)

$S^{6+} + C + Al$	Part. Beam-Matter Interaction	2 MeV/u	Exp
$S^{7+} + C + Al$	Part. Beam-Matter Interaction	2  MeV/u	Exp
$S^{8+} + C + Al$	Part. Beam-Matter Interaction	2  MeV/u	Exp

1637. L. G. Glazov, P. Sigmund
 Energy-loss spectra of light relativistic ions.
 Nucl. Instrum. Methods Phys. Res. B 256, 50 (2007)

$\mathbf{H}^+ + \mathbf{Si} + \mathbf{Al}$ Part. Beam-Matter Interaction 150 MeV	Th
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1638. Z. L. Miskovic, Y.-N. Wang, Y.-H. Song Dynamics of fast molecular ions in solids and plasmas: A review of recent theoretical developments. Nucl. Instrum. Methods Phys. Res. B 256, 57 (2007)

$N_2^+ + C + Al$	Part. Beam-Matter Interaction	Th
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1639. M. Kato, R. Souda

Elastic and inelastic collision of low energy proton scattering from rare gas solids. Nucl. Instrum. Methods Phys. Res. B 256, 71 (2007)

$H^+ + Ar + Al$	Part. Beam-Matter Interaction	50-500  eV	E/T
$H^+ + Kr + Al$	Part. Beam-Matter Interaction	50-500  eV	E/T
$\mathrm{H^{+}+Xe+Al}$	Part. Beam-Matter Interaction	50-500  eV	E/T

1640.	P. L. Grande, A. Hentz, R. I An analytical energy-loss ysis.	P. Pezzi, I.J.R. Baumvol, G. Schiwietz s line shape for high depth resolution in ion-beam anal-	
			- Th
	$H^+ + A + AI$	Part. Beam-Matter Interaction	Th
1641.	M. Kaneda, S. Sato, M. Shin Energy loss and small a ethanol target. Nucl. Instrum. Methods Phy	nizu, Z. He, K. Ishii, H. Tsuchida, A. Itoh <b>ngle scattering of swift protons passing through liquid</b> ys. Res. B 256, 97 (2007)	
	$\mathbf{H}^{+} + \mathbf{C}_{2}\mathbf{H}_{5}\mathbf{O}\mathbf{H} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction 2 MeV	$\mathrm{E}/\mathrm{T}$
1642.	V. Kuzmin On the correlation betwee targets. Nucl. Instrum. Methods Physics	een nuclear and electronic stopping of heavy ions in light ys. Res. B 256, 105 (2007)	
	$\mathbf{C}^+ + \mathbf{A}\mathbf{u} + \mathbf{A}\mathbf{l}$ $\mathbf{A}\mathbf{u}^+ + \mathbf{C} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction1-1000 keVPart. Beam-Matter Interaction1-1000 keV	Th Th
1643.	M. C. Tufan, H. Gumus, O. Calculation of the electroprotons by using molecul Nucl. Instrum. Methods Physical Science (1997) 1997 (19977) 1997 (1997) 1997 (1997) 1997 (1997) 1997 (1997) 1	Kabadayi onic stopping cross-sections of compounds for low energy lar orbitals. ys. Res. B 256, 118 (2007)	
	$egin{array}{lll} \mathbf{H}^+ + \mathbf{H}_2 \mathbf{O} + \mathbf{Al} \ \mathbf{H}^+ + \mathbf{C} \mathbf{H}_4 + \mathbf{Al} \end{array}$	Part. Beam-Matter Interaction Part. Beam-Matter Interaction	${ m Th}$ ${ m Th}$
1644.	E. A. Figueroa, N. R. Arista Determination of the diff loss of low-energy proton Nucl. Instrum. Methods Physics	, J. C. Eckardt, G. H. Lantschner Ference between the mean and the most probable energy a beams traversing thin solid foils. ys. Res. B 256, 126 (2007)	
	$H^+ + Bi + Al$	Part. Beam-Matter Interaction 3-9 keV	Exp
1645.	C. D. Denton, I. Abril, R. G Alignment effects in the Nucl. Instrum. Methods Physics	arcia-Molina, S. Heredia-Avalos interaction of $H_2^+$ molecules with thin foils. ys. Res. B 256, 137 (2007)	
	$\mathrm{H_{2}^{+}+C+Al}$	Part. Beam-Matter Interaction 0.5 MeV/amu	Th
1646.	J. Zuloaga, Z. L. Miskovic, H Energy loss and deflection sheet. Nucl. Instrum. Methods Physics	F. O. Goodman <b>in of fast ions under glancing incidence upon a graphene</b> ys. Res. B 256, 162 (2007)	
	$H^+ + C + Al$	Part. Beam-Matter Interaction	$\mathrm{Th}$
1647.	I. Abril, J. C. Moreno-Marin Garcia-Molina Calculation of the energy formalism: The role of in	n, J. M. Fernandez-Varea, C. D. Denton, S. Heredia-Avalos, R. y loss of swift H and He ions in Ag using the dielectric mer-shell ionization.	
		ys. 105. D 200, 112 (2007)	
	$egin{array}{lll} { m H}^+ + { m Ag} + { m Al} \ { m He}^+ + { m Ag} + { m Al} \end{array}$	Part. Beam-Matter Interaction $10^2 - 10^5 \text{ keV/amu}$ Part. Beam-Matter Interaction $10^2 - 10^5 \text{ keV/amu}$	΄Γh Th

1648. G. Lanzano, E. De Filippo, S. Hagmann, H. Rothard, C. Volant In-flight emission of projectile Auger electrons from highly energetic heavy ions (20 MeV/u; E; 100 MeV/u) colliding with carbon foils. Nucl. Instrum. Methods Phys. Res. B 256, 510 (2007)

$Ni^{14+} + C + Al$	Part. Beam-Matter Interaction	$20-100 { m MeV/u}$	Exp
$Ni^{19+} + C + Al$	Part. Beam-Matter Interaction	$20-100 { m MeV/u}$	Exp
$\mathbf{Kr}^{32+} + \mathbf{C} + \mathbf{Al}$	Part. Beam-Matter Interaction	$20-100 { m MeV/u}$	$\operatorname{Exp}$
$Kr^{34+} + C + Al$	Part. Beam-Matter Interaction	20-100 MeV/u	Exp

1649. H. Ogawa, N. Fujimoto, T. Ohata, M. Nagano, K. Ishii, N. Sakamoto, T. Kaneko Dependence of secondary electron emission on the emergent angle of 1 MeV/u H<sup>+</sup>, He<sup>2+</sup> and Li<sup>3+</sup> penetrating a thin carbon foil. Nucl. Instrum. Methods Phys. Res. B 256, 532 (2007)

$H^+ + C + Al$	Part. Beam-Matter Interaction	1 MeV/amu	Exp
$He^{2+} + C + Al$	Part. Beam-Matter Interaction	1 MeV/amu	Exp
$Li^{3+} + C + Al$	Part. Beam-Matter Interaction	1 MeV/amu	Exp

1650. G. Sun, M. Doebeli, A. M. Mueller, M. Stocker, M. Suter, L. Wacker Energy loss and straggling of heavy ions in silicon nitride in the low MeV energy

range.

Nucl. Instrum. Methods Phys. Res. B 256, 586 (2007)

		Ð
Part. Beam-Matter Interaction	0.4-4.0 MeV	Exp
Part. Beam-Matter Interaction	$0.4-4.0 { m MeV}$	Exp
Part. Beam-Matter Interaction	$0.4-4.0 { m MeV}$	Exp
Part. Beam-Matter Interaction	$0.4-4.0 { m MeV}$	Exp
Part. Beam-Matter Interaction	$0.4-4.0 { m MeV}$	Exp
Part. Beam-Matter Interaction	$0.4-4.0 { m MeV}$	Exp
	Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction Part. Beam-Matter Interaction	Part. Beam-Matter Interaction0.4-4.0 MeVPart. Beam-Matter Interaction0.4-4.0 MeV

## 1651. T. Kaneko, S. Ikegami

Average charge of MeV/atom carbon cluster ions impacted on foils. Nucl. Instrum. Methods Phys. Res. B 258, 57 (2007)

$C^+ + C + Al$	Part. Beam-Matter Interaction	1-2  MeV	Th
$C^+ + Al + Al$	Part. Beam-Matter Interaction	1-2  MeV	Th
$C_2^+ + C + Al$	Part. Beam-Matter Interaction	1-2  MeV	Th
$C_2^+ + Al + Al$	Part. Beam-Matter Interaction	$1-2 {\rm MeV}$	$\mathrm{Th}$

1652. T. Miyoshi, K. Noda, H. Tawara, I. Yu. Tolstikhina, V. P. Shevelko Distribution of exit silicon ions over excited states after penetrating through carbon foils at 2.65, 4.3 and 6.0 MeV/u. Nucl. Instrum. Methods Phys. Res. B 258, 329 (2007)

$\mathbf{C}^{2+} + \mathbf{C} + \mathbf{Al}$	Part. Beam-Matter Interaction	$2.65-6.0 { m MeV/u}$	Exp
$O^{3+} + C + Al$	Part. Beam-Matter Interaction	$2.65-6.0 { m MeV/u}$	Exp
$Ne^{4+} + C + Al$	Part. Beam-Matter Interaction	$2.65-6.0 { m MeV/u}$	Exp
$\mathrm{Si}^{5+} + \mathrm{C} + \mathrm{Al}$	Part. Beam-Matter Interaction	$2.65\text{-}6.0\;\mathrm{MeV/u}$	Exp

1653. M. Zadro, A. Di Pietro, P. Figuera, M. Fisichella, M. Lattuada, A. Maggio, F. Pansini, M. Papa, V. Scuderi, O. Yu. Goryunov, V. V. Ostashko Stopping power of helium gas for <sup>9</sup>Be ions from 2 to 31 MeV. Nucl. Instrum. Methods Phys. Res. B 259, 836 (2007)

$Be^+ + He + Al$ Part. Beam-Matter Interaction	2-31 MeV	Exp
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1654. M. Kitagawa

Theoretical solutions of stopping power in cylindrical many-electron systems. Vacuum 81, 160 (2006)

$\mathrm{H^{+}}+\mathrm{Al}+\mathrm{Al}$	Part. Beam-Matter Interaction	$1-50 {\rm ~MeV}$	$\mathrm{Th}$

1655. M. Moneta

A model for energy loss and straggling of slow ions in electron gas with intraband
exchange.
Vacuum 81, 1195 (2007)

 $\begin{array}{ll} \mathbf{H}^{+} + \mathbf{Ni} + \mathbf{Al} & \mbox{Part. Beam-Matter Interaction} & \mbox{Th} \\ \mathbf{H}^{+} + \mathbf{Gd} + \mathbf{Al} & \mbox{Part. Beam-Matter Interaction} & \mbox{Th} \end{array}$ 

1656. H. Paul, A. Schinner

Empirical stopping power tables for ions from  $_3Li$  to  $_{18}Ar$  and from 0.001 to 1000 MeV/nucleon in solids and gases.

At. Data Nucl. Data Tables 85, 377 (2003)

Li + He + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T
Li + Be + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + C + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Ne + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Al + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Si + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Ar + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Ti + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Fe + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Ni + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Cu + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Ge + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Kr + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Mo + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Ag + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Sn + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Xe + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Gd + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + W + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Pt + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Au + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + Pb + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Li + U + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Li + H_2 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Li + H_2O + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Li + CH_4 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Li + CO_2 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Li + N_2 + Al$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
$Li + O_2 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Li + Al_2O_3 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Be + He + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
Be + Be + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
Be + C + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
Be + Ne + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
Be + Al + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Be + Si + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
Be + Ar + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
Be + Ti + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T

Be + Fe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Be + Ni + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Be + Cu + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Be + Ge + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Be + Kr + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Be + Mo + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Be + Ag + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Be + Sn + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Be + Xe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Be + Gd + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T
Be + W + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T
Be + Pt + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T
Be + Au + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Be + Pb + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Be + U + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Be + H_2 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Be + H_2O + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$Be + CH_4 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$Be + CO_2 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$Be + N_2 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/'1
$Be + O_2 + AI$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/1
$\mathbf{Be} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/'1
B + He + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/1
B + Be + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/1
B + C + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/1
B + Ne + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/1
$\mathbf{B} + \mathbf{AI} + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/1 E/T
$\mathbf{B} + \mathbf{S}\mathbf{I} + \mathbf{A}\mathbf{I}$ $\mathbf{B} + \mathbf{A}\mathbf{n} + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/ 1 E / T
$\mathbf{D} + \mathbf{A}\mathbf{r} + \mathbf{A}\mathbf{I}$ $\mathbf{P} + \mathbf{T}\mathbf{i} + \mathbf{A}\mathbf{I}$	Part. Deam-Matter Interaction	0.001-1000 MeV	Е/ 1 Б /Т
$\mathbf{D} + \mathbf{II} + \mathbf{AI}$ $\mathbf{R} + \mathbf{F}_0 + \mathbf{AI}$	Part Boom Matter Interaction	0.001-1000 MeV	Е/ 1 F /T
B + Ie + AI B + Ni + AI	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
$B + Cu + \Delta l$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
B + Ge + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
B + Kr + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T E/T
$B + M_0 + Al$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T E/T
B + Ag + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T E/T
B + Sn + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
B + Xe + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	_/ - E/T
B + Gd + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	_/ _ E/T
B + W + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T
B + Pt + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \mathrm{MeV}$	É/T
B + Au + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	É/T
B + Pb + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	É/T
B + U + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	É/T
$\mathbf{B} + \mathbf{H}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
$\mathbf{B} + \mathbf{H}_2\mathbf{O} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
$\mathbf{B} + \mathbf{CH}_4 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
$\mathbf{B} + \mathbf{CO}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
$\mathbf{B} + \mathbf{N}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$\mathbf{B} + \mathbf{O}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$\mathbf{B} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + He + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Be + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + C + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
C + Ne + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T
C + Al + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T

C + Si + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Ar + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Ti + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Fe + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Ni + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Cu + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Ge + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Kr + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Mo + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Ag + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Sn + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Xe + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Gd + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + W + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Pt + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Au + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + Pb + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
C + U + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$C + H_2 + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$C + H_2O + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$\mathbf{C} + \mathbf{C}\mathbf{H}_4 + \mathbf{A}\mathbf{l}$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$\mathbf{C} + \mathbf{CO}_2 + \mathbf{Al}$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$\mathbf{C} + \mathbf{N}_2 + \mathbf{Al}$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$\mathbf{C} + \mathbf{O}_2 + \mathbf{Al}$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$C + Al_2O_3 + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
N + He + Al	Part.	Beam-Matter	Interaction	$0.001-1000 { m MeV}$	E/T
N + Be + Al	Part.	Beam-Matter	Interaction	$0.001-1000 { m MeV}$	E/T
N + C + Al	Part.	Beam-Matter	Interaction	$0.001-1000 { m MeV}$	E/T
N + Ne + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T
N + AI + AI	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T
N + Si + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T
N + Ar + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T D/T
N + Ti + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T D/T
N + Fe + AI	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/1
$\mathbf{N} + \mathbf{N}\mathbf{I} + \mathbf{A}\mathbf{I}$	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/1 E/T
N + Cu + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/1 E/T
N + Ge + AI $N + K_n + AI$	Part.	Deam-Matter	Interaction	0.001-1000 MeV	E/ 1 E/T
$\mathbf{N} + \mathbf{K}\mathbf{I} + \mathbf{A}\mathbf{I}$ $\mathbf{N} + \mathbf{M}_{\mathbf{O}} + \mathbf{A}\mathbf{I}$	Port	Beam-Matter	Interaction	0.001-1000 MeV	E/ I F/T
N + MO + AI	Dort	Boom Motter	Interaction	0.001-1000 MeV	E/ I F /T
N + Sn + Al	Port	Boom Matter	Interaction	0.001-1000 MeV	Б/Т F/Т
N + Sn + Al $N + X_0 + Al$	Part	Beam-Matter	Interaction	0.001-1000 MeV	Б/Т Е/Т
N + Gd + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T
N + W + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T
N + Pt + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T
N + Au + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T
N + Pb + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	—/ – E/T
N + U + Al	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T
$N + H_2 + Al$	Part.	Beam-Matter	Interaction	0.001-1000 MeV	E/T
$N + H_2O + Al$	Part.	Beam-Matter	Interaction	0.001-1000 MeV	_/ T E/T
$N + CH_4 + Al$	Part.	Beam-Matter	Interaction	0.001-1000  MeV	É/T
$N + CO_2 + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000 \mathrm{MeV}$	É/T
$N + N_2 + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E'/T
$N + O_2 + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	É/T
$N + Al_2O_3 + Al$	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	É/T
O + He + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
O + Be + Al	Part.	Beam-Matter	Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T

O + C + Al	Part Beam-Matter Interaction	0.001-1000  MeV	E/T
O + Ne + Al	Part Beam-Matter Interaction	0.001 1000 MeV	E/T
O + AI + AI	Part Beam Matter Interaction	0.001-1000  MeV	E/T
O + AI + AI	Part Deam-Matter Interaction	0.001-1000 MeV	E/ I E /T
O + SI + AI	Part. Deam-Matter Interaction	0.001-1000 MeV	E/ 1 E /T
O + AF + AI	Part. Deam-Matter Interaction	0.001-1000 MeV	E/ 1
O + Ti + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{O} + \mathbf{Fe} + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
O + Ni + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
O + Cu + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
O + Ge + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
O + Kr + Al	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T
O + Mo + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
O + Ag + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
O + Sn + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
O + Xe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
O + Gd + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
O + W + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
O + Pt + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
O + Au + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T
O + Pb + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	É/T
O + U + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	É/T
$\mathbf{O} + \mathbf{H}_2 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000  MeV	É/T
$O + H_2O + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	É/T
$O + CH_4 + Al$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
$O + CO_2 + Al$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
$O + N_2 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	—/ – E/T
$\mathbf{O} + \mathbf{O}_2 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	—/ – E/T
$\mathbf{O} + \mathbf{A}\mathbf{I}_2\mathbf{O}_2 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	—/ – E/T
F + He + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
F + Be + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
F + C + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
F + Ne + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
F + AI + AI	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \mathbf{Si} + \mathbf{Al}$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \Delta \mathbf{r} + \Delta \mathbf{l}$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} \perp \mathbf{T} \mathbf{i} \perp \mathbf{A} \mathbf{l}$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \mathbf{F}_0 + \mathbf{A}_1$	Part Boam Matter Interaction	0.001-1000 MeV	D/ Т F /Т
$\mathbf{F} + \mathbf{I}\mathbf{C} + \mathbf{A}\mathbf{I}$ $\mathbf{F} + \mathbf{N}\mathbf{i} + \mathbf{A}\mathbf{I}$	Part Boam Matter Interaction	0.001-1000 MeV	D/ Т F /Т
$\mathbf{F} + \mathbf{O}\mathbf{r} + \mathbf{A}\mathbf{I}$	Part Beam Matter Interaction	0.001-1000 MeV	E/T E/T
$\mathbf{F} + \mathbf{C}\mathbf{u} + \mathbf{A}\mathbf{I}$ $\mathbf{F} + \mathbf{C}\mathbf{u} + \mathbf{A}\mathbf{I}$	Part Poam Matter Interaction	0.001-1000 MeV	E/ 1 E /T
$\mathbf{F} + \mathbf{G}\mathbf{e} + \mathbf{A}\mathbf{I}$ $\mathbf{F} + \mathbf{K}_{n} + \mathbf{A}\mathbf{I}$	Part Poam Matter Interaction	0.001-1000 MeV	E/ 1 E /T
$\mathbf{F} + \mathbf{K}\mathbf{I} + \mathbf{A}\mathbf{I}$ $\mathbf{F} + \mathbf{M}_{\mathbf{O}} + \mathbf{A}\mathbf{I}$	Part Poam Matter Interaction	0.001-1000 MeV	E/ 1 E /T
$\mathbf{F} + \mathbf{MO} + \mathbf{AI}$ $\mathbf{F} + \mathbf{Am} + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001 - 1000  MeV	E/ 1 E / T
$\mathbf{F} + \mathbf{Ag} + \mathbf{AI}$ $\mathbf{F} + \mathbf{Sm} + \mathbf{AI}$	Part Poam Matter Interaction	0.001-1000 MeV	E/ 1 E /T
$\mathbf{F} + \mathbf{S}\mathbf{I} + \mathbf{A}\mathbf{I}$ $\mathbf{F} + \mathbf{V}_{\mathbf{a}} + \mathbf{A}\mathbf{I}$	Part. Deam-Matter Interaction	0.001-1000 MeV	E/ 1 E /T
$\mathbf{r} + \mathbf{A}\mathbf{e} + \mathbf{A}\mathbf{I}$ $\mathbf{F} + \mathbf{C}\mathbf{I} + \mathbf{A}\mathbf{I}$	Part. Deam-Matter Interaction	0.001-1000 MeV	E/ 1 E /T
$\mathbf{F} + \mathbf{G}\mathbf{a} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/ 1 E/T
$\mathbf{F} + \mathbf{W} + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/1
$\mathbf{F} + \mathbf{Pt} + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \mathbf{A}\mathbf{u} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \mathbf{Pb} + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \mathbf{U} + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/'1
$\mathbf{F} + \mathbf{H}_2 + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \mathbf{H}_2\mathbf{O} + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \mathbf{C}\mathbf{H}_4 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \mathbf{CO}_2 + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \mathbf{N}_2 + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{F} + \mathbf{O}_2 + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T

$\mathbf{F} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T
Ne + He + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	E/T
Ne + Be + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	É/T
Ne + C + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	$\dot{E/T}$
Ne + Ne + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	$\dot{E/T}$
Ne + Al + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	$\dot{E/T}$
Ne + Si + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	$\dot{E/T}$
Ne + Ar + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	$\dot{E/T}$
Ne + Ti + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Ne + Fe + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
Ne + Ni + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
Ne + Cu + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
Ne + Ge + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
Ne + Kr + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
Ne + Mo + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
Ne + Ag + Al	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
$Ne + Sn + \Delta l$	Part Beam-Matter Interaction	0.001-1000 MeV	E/T
$N_0 + X_0 + Al$	Part Beam-Matter Interaction	0.001-1000  MeV	E/T
Ne + Cd + Al	Part Beam-Matter Interaction	0.001-1000  MeV	E/T
$N_0 + W + Al$	Part Beam Matter Interaction	0.001 + 1000  MeV	E/T
$N_0 + P_t + A_1$	Part Beam Matter Interaction	0.001 + 1000  MeV	E/T
$N_{0} + A_{1} + A_{1}$	Part Beam Matter Interaction	0.001 + 1000  MeV	Б/Т Б/Т
Ne + Au + Al	Part. Deam-Matter Interaction	0.001-1000  MeV	
Ne + FD + AI	Part Deam Matter Interaction	0.001-1000  MeV	E/ I E/T
Ne + U + AI	Part. Deam-Matter Interaction	0.001-1000  MeV	E/ 1 E/T
$\mathbf{N}\mathbf{e} + \mathbf{n}_2 + \mathbf{A}\mathbf{I}$	Part. Deam-Matter Interaction	0.001-1000  MeV	E/ 1 E/T
$Ne + H_2O + AI$	Part. Deam-Matter Interaction	0.001-1000  MeV	E/1 E/T
$Ne + CH_4 + AI$	Part. Deam-Matter Interaction	0.001-1000  MeV	E/1 E/T
$Ne + CO_2 + AI$	Part. Deam-Matter Interaction	0.001-1000 MeV	
$\mathbf{Ne} + \mathbf{N}_2 + \mathbf{AI}$	Part. Beam-Matter Interaction	0.001-1000 MeV	
$Ne + O_2 + AI$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T
$Ne + Al_2O_3 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T
Na + He + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	
Na + Be + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I E/T
Na + C + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I D/T
Na + Ne + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/I D/T
Na + AI + AI	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Si + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Ar + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Ti + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Fe + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Ni + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Cu + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Ge + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Kr + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Mo + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Ag + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Sn + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Xe + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Gd + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	Е/'Г
Na + W + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Pt + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Au + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + Pb + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
Na + U + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$Na + H_2 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$Na + H_2O + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$Na + CH_4 + Al$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T

$Na + CO_2 + Al$	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
$Na + N_2 + Al$	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
$Na + O_2 + Al$	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
$Na + Al_2O_3 + Al$	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + He + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Be + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + C + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Ne + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Al + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Si + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Ar + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Ti + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Fe + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Ni + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Cu + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Ge + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Kr + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Mo + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Ag + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Sn + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Xe + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Gd + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + W + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Pt + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Au + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + Pb + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Mg + U + AI	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
$Mg + H_2 + AI$	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
$Mg + H_2O + AI$	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
$Mg + CH_4 + AI$	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/I E/T
$Mg + CO_2 + AI$	Part. De	eam-Matter	Interaction	0.001-1000	MeV	E/I F/T
$Mg + N_2 + Al$	Dort Bo	eam-Matter	Interaction	0.001-1000	MeV	$\mathbf{E}/\mathbf{T}$
$Mg + \Delta l_2 \Omega_2 + Al$	Port Bo	ann-Matter	Interaction	0.001-1000	MeV	E/T
$A_1 \perp H_0 \perp A_1$	Part Re	am-Matter	Interaction	0.001-1000	MeV	E/T
AI + Be + AI	Part Be	am-Matter	Interaction	0.001-1000	MeV	E/T
Al + C + Al	Part Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Ne + Al	Part Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Al + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Si + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Ar + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Ti + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Fe + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Ni + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Cu + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Ge + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Kr + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	É/T
Al + Mo + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Ag + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Sn + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Xe + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Gd + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + W + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Pt + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Au + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + Pb + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
Al + U + Al	Part. Be	eam-Matter	Interaction	0.001-1000	MeV	E/T
$Al + H_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
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$Al + H_2O + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
$Al + CH_4 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
$Al + CO_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
$Al + N_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
$Al + O_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
$Al + Al_2O_3 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + He + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Be + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + C + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Ne + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Al + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Si + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Ar + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Ti + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Fe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Ni + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Cu + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Ge + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Kr + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Mo + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Ag + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Sn + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Xe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Gd + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + W + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Pt + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Au + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + Pb + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
Si + U + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T			
$Si + H_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T			
$Si + H_2O + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T			
$\mathbf{Si} + \mathbf{CH}_4 + \mathbf{Al}$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T			
$Si + CO_2 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T			
$Si + N_2 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T			
$Si + O_2 + Al$	Part. Beam-Matter Interaction	0.001-1000  MeV	E/T			
$Si + Al_2O_3 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T			
P + He + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T			
P + Be + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T			
P + C + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T			
P + Ne + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T			
P + Al + Al	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T			
P + Si + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T			
P + Ar + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T			
$\mathbf{P} + \mathbf{Ti} + \mathbf{Al}$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T			
$\mathbf{P} + \mathbf{F}\mathbf{e} + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T			
P + Ni + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T			
P + Cu + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T			
P + Ge + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T			
$\mathbf{P} + \mathbf{K}\mathbf{r} + \mathbf{A}\mathbf{l}$	Part. Beam-Matter Interaction	U.UU1-1000 MeV	E/T			
$\mathbf{P} + \mathbf{M}0 + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	U.UU1-1000 MeV	E/T			
P + Ag + Al	Part. Beam-Matter Interaction	U.UU1-1000 MeV	E/T			
r + 5n + Al D + Va + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T			
$\mathbf{r} + \mathbf{A}\mathbf{e} + \mathbf{A}\mathbf{I}$ $\mathbf{D} + \mathbf{C}\mathbf{d} + \mathbf{A}\mathbf{I}$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T			
r + Ga + Al D + W + Al	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T			
$\Gamma + W + AI$	rart. Deam-Matter Interaction	0.001-1000 MeV	E/T			
$\Gamma + \Gamma \iota + AI$	rart. Deam-matter interaction	0.001-1000 MeV	Ľ/ 1			

P + Au + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T
P + Pb + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	É/T
P + U + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$P + H_2 + Al$	Part.	Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	É/T
$P + H_2O + Al$	Part.	Beam-Matter Interaction	$0.001\text{-}1000 \; \mathrm{MeV}$	É/T
$\mathbf{P} + \mathbf{C}\mathbf{H}_4 + \mathbf{A}\mathbf{I}$	Part.	Beam-Matter Interaction	0.001-1000  MeV	É/T
$P + CO_2 + Al$	Part.	Beam-Matter Interaction	0.001-1000  MeV	É/T
$\mathbf{P} + \mathbf{N}_2 + \mathbf{Al}$	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T
$P + O_2 + Al$	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
$P + Al_2O_2 + Al_2O_3$	Part.	Beam-Matter Interaction	0.001-1000 MeV	_/ _ E/T
S + He + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	—/ – E/T
S + Be + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + C + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Ne + Al	Part	Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{S} + \mathbf{A}\mathbf{I} + \mathbf{A}\mathbf{I}$	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
$\mathbf{S} + \mathbf{S}\mathbf{i} + \mathbf{A}\mathbf{l}$	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T E/T
S + Ar + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Ti + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Fe + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Ni + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Cu + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Ge + Al	Part	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Kr + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Mo + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Ag + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Sn + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
S + Xe + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	_/ - E/T
S + Gd + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T
S + W + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T
S + Pt + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T
S + Au + Al	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	$\mathbf{E}'$ T
S + Pb + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	É/T
S + U + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	É/T
$\mathbf{S} + \mathbf{H}_2 + \mathbf{Al}$	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$S + H_2O + Al$	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$S + CH_4 + Al$	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$S + CO_2 + Al$	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$\mathbf{S} + \mathbf{N}_2 + \mathbf{Al}$	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$S + O_2 + Al$	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$\mathbf{S} + \mathbf{Al}_2\mathbf{O}_3 + \mathbf{Al}$	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + He + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + Be + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + C + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + Ne + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + Al + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + Si + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + Ar + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + Ti + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + Fe + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + Ni + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + Cu + Al	Part.	Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + Ge + Al	Part.	Beam-Matter Interaction	0.001-1000  MeV	E/T
Cl + Kr + Al	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
Cl + Mo + Al	Part.	Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
Cl + Ag + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
Cl + Sn + Al	Part.	Beam-Matter Interaction	0.001-1000 MeV	E/T
Cl + Xe + Al	Part.	Beam-Matter Interaction	0.001  1000  MeV	E/T

Cl + Gd + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + W + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	É/T
Cl + Pt + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	É/T
Cl + Au + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T
Cl + Pb + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Cl + U + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T
$Cl + H_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T
$Cl + H_2O + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$Cl + CH_4 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000 { m MeV}$	E/T
$Cl + CO_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$Cl + N_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$Cl + O_2 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
$Cl + Al_2O_3 + Al$	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Ar + He + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Ar + Be + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Ar + C + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Ar + Ne + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Ar + Al + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Ar + Si + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Ar + Ar + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Ar + Ti + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Ar + Fe + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Ar + Ni + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Ar + Cu + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Ar + Ge + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000~\mathrm{MeV}$	E/T
Ar + Kr + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Ar + Mo + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Ar + Ag + Al	Part. Beam-Matter Interaction	$0.001\text{-}1000\;\mathrm{MeV}$	E/T
Ar + Sn + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Ar + Xe + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Ar + Gd + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Ar + W + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Ar + Pt + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Ar + Au + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Ar + Pb + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
Ar + U + Al	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Ar + H_2 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Ar + H_2O + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Ar + CH_4 + Al$	Part. Beam-Matter Interaction	$0.001-1000 { m MeV}$	E/T
$Ar + CO_2 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$Ar + N_2 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T
$Ar + O_2 + Al$	Part. Beam-Matter Interaction	0.001-1000 MeV	E/T
$Ar + Al_2O_3 + Al$	Part. Beam-Matter Interaction	0.001  1000  MeV	E/T

## 3.7 Interactions of Atomic Particles with Fields

1657. A. V. Turbiner, J. C. Lopez Vieyra, N. L. Guevara Exotic  $H_3^{2+}$  ion in a strong magnetic field: Linear configuration. Phys. Rev. A 72, 023403 (2005)

 $\mathbf{H}_{3}^{2+} + \mathbf{Al}$ 

## Atom Field Interaction

 $\mathrm{Th}$ 

1658. K. M. Dunseath, M. Terao-Dunseath, G. Bourhis Selection rules for laser-assisted electron-atom collisions with the laser field normal to the scattering plane. Phys. Rev. A 72, 033410 (2005)

	e + He + Al	Atom Field Interaction	4-22  eV	$\mathrm{Th}$
1659.	A. S. Alnaser, M. Zamkov, Litvinyuk Resonant excitation dur	X. M. Tong, C. M. Maharjan, P.	Ranitovic, C. L. Cocke, I. V.	
	Phys. Rev. A 72, 041402 (2	005)		
	$O_2 + Al$	Atom Field Interaction	550-1800 nm	Exp
1660.	C. M. Maharjan, A. S. Alna I. V. Litvinyuk, C. L. Cocke Momentum imaging of a ization region. Phys. Rev. A 72, 041403 (2	aser, X. M. Tong, B. Ulrich, P. Ra e doubly charged ions of Ne and 005)	nitovic, S. Ghimire, Z. Chang, d <b>Ar in the sequential ion-</b>	
	Ne + Al	Atom Field Interaction	800 nm	Exp
	Ar + Al	Atom Field Interaction	800 nm	Exp
1661.	M. Buser, L. Frommhold Collision-induced rototr Phys. Rev. A 72, 042715 (2	anslational absorption in com 005)	pressed methane gas.	<b>T</b> 1
	$CH_4 + AI$	Atom Field Interaction	163-297 К	Th
1662.	E. J. Angstmann, T. H. Dir <b>Parity nonconservation</b> Phys. Rev. A 72, 052108 (2	nh, V. V. Flambaum in atomic Zeeman transitions 005)		
	K + Al	Atom Field Interaction	0-1 T	$\mathrm{Th}$
	$\mathbf{Rb} + \mathbf{Al}$	Atom Field Interaction	0-1 T	$\mathrm{Th}$
	Cs + Al	Atom Field Interaction	0-1 T	$\mathrm{Th}$
	$Ba^+ + Al$	Atom Field Interaction	0-1 T	$\mathrm{Th}$
	Au + Al	Atom Field Interaction	0-1 T	$\mathrm{Th}$
	Tl + Al	Atom Field Interaction	0-1 T	$\mathrm{Th}$
	Fr + Al	Atom Field Interaction	0-1 T	$\mathrm{Th}$
1663.	A. Chattopadhyay, C. Sinha Ionization of a hydrogen of a laser field. Phys. Rev. A 72, 053406 (2	n nic ion by electron and positr 005)	on impact in the presence	
	$e + He^+ + Al$	Atom Field Interaction	200-500  eV	$\mathrm{Th}$
1664.	C. Rangan, R.J.A. Murray <b>Theory of detection of a</b> <b>cycle pulses.</b> Phys. Rev. A 72, 053409 (2	angular momentum states in 1 005)	Rydberg atoms using half-	
	H + AI	Atom Field Interaction	0.001-0.009 a.u.	Th
	$H^* + Al$	Atom Field Interaction	0.001-0.009 a.u.	Th
	Cs + Al	Atom Field Interaction	0.001-0.009 a.u.	Th
	$Cs^* + Al$	Atom Field Interaction	0.001-0.009 a.u.	$\mathrm{Th}$
1665	L C Managaga A D L C-:	nog V A Nagoimento O Duliou	I Written V & Domeste	

1665. L. G. Marcassa, A.R.L. Caires, V. A. Nascimento, O. Dulieu, J. Weiner, V. S. Bagnato Storage ring to investigate cold unidimensional atomic collisions. Phys. Rev. A 72, 060701 (2005)

Rb + Rb + Al	Atom Field Interaction	10  cm/s	Exp
$\mathrm{Rb} + \mathrm{Rb}^* + \mathrm{Al}$	Atom Field Interaction	10  cm/s	Exp

1666. A. Krug, A. Buchleitner

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Universal ionization threshold for strongly driven Rydberg states.
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Phys. Rev. A 72, 061402 (2005)

H + Al	Atom Field Interaction	$8.9-36~\mathrm{GHz}$	$\mathrm{Th}$
Li + Al	Atom Field Interaction	$8.9-36~\mathrm{GHz}$	$\mathrm{Th}$
Na + Al	Atom Field Interaction	$8.9-36~\mathrm{GHz}$	$\mathrm{Th}$
Rb + Al	Atom Field Interaction	$8.9-36~\mathrm{GHz}$	Th

1667.	. A. V. Lugovskoy, I. Bray Sudden perturbation of hydrogen atoms by intense ultrashort laser pulses. Phys. Rev. A 72, 063402 (2005)			
	H + Al	Atom Field Interaction	$10^{-3} - 0.2$ a.u.	$\mathrm{Th}$
1668.	M. G. Dimova, M. S. Kasch The Kantorovich metho strong magnetic field: L J. Phys. B 38, 2337 (2005)	iev, S. I. Vinitsky d for high-accuracy calculat ow-lying excited states.	ions of a hydrogen atom in a	
	H + Al	Atom Field Interaction	$0 - 10^{13} { m Ga}$	Th
1669.	M. N. Guimaraes, F. V. Pro A study of the confined J. Phys. B 38, 2811 (2005)	udente hydrogen atom using the fi	nite element method.	
	H + Al	Atom Field Interaction		$\mathrm{Th}$
1670.	S. Cohen, S. I. Themelis Construction of RKR-Q2 polarizabilities and hype J. Phys. B 38, 3705 (2005)	DT atomic model potentials er-polarizabilities.	for the calculation of Lithium	
	Li + Al	Atom Field Interaction		Th
1671.	O. Guyetand, M. Gisselbred Antonucci, O. Boyko, C. Va Multicolour above-thress in angular distributions J. Phys. B 38, L357 (2005)	cht, A. Huetz, P. Agostini, R. 7 alentin, D. Douillet shold ionization of helium:	Taieb, V. Veniard, A. Maquet, L. Quantum interference effects	
	He + Al	Atom Field Interaction	810 nm	$\mathrm{E}/\mathrm{T}$
1672.	V. A. Pazdzersky, A. V. Ko Angular photoelectron s field. J. Phys. B 38, 3945 (2005)	wal spectra for atom ionization i	in an intense two-colour laser	
	H + Al Xe + Al	Atom Field Interaction Atom Field Interaction	1.93 eV 1.93 eV	Th Th

1673. M. Ortiz, R. Mayo

Measurement of the Stark broadening for several lines of singly ionized gold. J. Phys. B 38, 3953 (2005)

	$Au^+ + Al$	Atom Field Interaction		Exp
1674.	M. Madine, H. W. van der H Competition between mu He 1s2s <sup>1</sup> S. J. Phys. B 38, 3963 (2005)	lart Ilti-photon emission of the 1s	s and the 2s electron from	
	$egin{array}{ll} { m He} + { m Al} \ { m He}^* + { m Al} \end{array}$	Atom Field Interaction Atom Field Interaction	11.2-49.50 eV 11.2-49.50 eV	$_{\mathrm{Th}}^{\mathrm{Th}}$
1675.	M. Awasthi, Y. V. Vanne, A Non-perturbative solutio ing $H_2$ in intense short la J. Phys. B 38, 3973 (2005)	. Saenz n of the time-dependent Schu ser pulses.	rodinger equation describ-	
	$egin{array}{lll} {f He} + {f Al} \ {f H}_2 + {f Al} \end{array}$	Atom Field Interaction Atom Field Interaction	2-30 eV 2-30 eV	Th Th
1676.	V. N. Ostrovsky High harmonic generation functions. J. Phys. B 38, 4399 (2005)	n by anions and atoms: Effect	of initial/final-state wave-	
	$\begin{array}{l} \mathbf{H}+\mathbf{Al}\\ \mathbf{H}^{*}+\mathbf{Al}\\ \mathbf{B}+\mathbf{Al}\\ \mathbf{F}^{-}+\mathbf{Al}\\ \mathbf{Ne}+\mathbf{Al}\\ \mathbf{I}^{-}+\mathbf{Al}\\ \mathbf{Xe}+\mathbf{Al} \end{array}$	Atom Field Interaction Atom Field Interaction Atom Field Interaction Atom Field Interaction Atom Field Interaction Atom Field Interaction		Th Th Th Th Th Th Th
1677.	R. J. Pelaez, V. R. Gonzalez Stark parameters of neut Astron. Astrophys. 453, 751	, F. Rodriguez, J. A. Aparicio, S. <b>ral helium 318.8 nm line.</b> (2006)	Mar	
	He + Al	Atom Field Interaction	318.8 nm	Exp
1678.	S.Y.T. van de Meerakker, N. <b>Transverse stability in a</b> Phys. Rev. A 73, 023401 (20	Vanhaecke, H. L. Bethlem, G. M Stark decelerator. 006)	leijer	
	OH + Al	Atom Field Interaction		$\mathrm{E}/\mathrm{T}$
1679.	X. Dai, EB.W. Lerch, S. R. Coherent control through Phys. Rev. A 73, 023404 (20	. Leone <b>n near-resonant Raman trans</b> 106)	itions.	
	$Li_2 + Al$	Atom Field Interaction	$12,500 \ cm^{-1}$	$\mathrm{E}/\mathrm{T}$
1680.	E. S. Shuman, T. F. Gallagh Microwave spectroscopy Phys. Rev. A 73, 032511 (20	er of autoionizing Ba 5d <sub>3/2</sub> nl sta 006)	ites.	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Atom Field Interaction Atom Field Interaction	50-70 GHz 50-70 GHz	Exp Exp
1681.	F. Ferlaino, C. D'Errico, G. Feshbach spectroscopy of Phys. Rev. A 73, 040702 (20	Roati, M. Zaccanti, M. Inguscio, <b>F a K-Rb atomic mixture.</b> 006)	G. Modugno, A. Simoni	

	K + Rb + Al	Atom Field Interaction	$1x10^{-6} { m K}$	Exp
1682.	E. Juarros, P. Pellegrini, K. <b>Dne-photon-assisted form</b> Phys. Rev. A 73, 041403 (20	Kirby, R. Cote nation of ultracold polar mole 06)	ecules.	
	Li + H + Al Na + H + Al	Atom Field Interaction Atom Field Interaction	1 mK 1 mK	Th Th
1683.	T. Niederhausen, U. Thumm Capture and ionization in Phys. Rev. A 73, 041404 (20	n laser-assisted proton-hydrog 06)	gen collisions.	
	$H^+ + H + Al$	Atom Field Interaction	1.21  keV	$\mathrm{Th}$
1684.	J. Sjakste, A. G. Borisov, J. <b>Ionization of Rydberg at</b> Phys. Rev. A 73, 042903 (20	P. Gauyacq oms colliding with a metal su 06)	ırface.	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Atom Field Interaction Atom Field Interaction	0.005-0.01 a.u. 0.005-0.01 a.u.	Th Th
1685.	J. McKenna, M. Suresh, B. Stebbings, W. R. Newell, I.C. J. L. Collier Ultrafast ionization study fields. Phys. Rev. A 73, 043401 (20)	Srigengan, I. D. Williams, W. A. E. Turcu, J. M. Smith, E. J. Divation of $N_2$ in intense linearly and 006)	Bryan, E.M.L. English, S. L. ll, C. J. Hooker, A. J. Langley, d circularly polarized laser	
	$N_2 + Al$	Atom Field Interaction	790 nm	Exp
1686.	K. J. LaGattuta Behavior of $H_2^+$ and $H_2$ dynamics. Phys. Rev. A 73, 043404 (20)	in strong laser fields simula	ted by fermion molecular	
	$egin{array}{lll} \mathbf{H}_2 + \mathbf{Al} \ \mathbf{H}_2^+ + \mathbf{Al} \end{array}$	Atom Field Interaction Atom Field Interaction	758 nm 758 nm	Th Th
1687.	T. Topcu, F. Robicheaux <b>Radiative cascade of high</b> Phys. Rev. A 73, 043405 (20	nly excited hydrogen atoms in 106)	n strong magnetic fields.	
	$f H + Al \\ H^* + Al f$	Atom Field Interaction Atom Field Interaction		$_{\rm Th}$
1688.	G. Yang, Y. Zheng, X. Chi <b>Photodetachment of</b> $H^-$ Phys. Rev. A 73, 043413 (20)	in a static electric field near a 06)	an elastic wall.	
	$H^- + Al$	Atom Field Interaction	0.75-1.05  eV	$\mathrm{Th}$
1689.	F. Anis, V. Roudnev, R. Cal Laser-assisted charge tran Phys. Rev. A 73, 043414 (20	prera-Trujillo, B. D. Esry <b>nsfer in</b> $He^{2+}$ + H collisions. 06)		
	$He^{2+} + H + Al$	Atom Field Interaction	1 keV	$\mathrm{Th}$

1690.	R. N. Coffee, L. Fang, G. N. Gibson <b>Light-induced potentials ignite dissociation of</b> $N_2^{2+}$ . Phys. Rev. A 73, 043417 (2006)				
	$N_2 + Al$	Atom Field Interaction	400-1200 nm	Exp	
1691.	T. Rieger, T. Junglen Water vapor at a t Phys. Rev. A 73, 061	, S. A. Rangwala, G. Rempe, P.W.H ranslational temperature of 1 k 402 (2006)	I. Pinkse, J. Bulthuis K.		
	$egin{array}{lll} { m H}_2{ m O}+{ m Al}\ { m D}_2{ m O}+{ m Al} \end{array}$	Atom Field Interaction Atom Field Interaction	1 K 1 K	$\operatorname{Exp}$	
1692.	C. Ruiz, L. Plaja, R. Quantum and semi Phys. Rev. A 73, 063	Taieb, V. Veniard, A. Maquet classical simulations in intense 411 (2006)	$laser - H_2^+$ interactions.		
	$\mathbf{H}_{2}^{+} + \mathbf{Al}$	Atom Field Interaction	0.043 a.u.	$\mathrm{Th}$	
1693.	LY. Peng, Q. Wang, Photodetachment magnetic fields. Phys. Rev. A 74, 023	A. F. Starace of $H^-$ by a short laser pulse = 402 (2006)	in crossed static electric and	d	
	$H^- + Al$	Atom Field Interaction	$0-500 \ cm^{-1}$	$\mathrm{Th}$	
1694.	C. B. Madsen, L. B. I <b>High-order harmonic including nuclear</b> in Phys. Rev. A 74, 023	Madsen nic generation from arbitrarily notion and field-free alignment. 403 (2006)	oriented diatomic molecule	s	
	$\mathbf{H}_2 + \mathbf{Al}$	Atom Field Interaction	800 nm	Th	
	$\mathbf{D}_2 + \mathbf{AI}$	Atom Field Interaction	800 nm 800 nm	Th Th	
	$\mathbf{O}_2 + \mathbf{AI}$ $\mathbf{O}_2 + \mathbf{AI}$	Atom Field Interaction	800 nm	Th	
1695.	X. Guan Oscillator strength with arbitrary mut Phys. Rev. A 74, 023	spectrum of hydrogen in stron ual orientation. 413 (2006)	g magnetic and electric field	s	
	H + Al	Atom Field Interaction	$10^8 \mathrm{V/m}$	Th	
1696.	I. A. Ivanov, A. S. Kit Single-photon doul Phys. Rev. A 74, 042	neifets <b>ble ionization of helium in the</b> p 710 (2006)	presence of dc electric field.		
	He + Al	Atom Field Interaction	85-90  eV	$\mathrm{Th}$	
1697.	R. Santra, R. W. Dur <b>Spin-orbit effect or</b> Phys. Rev. A 74, 043	aford, L. Young a strong-field ionization of kryp 403 (2006)	ton.		
	Kr + Al	Atom Field Interaction	800 nm	$\mathrm{Th}$	
1698.	SM. Wang, KJ. Yu Phase control of the intense few-cycle la Phys. Rev. A 74, 043	an, YY. Niu, YC. Han, SL. Cor ne photofragment branching ra- aser pulses. 406 (2006)	ng tio of the HI molecule in two	0	

	HI + Al	Atom Field Interaction	$10^{13} \mathrm{~W}/cm^2$	$\mathrm{Th}$
1699.	J. McKenna, M. Suresh, B. Stebbings, W. R. Newell, I.C J. L. Collier <b>Rescattering-enhanced d</b> Phys. Rev. A 74, 043409 (20	Srigengan, I. D. Williams, W. A. .E. Turcu, J. M. Smith, E. J. Diva issociation of a molecular ion 006)	Bryan, E.M.L. English, S. L. Il, C. J. Hooker, A. J. Langley,	
	$\mathbf{CO}_2^+ + \mathbf{Al}$	Atom Field Interaction	$3x10^{13}-6x10^{16}~{\rm W}/cm^2$	Exp
1700.	H. Ohmura, F. Ito, M. Tachi Phase-sensitive molecula laser field in methyl halid Phys. Rev. A 74, 043410 (20	iya ur ionization induced by a p des. 006)	phase-controlled two-color	
	$CH_{3}I + Al$	Atom Field Interaction	$10^{12} - 10^{13} \text{ W/cm}^2$	Exp
	$CH_3Cl + Al$	Atom Field Interaction	$10^{12} - 10^{13} \text{ W/cm}^2$	Exp
	$CH_3Br + Al$	Atom Field Interaction	$10^{12} - 10^{13} \text{ W/} cm^2$	Exp
	$CH_3F + Al$	Atom Field Interaction	$10^{12} - 10^{13} \text{ W/} cm^2$	Exp
1701.	P. Q. Wang, A. M. Sayler, K Dissociation of $H_2^+$ in in three-dimensional moment Phys. Rev. A 74, 043411 (20)	X. D. Carnes, J. F. Xia, M. A. Sm ntense femtosecond laser fiel ntum imaging. 006)	ith, B. D. Esry, I. Ben-Itzhak ds studied by coincidence	
	$\mathbf{H}_{2}^{+} + \mathbf{Al}$	Atom Field Interaction	790 nm	$\mathrm{E}/\mathrm{T}$
1702.	J. M. Menendez, I. Martin, A Molecular quantum defect Phys. Rev. A 74, 043413 (20)	A. M. Velasco ct orbital study of the Stark 006)	effect in the $H_3$ molecule.	
	$H_3 + Al$	Atom Field Interaction		Th
1703.	M. Vafaee, H. Sabzyan, Z. V Detailed instantaneous ic Phys. Rev. A 74, 043416 (20	Tafaee, A. Katanforoush <b>onization rate of</b> $H_2^+$ <b>in an in</b> 006)	tense laser field.	
	$\mathbf{H}_{2}^{+} + \mathbf{Al}$	Atom Field Interaction	$10^{14} \mathrm{~W}/cm^2$	Th
1704.	E. Shchekinova, C. Chandre, Phase-space structures as cally polarized microwave Phys. Rev. A 74, 043417 (20)	T. Uzer nd ionization dynamics of the es. 006)	e hydrogen atom in ellipti-	
	H + Al	Atom Field Interaction		Th
1705.	KJ. Yuan, Z. Sun, SL. Co Molecular photoelectron ting under rotational and Phys. Rev. A 74, 043421 (20	ong, N. Lou <b>spectrum in ultrashort laser f</b> <b>1 aligned effects.</b> 006)	ields: Autler-Townes split-	
	$Na_2 + Al$	Atom Field Interaction	$2.5\text{-}7.5,10^{11}~\mathrm{W}/cm^2$	$\mathrm{Th}$
1706.	E. L. Foley, F. M. Levinton A collisional-radiative moradiation. J. Phys. B 39, 443 (2006)	odel including sublevel param	eters (CRISP) for H-alpha	

	$egin{array}{ll} \mathbf{H}+\mathbf{Al} \\ \mathbf{e}+\mathbf{H}+\mathbf{Al} \end{array}$	Atom Field Interaction Atom Field Interaction		Th Th
1707.	A. K. Kazansky, N. M. Kaba Non-stationary treatmen ionization of Ne by ultra J. Phys. B 39, L53 (2006)	achnik It of energy distribution of el- -short pulses.	ectrons in resonant double	
	Ne + Al	Atom Field Interaction	871.7  eV	$\mathrm{Th}$
1708.	K. Hoshina, A. Hishikawa, K K. Midorikawa <b>Dissociative ATI of</b> $H_2$ and J. Phys. B 39, 813 (2006)	. Kato, T. Sako, K. Yamanouchi, nd $D_2$ in intense soft x-ray la	E. J. Takahashi, Y. Nabekawa, ser fields.	
	$egin{array}{lll} \mathbf{H}_2 + \mathbf{Al} \ \mathbf{D}_2 + \mathbf{Al} \end{array}$	Atom Field Interaction Atom Field Interaction	41.7 eV 41.7 eV	Exp Exp
1709.	L.A.A. Nikolopoulos, P. Lam Helium double ionization J. Phys. B 39, 883 (2006)	ubropoulos n signals under soft-x-ray coh	erent radiation.	
	He + Al	Atom Field Interaction	41.85-51.15  eV	$\mathrm{Th}$
1710.	D. Dimitrovski, E. A. Solov' Ionization of negative ion pulse duration. J. Phys. B 39, 895 (2006)	ev ns and atoms by electric puls	ses: Zigzag dependence on	
	$egin{array}{ll} \mathrm{H}^- + \mathrm{Al} \ \mathrm{H} + \mathrm{Al} \ \mathrm{He}^- + \mathrm{Al} \end{array}$	Atom Field Interaction Atom Field Interaction Atom Field Interaction		Th Th Th
1711.	M. Busch, Th. Ludwig, R. D Anticrossing spectra of <sup>3</sup> J. Phys. B 39, 1929 (2006)	Drozdowski, G. von Oppen He and ${}^{4}He$ atoms excited by	$He^+ - He$ collisions.	
	$\mathrm{He^{+} + He + Al}$	Atom Field Interaction		Exp
1712.	S. Djurovic, R. J. Pelaez, M. Stark widths of Xe II lin J. Phys. B 39, 2901 (2006)	. Cirisan, J. A. Aparicio, S. Mar es in a pulsed plasma.		
	$Xe^+ + Al$	Atom Field Interaction		Exp
1713.	M. Vincke, D. Baye Hydrogen molecular ion mesh method. J. Phys. B 39, 2605 (2006)	in an aligned strong magne	etic field by the Lagrange-	
	$\mathrm{H_{2}^{+}+Al}$	Atom Field Interaction	$2\text{-}2000 \ 10^5 \ \mathrm{T}$	$\mathrm{Th}$
1714.	X. Liu, C. F. de Morisson Fa Attosecond electron ther J. Phys. B 39, L305 (2006)	aria, W. Becker, P. B. Corkum malization by laser-driven ele	ectron recollision in atoms.	
	Ne + Al	Atom Field Interaction		Th

1715.	R. Casini, R. M. Sainz Scattering polarizatio fields. J. Phys. B 39, 3241 (200	n of hydrogen lines in the g	presence of turbulent electric	
	H + Al	Atom Field Interaction		Exp
1716.	<ul> <li>716. I. Sundvor, J. P. Hansen, R. Taieb</li> <li>On the description of nuclear dynamics in ionization of diatomic molecules short strong electromagnetic fields.</li> <li>J. Phys. B 39, 3299 (2006)</li> </ul>			
	${ m H_2}^+ + { m Al}$	Atom Field Interaction		Th
1717.	X. Li, Z. Xu, F. B. Rosmej Exchange energy shifts under dense plasma conditions. J. Phys. B 39, 3373 (2006)			
	$Al^{11+} + Al$	Atom Field Interaction		$\mathrm{Th}$
1718.	A. B. Voitkiv, N. Toshim Ionization of hydrogen bound-bound atomic f J. Phys. B 39, 3791 (200	a, J. Ullrich n by ion impact in the present transitions. 6)	nce of a laser field resonant to	
	$\mathbf{C}^{6+} + \mathbf{H} + \mathbf{Al}$	Atom Field Interaction	$1 { m MeV/u}$	Th
1719.	. T. Bergeman, J. Qi, D. Wang, Y. Huang, H. K. Pechkis, E. E. Eyler, P. L. Gould, W. C. Stwalley, R. A. Cline, J. D. Miller, D. J. Heinzen <b>Photoassociation of</b> $^{85}Rb$ atoms into $O_u^+$ states near the 5S+5P atomic limits. J. Phys. B 39, S813 (2006)			
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Atom Field Interaction Atom Field Interaction	$2x10^{-4}$ K $2x10^{-4}$ K	E/T $E/T$
1720.	E. van der Zwan, D. van Oosten, D. Nehari, P. van der Straten, H.T.C. Stoof On the role of Penning ionization in photoassociation spectroscopy. J. Phys. B 39, S825 (2006)			
	$\mathrm{He} + \mathrm{He} + \mathrm{Al}$ $\mathrm{He} + \mathrm{He}^* + \mathrm{Al}$	Atom Field Interaction Atom Field Interaction	1.9-2.7 mK 1.9-2.7 mK	E/T $E/T$
1721.	M. Vatasescu, C. M. Dio Efficient formation of ciation with tunnellin J. Phys. B 39, S945 (200	n, O. Dulieu strongly bound ultracold cae g. 6)	esium molecules by photoasso-	
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Atom Field Interaction Atom Field Interaction	$1.5x10^{-4}$ K $1.5x10^{-4}$ K	Th Th
1722.	C. Haimberger, J. Kleine <b>Processes in the form</b> J. Phys. B 39, S957 (200	rt, O. Dulieu, N. P. Bigelow ation of ultracold NaCs. 6)		
	$egin{array}{l} { m Na}+{ m Cs}+{ m Al} \ { m Na}+{ m Cs}^*+{ m Al} \end{array}$	Atom Field Interaction Atom Field Interaction	$3x10^{-5}$ K $3x10^{-5}$ K	Exp Exp

1723.	E. Juarros, K. Kirby, R. Co Laser-assisted ultracold spontaneous emission. J. Phys. B 39, S965 (2006)	te lithium-hydride molecule	formation: Stimulated versus	
	$egin{array}{ll} \mathbf{H} + \mathbf{L} \mathbf{i}^* + \mathbf{A} \mathbf{l} \ \mathbf{L} \mathbf{i} + \mathbf{H} + \mathbf{A} \mathbf{l} \end{array}$	Atom Field Interaction Atom Field Interaction	1 mK 1 mK	Th Th
1724.	S. D. Kraft, P. Staanum, J. Formation of ultracold I J. Phys. B 39, S993 (2006)	Lange, L. Vogel, R. Wester, M LiCs molecules.	I. Weidemueller	
	Li + Cs + Al	Atom Field Interaction	$10^{-4} \mathrm{K}$	Exp
1725.	U. Poschinger, W. Salzmann, R. Wester, M. Weidemueller, C. P. Koch, R. Kosloff <b>Theoretical model for ultracold molecule formation via adaptive feedback control.</b> J. Phys. B 39, S1001 (2006)			
	$egin{array}{lll} { m Rb} + { m Rb} + { m Al} \ { m Rb} + { m Rb}^* + { m Al} \end{array}$	Atom Field Interaction Atom Field Interaction	$10^{-4} \text{ K}$ $10^{-4} \text{ K}$	Th Th
1726.	C. P. Koch, R. Kosloff, E. Luc-Koenig, F. Masnou-Seeuws, A. Crubellier <b>Photoassociation with chirped laser pulses: Calculation of the absolute number</b> <b>of molecules per pulse.</b> J. Phys. B 39, S1017 (2006)			
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Atom Field Interaction Atom Field Interaction	$0.5x10^{-4} - 1.5x10^{-4}$ K $0.5x10^{-4} - 1.5x10^{-4}$ K	Th Th
1727.	<ul> <li>B. Schaefer-Bung, R. Mitric, V. Bonacic-Koutecky</li> <li>Photostabilization of the ultracold Rb<sub>2</sub> molecule by optimal control.</li> <li>J. Phys. B 39, S1043 (2006)</li> </ul>			
	$egin{array}{lll} { m Rb} + { m Rb} + { m Al} \ { m Rb} + { m Rb}^* + { m Al} \end{array}$	Atom Field Interaction Atom Field Interaction		Th Th
1728.	I. S. Vogelius, L. B. Madsen, M. Drewsen Rotational cooling of molecular ions through laser-induced coupling to the col- lective modes of a two-ion Coulomb crystal. J. Phys. B 39, S1267 (2006)			
	$\mathrm{Ca^{+}} + \mathrm{MgH^{+}} + \mathrm{Al}$	Atom Field Interaction	300 K	Th
1729.	<ul> <li>Z. X. Zhao, T. Brabec</li> <li>Tunnel ionization of open-shell atoms.</li> <li>J. Phys. B 39, L345 (2006)</li> </ul>			
	V + Al $Ni + Al$ $Nb + Al$ $Pd + Al$ $Ta + Al$	Atom Field Interaction Atom Field Interaction Atom Field Interaction Atom Field Interaction Atom Field Interaction		Th Th Th Th Th
1730.	M. F. Ciappina, L. B. Mads Electron emission in en electromagnetic radiatic J. Phys. B 39, 5037 (2006)	sen nergetic ion-atom collisions on.	s in the presence of coherent	

	$egin{array}{lll} \mathbf{H}^+ + \mathbf{H} + \mathbf{Al} \ \mathbf{He}^{2+} + \mathbf{H} + \mathbf{Al} \ \mathbf{C}^{6+} + \mathbf{H} + \mathbf{Al} \end{array}$	Atom Field Interaction Atom Field Interaction Atom Field Interaction	10 a.u. 10 a.u. 10 a.u.	Th Th Th	
1731.	H. Ben Chaouacha, S. Sahal-Brechot, N. Ben Nessib Semi-classical Stark broadening calculations of Hel lines in a non-ideal plasma. Astron. Astrophys. 465, 651 (2007)				
	He + Al	Atom Field Interaction	$5000~\AA$	Th	
1732.	<ol> <li>A. Alonso-Medina, C. Colon</li> <li>Stark widths of several Pb III spectral lines in a laser-induced lead plasma. Astron. Astrophys. 466, 399 (2007)</li> </ol>				
	$Pb^{2+} + Al$	Atom Field Interaction	25,200 K	Exp	
1733. D. L. Moskovkin, V. M. Shabaev Zeeman effect of the hyperfine-structure levels in hydrogenlike ions. Phys. Rev. A 73, 052506 (2006)					
	H + Al	Atom Field Interaction	1-10 T	$\mathrm{Th}$	
	$C^{5+} + Al$	Atom Field Interaction	1-10 T	$\mathrm{Th}$	
	$O^{7+} + Al$	Atom Field Interaction	1-10 T	$\mathrm{Th}$	
	$S^{15+} + Al$	Atom Field Interaction	1-10 T	$\mathrm{Th}$	
	$Ca^{19+} + Al$	Atom Field Interaction	1-10 T	$\mathrm{Th}$	
	$Cr^{23+} + Al$	Atom Field Interaction	1-10 T	Th	
	$\operatorname{Ge}^{31+}$ + Al	Atom Field Interaction	1-10 T	Th	
	$\mathbf{X}\mathbf{e}^{33+} + \mathbf{A}\mathbf{I}$	Atom Field Interaction	1-10 T	Th	
	$Pb^{\circ 1+} + Al$	Atom Field Interaction	1-10 T	Th	
	$B1^{02+} + A1$	Atom Field Interaction	1-10 T	Th	
	$\mathbf{U}^{\mathbf{J}\mathbf{I}+} + \mathbf{A}\mathbf{I}$	Atom Field Interaction	1-10 1	Th	
1734.	<ol> <li>L. Perotti</li> <li>Ionization of Rydberg alkali-metal atoms in quasistatic electric fields: A classical view of the N<sup>-5</sup> scaling of the threshold field.</li> <li>Phys. Rev. A 73, 053405 (2006)</li> </ol>				
	Li + Al	Atom Field Interaction	-E - E E= $1/3n_0^5$	$\mathrm{Th}$	
	Na + Al	Atom Field Interaction	$-E - E E = 1/3n_0^5$	$\mathrm{Th}$	
	$\mathbf{K} + \mathbf{A}\mathbf{l}$	Atom Field Interaction	$-E - E E = 1/3n_0^5$	$\mathrm{Th}$	
	Rb + Al	Atom Field Interaction	$-E - E E = 1/3n_0^{-5}$	Th	
	Cs + Al	Atom Field Interaction	-E - E E= $1/3n_0^{-5}$	Th	
1735.	K. M. Dunseath, M. Terao-Dunseath Laser-assisted electron-helium scattering at very low collision energies. Phys. Rev. A 73, 053407 (2006)				
	C + He + Al	Atom Field Interaction	$0.2\text{-}2.5\;\mathrm{eV}$	$\mathrm{E}/\mathrm{T}$	
1736.	C. C. Chirila, M. Lein <b>High-order above-threshold ionization in stretched molecules.</b> Phys. Rev. A 74, 051401 (2006)				
	${ m H_2}^+ + { m Al}$	Atom Field Interaction	0-60 $U_p$	Th	
1737.	M. Zitnik, F. Penent, P. Lab Effect of electric fields or in helium measured by t Phys. Rev. A 74, 051404 (20	lanquie, A. Mihelic, K. Bucar, R. 1 1 <b>the decay branching ratio o</b> i <b>me-resolved fluorescence.</b> 006)	Richter, M. Alagia, S. Stranges f ${}^{1}P^{e}$ doubly excited states		

	He + Al	Atom Field Interaction	1-6  kV/cm	Exp
1738.	M. Hoerndl, S. Yoshida, A. Wolf, G. Gwinner, M. Seliger, J. Burgdorfer Classical dynamics of enhanced low-energy electron-ion recombination in storage rings. Phys. Rev. A 74, 052712 (2006)			
	$\mathbf{e} + \mathbf{C}^{6+} + \mathbf{Al}$	Atom Field Interaction	$10^{-5} - 10^0 \text{ eV}$	$\mathrm{E}/\mathrm{T}$
1739.	M. Gustafsson, L. Frommhol Infrared absorption by <i>H</i> intermolecular interactio Phys. Rev. A 74, 054703 (20	Id $H_2 - Ar$ collisional complexes n potential. 006)	and the anisotropy of the	
	$Ar + H_2 + Al$	Atom Field Interaction	195 K	Th
1740.	. L. B. Zhao, P. C. Stancil <b>Photoionization of hydrogen in white dwarf strength magnetic fields.</b> Phys. Rev. A 74, 055401 (2006)			
	H + Al	Atom Field Interaction	$0-60,000 \ cm^{-1}$	Th
1741.	D. B. Milosevic Strong-field approximation for ionization of a diatomic molecule by a strong laser field. Phys. Rev. A 74, 063404 (2006)			
	$\begin{array}{l} \mathbf{Ar} + \mathbf{Al} \\ \mathbf{Xe} + \mathbf{Al} \\ \mathbf{N}_2 + \mathbf{Al} \\ \mathbf{O}_2 + \mathbf{Al} \end{array}$	Atom Field Interaction Atom Field Interaction Atom Field Interaction Atom Field Interaction	$\begin{array}{c} 1\text{-}2 \ 10^{14} \ \mathrm{W}/cm^2 \\ 1\text{-}2 \ 10^{14} \ \mathrm{W}/cm^2 \\ 1\text{-}2 \ 10^{14} \ \mathrm{W}/cm^2 \\ 1\text{-}2 \ 10^{14} \ \mathrm{W}/cm^2 \end{array}$	Th Th Th Th
1742.	J. Hu, MS. Wang, KL. Han, GZ. He Attosecond resolution quantum dynamics between electrons and $H_2^+$ molecules. Phys. Rev. A 74, 063417 (2006)			
	$\mathbf{e} + \mathbf{H}_2^+ + \mathbf{A} \mathbf{l}$	Atom Field Interaction	800-1850 nm	$\mathrm{Th}$
1743.	A. V. Turbiner, N. L. Guevara $He_2^{2+}$ molecular ion can exist in a magnetic field. Phys. Rev. A 74, 063419 (2006)			
	$\mathrm{He_2}^{2+} + \mathrm{Al}$	Atom Field Interaction	0-4 a.u.	$\mathrm{Th}$
1744.	R. M. Potvliege, S. Vucic Stark-shift induced reson Phys. Scr. 74, 655 (2006)	ances in multiphoton ionizat	ion.	
	Ar + Al	Atom Field Interaction		Th
1745.	. G. G. Paulus, F. Lindner, D. B. Milosevic, W. Becker <b>Phase-controlled single-cycle strong-field photoionization.</b> Phys. Scr. T110, 120 (2004)			
	Xe + Al	Atom Field Interaction	1.55  eV	Exp

1746.	A. Saenz Molecular hydrogen in s and coherent control. Phys. Scr. T110, 126 (2004)	trong laser fields: Bond soft	ening, enhanced ionisation,		
	$H_2 + Al$	Atom Field Interaction		Th	
1747.	K. T. Taylor, J. S. Parker, McCann Few-electron dynamics of Phys. Scr. T110, 154 (2004)	D. Dundas, K. J. Meharg, L of atoms and molecules in int	Y. Peng, B.J.S. Doherty, J. F.		
	$egin{array}{lll} {f He} + {f Al} \ {f H_2}^+ + {f Al} \end{array}$	Atom Field Interaction Atom Field Interaction		$\begin{array}{c} Exp\\ Exp \end{array}$	
1748.	M. S. Dimitrijevic, T. Ryab The influence of Stark b spheres. Astron. Astrophys. 469, 683	chikova, Z. Simic, L. C. Popovic, roadening on Cr II spectral (2007)	M. Dacic line shapes in stellar atmo-		
	$Cr^+ + Al$	Atom Field Interaction	5,000-100,000 K	Th	
1749.	Q. Wu <b>Precision calculation of electronic</b> $g_J$ factors for $n^3S_1$ states of ${}^4He$ and ${}^7Li^+$ ion. J. Phys. B 39, 4213 (2006)				
	$egin{array}{lll} {f He} + {f Al} \ {f Li}^+ + {f Al} \end{array}$	Atom Field Interaction Atom Field Interaction		Th Th	
1750.	M. Kajita Collision between magne Phys. Rev. A 74, 032710 (2	etically trapped NH molecule 006)	es in the (N=0, J=1) state.		
	NH + NH + Al	Atom Field Interaction	$10^{-6} {\rm K}$	$\mathrm{Th}$	
1751.	E. Wagenaars, G.M.W. Kro Investigations of Stark ef dip spectroscopy. Phys. Rev. A 74, 033409 (2	esen, M. D. Bowden fects in xenon Rydberg states 006)	s by laser-induced fluorescence-		
	$egin{array}{llllllllllllllllllllllllllllllllllll$	Atom Field Interaction Atom Field Interaction	0-4000 V/cm 0-4000 V/cm	${ m E/T} { m E/T}$	
1752.	D. Tankosic, L. C. Popovic, Electron-impact Stark b At. Data Nucl. Data Tables	M. S. Dimitrijevic roadening parameters for Ti s 77, 277 (2001)	II and Ti III spectral lines.		
	TD:+ _ A 1		5000 50 000 V	TTI-	

$Ti^+ + Al$	Atom Field Interaction	$5000-50,000 { m K}$	$\mathrm{Th}$
$Ti^{2+} + Al$	Atom Field Interaction	$5000-50,000 { m K}$	$\mathrm{Th}$

## AUTHOR INDEX

Abdel-Naby Sh. A. 806 Abdesselam M. 1383, 1589 Abgrall H. 456 Abou Steit S. A. H. 335 Abrahamsson E. 1294 Abril I. 1584, 1607, 1612, 1645, 1647 Abu-Haija O. 1080, 1157 Acharya B. S. 1396 Achenbach A. 1098, 1113 Ackerman G. 279, 681 Ackerman G. D. 81, 168, 181, 249, 406, 508, 515 Adachi J. 446 Adachi J.-I. 549 Adam L. 1310 Adamowicz L. 59, 90 Adaniya H. 519 Adelhelm C. 1458, 1561 Adibzadeh M. 1045 Adoui L. 1099, 1165, 1176, 1219, 1595 Af Ugglas M. 890 Afaneh F. 1348 Agaker M. 20 Ageev V. N. 1430 Aggarwal K. M. 5, 42, 45, 46, 66, 131, 135, 136, 231, 268, 315, 342, 344, 352, 639, 640, 642, 733 Agostini P. 448, 1671 Aguado A. 1128 Aguilar A. 94, 181, 188, 246, 260, 266, 279, 360, 424, 434, 506, 508, 515, 681, 1139, 1306 Agundez M. 1577 Ahamad A. 1150 Ahlgren T. 1558 Ahmad I. 490 Ahmad M. 618 Ajay Kumar 1150 Akahane Y. 267 Akin E. 348 Aksela H. 15, 37, 51, 83, 98, 108, 110, 204, 208, 299, 376, 380, 390, 399, 441, 494, 522, 524, 525, 668, 672, 693 Aksela S. 15, 37, 51, 83, 98, 108, 110, 204, 208, 299, 376, 380, 390, 399, 441, 494, 522, 524, 525, 668, 672, 693 Al-Faify S. A. 1157 Al-Halabi A. 1565 Alagia M. 507, 562, 1737 Albritton J. R. 706 Alcantara-Nunez J. A. 56

Aldenius M. 44, 141, 641 Alducin M. 1363, 1367, 1437, 1579 Alexander M. H. 1129, 1293 Alfaz Uddin M. 978 Alford T. L. 1171 Ali R. 574, 1156 Alimov S. S. 1493 Alimov V. Kh. 1539, 1556 Alioua K. 697 Alitalo S. 83 Allain J. P. 1382 Allam S. H. 160, 722 Allan M. 797, 894, 916, 983, 1008 Allan R. J. 1308 Alman D. A. 1382, 1550 Almiev I. R. 980 Almulhem A. A. 1574 Alna'washi G. 88, 169, 523, 671, 863, 972 Alnama K. 53 Alnaser A. S. 256, 396, 397, 606, 616, 1659, 1660 Alnis J. 236 Aloise S. 202 Alonso J. A. 384 Alonso-Medina A. 1732 Altevogt S. 737, 989 Altun Z. 39, 937 Alvarado F. 1114 Alvarez I. 266, 279, 321, 395, 428, 623, 1300 Alvarez Ruiz J. 551, 599 Alves E. 1168 Alves-Conde R. 56 Amadon S. 1613 Amekura H. 1621 Amin N. 465, 574, 586, 656 Amini J. 519 Ammi H. 1383, 1589 Amokrane A. 1169 Amusia M. Ya. 392, 520, 562, 625 An S. J. 1464 An Z. 826, 1016 Ancarani L. U. 759 Andersen L. H. 846, 890 Anderson L. W. 745 Andersson M. 206, 210, 213, 217 Andersson P. 406 Andersson P. U. 1542 Andreev A. V. 302 Andreev O. Yu. 2

Andrianarijaona V. 737, 989 Andrianov I. 1374 Andrianova N. N. 1495 Andrist M. 218 Andrzejewski J. 1617 Angstmann E. J. 1662 Anis F. 1204, 1689 Antonucci L. 448, 1671 Antony B. K. 817 Anwar-ul-Haq M. 465 Aoiz F. J. 1130, 1141, 1301 Aoto T. 106, 114, 617 Aoyama M. 267 Aparicio J. A. 422, 620, 782, 1677, 1712 Apaydin G. 474 Appaji Gowda S. B. 472 Aquilanti V. 1306, 1313 Aracil B. 296 Arakawa I. 1377, 1421 Archubi C. D. 1624 Arey B. W. 1609 Argenti L. 109, 595 Arista N. R. 1624, 1644 Arkhipov I. I. 1457 Arnau A. 1534 Arora B. 488 Arretche F. 825 Artemyev A. 241 Artemyev A. N. 61, 89, 154, 253, 262, 950, 951 Asano M. 1482 Ascoli M. 35 Asen B. 337 Ashmore J. P. 480 Aslam M. 32, 207, 283 Asplund M. 636 Atabek O. 394, 676 Atahan S. 1129 Atake M. 127 Atanassova S. 208, 693 Atec S. 362 Atems D. E. 1020 Auboeck G. 1259 Auerbach D. J. 1505 Aumayr F. 1487, 1496 Aumiler D. 436 Aussendorf G. 908, 970 Austin G. 292 Avaldi L. 247, 443, 476, 562, 579, 683 Avasthi D. K. 1483 Awasthi M. 451, 604, 1675 Aymar M. 1260 Avsto J. 172 Azarenkov N. 1459 Azuma Y. 180, 186, 517, 630 Baba Y. 1425 Babb J. F. 1177, 1187, 1216 Bacalis N. C. 228

Bachau H. 592, 605 Baclawski A. 347, 363 Bacskay G. B. 658 Baczynska K. 172 Badiger N. M. 505 Badnell N. R. 39, 132, 806, 808, 810, 811, 814, 932, 940, 941, 992, 1000, 1001, 1051 Badr T. 669 Bagge L. 1061 Bagnato V. S. 1665 Bahou M. 469 Bahr D. A. 1536 Bahrim B. 1426, 1427 Bahrim C. 1274 Bai L. 534 Baig M. A. 32, 207, 283, 465, 527, 574, 586, 633, 646,656 Bailev J. E. 152 Bailey K. 56, 305 Bailey M. 1028, 1359 Bailey P. 1175, 1335, 1404, 1533 Baktash C. 104 Balakrishnan N. 1136, 1137, 1270, 1271, 1291, 1302 Balamurugan A. K. 1625 Balanca C. 1281 Balashov V. V. 1600 Balashova L. L. 1598 Balden M. 1450, 1458, 1548, 1561 Baldwin K. G. H. 339 Balint-Kurti G. G. 1124, 1308, 1318 Ballance C. P. 623, 839, 868, 879, 923, 974, 1051 Balouria P. 1150 Baltenkov A. S. 392 Baluja K. L. 801, 802, 852, 919, 1011 Ban T. 436 Ban-d'Etat B. 1520, 1543 Banares L. 1130, 1141, 1301 Banas D. 1164, 1180, 1211, 1349 Bancewicz T. 510, 1201 Bandrauk A. D. 385, 423, 548, 608 Banerjee T. 663 Banks J. C. 1174 Bapat B. 526 Baragiola R. A. 1407, 1410, 1489, 1502, 1535, 1536, 1569 Baraldi C. 432 Barbatti M. 753 Barbera M. 331 Bardon A. B. 573 Barinovs G. 1123 Barklem P. S. 939 Barna I. F. 496 Barnes B. M. 1071 Barone P. 1504, 1535 Barradas N. P. 1168, 1587, 1588 Barragan P. 1122, 1214, 1220

Barrue F. 1595 Barthe M.-F. 1385 Bartlett P. L. 874, 889, 929, 998, 1010, 1037 Bartschat K. 475, 492, 583, 596, 647, 742, 747, 751, 791, 792, 803, 831, 857, 887, 894, 898, 904,907, 908, 954, 970, 990, 1003, 1005, 1008, 1010, 1028, 1359 Basak A. K. 755, 828, 835, 946, 978 Basko M. M. 1605 Bassler M. 588 Baudon J. 1399, 1444 Bauer P. 1508, 1511, 1512, 1618 Baumgartner F. 1089 Baumvol I.J.R. 1640 Baur G. 1233 Bautista M. A. 244, 297, 624, 940, 1000 Baxter H. D. 1071 Bave D. 1713 Bayram S. B. 1203 Beck D. R. 117, 194, 275, 365, 445 Beck K. M. 1418 Becker F. 1599 Becker K. 881 Becker U. 447, 547 Becker W. 614, 687, 1714, 1745 Beeman J. 292, 331 Beene J. R. 104 Begrambekov L. 1540 Behar E. 50, 133, 464 Beiersdofer P. 1188 Beiersdorfer P. 8, 9, 10, 17, 40, 50, 162, 165, 191, 205, 251, 263, 308, 309, 310, 332, 349, 370, 654, 833, 873, 1079, 1121 Beigman I. 979, 1336 Beijerinck H.C.W. 480, 1182 Beikler R. 1512 Belghanem K. 1474 Belic D. S. 859, 920, 936 Belim S. 931 Belkacem A. 519 Bell F. 1596 Bell K. L. 434, 812, 938, 1014, 1018, 1032, 1034, 1053Bellm S. 831 Belov K. 21 Ben Chaouacha H. 1731 Ben Lakhdar Z. 957, 1111 Ben Nessib N. 1731 Ben Yaghlane S. 1111 Ben-Itzhak I. 425, 543, 1071, 1085, 1156, 1236, 1701Benazeth C. 1474, 1513 Benec'h S. 592 Benis E. P. 242, 314 Berengut J. C. 192 Bergeman T. 1257, 1719 Bergemann M. 343

Bergersen H. 390, 524 Berkovits D. 1205 Bernardi G. 1077, 1097 Bernhardt D. 80 Bernshtam V. A. 980 Berrah N. 81, 168, 181, 249, 399, 400, 406, 481, 508, 515, 681 Berrington K. A. 700, 808, 925, 930, 1019 Berry H. G. 258 Bertschinger G. 252 Beterov I. I. 455, 1117 Bethlem H. L. 1678 Bettega M.H.F. 740, 765, 777, 872, 906, 963, 964 Bettiol A. 1464 Beuc R. 436 Beunker R. J. 1086 Beyer H. F. 1211 Beylerian C. 565 Beyvers S. 1374 Bezuglov N. N. 455, 1117 Bhatia A. K. 6, 70, 159, 350, 356, 479, 698, 701, 704, 705, 708, 709, 710, 716, 717, 718, 720, 724, 727, 731, 734, 807, 834, 1017, 1025, 1029, 1030, 1031, 1033, 1036, 1040, 1041, 1043, 1046, 1047, 1052, 1055, 1057 Bhattacharyya S. R. 1397 Bhattacharyya S. S. 502 Bhatti S. A. 207, 283 Bian X. 325 Bianconi M. 1587 Biaye M. 92, 269 Biedermann C. 128 Biel W. 252 Bielschowsky C. E. 753, 1237 Biemont E. 65, 67, 69, 71, 230, 351, 353, 355, 364, 460 Bienkowski A. 1180 Bieron J. 26 Bigelow N. P. 1263, 1722 Billebaud A. 1595 Billowes J. 172 Bilodeau R. C. 81, 168, 181, 249, 406, 508, 515, 681 Binder C. 1259 Bissell M. L. 172 Bista R. 11 Bitter M. 9, 10, 165, 263, 1079 Bizau J. M. 484, 493 Bizau J.-M. 234, 682 Bizyukov I. 1459 Bjelland M. 438 Bjoerneholm O. 376, 588 Blackwell-Whitehead R. 343 Blackwell-Whitehead R. J. 140, 237 Blagojevic B. 184, 260, 329, 943 Blancard C. 234, 484, 493, 682 Blanco J. M. 1537

Blazevic A. 1583, 1600 Blieck J. 484 Blondel C. 286, 571 Blondiaux G. 1385 Bloom K. M. 1071 Bloomfield D. S. 131, 231 Bluett J. B. 471 Bluhme H. 846 Blundell S. A. 16, 177 Blythe P. 1202 Bobashev S. V. 611 Bobkov V. V. 1493 Bocan G. A. 1582 Bochareva I. 606 Bock R. 1583 Bocvarski V. 1444 Bodewits D. 1125 Bodo E. 1185, 1191, 1269 Boduch Ph. 1520, 1543 Boechat-Roberty H. M. 921 Boehm S. 1001 Boerma D. O. 1620 Boffard J. B. 745 Bogdanovich P. 138, 178, 240, 468, 714, 887 Bohlen H. G. 1600 Bohm S. 39 Bohne W. 1619 Boivin R. F. 868 Bolcatto P. G. 1431 Bolognesi P. 415, 476, 579, 628, 683 Bolorizadeh M. A. 961 Bolotin I. 1426 Bolovinos A. 592 Bonacic-Koutecky V. 1268, 1727 Bonanno A. 1407, 1489, 1504, 1519, 1535 Bondar A. E. 1379 Bondurko V. V. 1473 Boney C. 1175, 1404 Bordas C. 684 Borges F. O. 121, 156 Borges Jr. I. 558 Borisov A. B. 221 Borisov A. G. 1441, 1684 Borisov A. M. 1436, 1486, 1495, 1522 Borodin D. 979, 1336 Borovik A. A. 857, 887 Borovik Jr. A. A. 857 Bosch F. 1164, 1211, 1595 Boudjema M. 1474, 1513 Bouffard S. 1543 Boulbain S. 760 Bouledroua M. 697 Bourhis G. 758, 1658 Bouri C. 401, 495, 695 Boustimi M. 1399, 1444 Boutin D. 1599 Bowden M. D. 1751

Bowman J. M. 1307 Boyce K. 191 Boyce K. R. 309, 833, 873 Boyer K. 221 Boyko E. B. 1485 Boyko O. 448, 1671 Bozanic D. K. 1576 Bozek J. 434 Bozek J. D. 81, 168, 181, 188, 249, 279, 406, 506, 508, 515, 631, 681 Brabec T. 1729 Braeuning H. 785, 1251 Brage T. 210, 213, 217 Brandao J. 1135, 1136 Brandau C. 39, 1001, 1211 Brandenberger J. R. 189 Braun J. 58, 241, 259, 261, 950 Braun M. 880 Braune M. 447 Brauning H. 1098, 1164, 1595 Brauning-Demian A. 1164, 1595 Brav I. 381, 408, 475, 485, 550, 683, 736, 773, 803, 874, 889, 908, 970, 990, 998, 1003, 1005, 1010, 1013, 1028, 1181, 1359, 1667 Braziewicz J. 1180 Brenner G. 60, 241, 259, 950 Brescansin L. M. 799 Bressler C. 519 Brichta J. P. 621 Brickhouse N. S. 131, 153, 877, 949 Bridges J. M. 358 Briggs J. S. 967, 977 Bringa E. M. 1555 Bristow P. 328 Broquin V. 760 Brosius J. W. 46, 231, 344 Brown D. O. 803 Brown G. V. 40, 50, 191, 309, 310, 349, 654, 833, 873 Brown M. 652 Browning J. F. 1174 Bruch R. 11, 239, 1028, 1359 Bruck K. 104 Bruhns H. 58, 78, 154, 241, 259, 261, 950 Bruneau J. 682 Brunger M. J. 776, 961, 962 Bryan W. A. 511, 541, 1685, 1699 Brykalova X. O. 619 Bubin S. 59, 90 Bucar K. 1737 Buchal Ch. 1621 Buchleitner A. 1666 Buckman S. 1005 Buckman S. J. 824, 924, 984 Buczek A. 113 Buenker R. J. 1078, 1126, 1212, 1278 Buhr H. 737, 989

Buica G. 531 Bulthuis J. 1691 Bulut N. 1301 Bundaleski N. 1481 Burgdorfer J. 496, 955, 999, 1406, 1487, 1525, 1738 Burgess A. 1102 Burke P. G. 788, 809, 882, 1053 Burke V. M. 788, 809, 882, 1053 Burnett J. H. 260 Busch M. 1239, 1711 Buser M. 1082, 1661 Busnengo H. F. 1544 Busnyuk A. 1538 Bussery-Honvault B. 1141, 1316 Butzbach R. 338 Buzhinsky O. 1540 Bvron L. J. 339 Cabrera-Trujillo R. 1204, 1236, 1590, 1689 Cacho C. 547 Caciolli A. 1172, 1173 Cadez I. 888, 1344 Caillat J. 1147, 1183 Caires A.R.L. 1665 Calabrese D. 395, 424 Caliebe W. A. 559 Calliari L. 1635 Calo A. 208, 494, 672, 693 Camacho J. J. 590 Camilloni R. 443, 683 Campbell P. 172 Cancio P. 336 Canton S. 279 Cao D.-B. 1563 Cao S. P. 977 Cao W. 163, 270, 271 Capitelli M. 1020 Carbonell J. 1209 Carnes K. D. 425, 543, 1071, 1085, 1156, 1236, 1701Carraro L. 971 Carravetta V. 673 Carrier W. 653 Casini R. 1715 Casnati E. 432 Caspary K. 438 Cassimi A. 435, 1099, 1165, 1176, 1219, 1595 Castelli F. 295 Catoire F. 904, 934, 995 Cavalcanti E. G. 1347 Cavalcanti G. H. 121, 156 Cavalli S. 1306, 1313 Cazaux J. 1389 Cederquist H. 1061, 1083, 1287 Celiberto R. 1020 Celik G. 348, 362 Cerkic A. 667

Cernicharo J. 1120 Chabot M. 1076 Chaibi W. 286, 571 Chakarov D. 1419 Chakrabarti K. 421, 655, 746, 1234 Chakraborty H. S. 1387 Chalasinski G. 1293 Chami A. C. 1383, 1513, 1589 Champeaux J. P. 493 Champeaux J.-P. 234, 682 Champion C. 770, 838 Chander C. T. 41 Chandre C. 545, 649, 1704 Chang C. H. 489 Chang H. W. 389 Chang Z. 397, 1660 Chantler C. T. 79, 167 Chao S. D. 1184 Charpentier I. 934 Chartier A. 1403 Chattopadhyay A. 769, 1663 Chaudhuri R. K. 30, 274, 345, 367 Chauhan R. K. 780, 781 Chazallon B. 1372 Cheal B. 172 Chelkowski S. 548 Chen C. 273 Chen C. Y. 1021 Chen G. X. 153, 877, 949 Chen H. 40, 50, 309, 654, 833, 873 Chen H.-K. 444, 469 Chen J. M. 389 Chen K. M. 1154, 1591, 1592, 1616 Chen M. H. 132, 166, 174, 330, 814 Chen Q. 1115 Chen S.-H. 124 Chen X. 1390, 1411, 1413, 1523 Chen X. M. 1299, 1334 Chen X.-Q. 271 Chen Z. 407, 665, 804, 1003 Chenakin S. P. 1511, 1618 Cheng B.-M. 444, 469 Cheng H.-D. 509, 738, 853 Cheng K. T. 166, 174, 193, 330 Cheng S. 258, 652 Cheng S. C. 1064 Cheng S.-C. 1062 Cheng X. L. 14, 195, 220, 557 Cheng Z. 24, 201 Cherepkov N. A. 549, 555, 587, 629 Cherkani-Hassani H. 920, 936 Chernov V. A. 1379 Chernysheva L. V. 392, 520, 562, 625 Chesnel J. Y. 1343 Chesnel J.-Y. 760, 867, 953, 1084, 1101, 1147, 1165, 1219, 1231 Chevallier M. 1595

Chi X. 513, 577, 1688 Chiari M. 1172, 1173 Childers G. 855 Childers J. G. 175, 773, 994, 1012 Chirila C. C. 500, 1736 Cho H. 924, 961 Cholewa M. 1464 Chollet E. E. 291 Chu S.-I. 97, 105, 497 Chu T. 1332 Chu T.-S. 1305, 1318 Chu X. 1075 Chueh M. C. 1384 Chuluunbaatar O. 752, 869 Chung H.-K. 152 Chung S. 131 Churilov S. S. 197, 198 Chutjian A. 412, 689, 991, 1158, 1344 Chwirot S. 902 Ciappina M. F. 1221, 1242, 1246, 1277, 1730 Cicman P. 926 Cipiti B. B. 1370 Cipolla S. J. 1159 Cirisan M. 1712 Cisneros C. 169, 266, 279, 321, 395, 424, 428, 434, 523, 623, 671, 863, 972, 1300 Ciurylo R. 1178 Cizek M. 843 Claessens B. J. 480 Clar M. 364 Clark C. W. 488 Clark T. K. 1291 Clerc C. 1543 Climent-Font A. 1172, 1173, 1588, 1617 Cline R. A. 1257, 1719 Cocke C. L. 396, 397, 606, 680, 981, 1061, 1083, 1337, 1659, 1660 Coelho L.F.S. 1077, 1217 Coffee R. N. 514, 1690 Cohen C. 1595 Cohen S. 592, 798, 1670 Colavecchia F. D. 579 Colgan J. 132, 383, 521, 578, 634, 678, 739, 790, 858, 865, 893, 1051 Colgan J. P. 814, 855, 947 Collier J. L. 511, 541, 1685, 1699 Collins G. F. 763 Collins L. A. 499 Colon C. 1732 Commisso M. 1407, 1489, 1504, 1519, 1535 Compant la Fontaine A. 682 Comtet G. 1420 Cong S.-L. 540, 546, 1698, 1705 Conneely M. J. 307 Cooper J. W. 847 Coplan M. A. 847 Corbel C. 1385

Corchado J. C. 1319 Coreno M. 15, 157, 247, 415, 443, 507, 551, 562, 579, 599, 628, 683 Corkum P. B. 573, 608, 614, 692, 1714 Cornaggia C. 565 Cornelius K. R. 1192 Corrales L. R. 1403 Correge G. 461, 711 Correra L. 1587 Costa M. L. 661 Costello J. T. 284, 433, 453 Cote R. 1199, 1264, 1682, 1723 Coupier B. 926 Coventry M. D. 1382 Covington A. M. 246, 279, 395, 424, 428 Covington I. R. 428 Cowan T. E. 143, 212, 219, 915 Cox H. 478 Cravero W. R. 1221, 1242, 1246 Crespo Lopez Urrutia J. R. 78 Crespo Lopez-Urrutia J. R. 22, 58, 60, 154, 241, 259, 261, 411, 950, 951, 1496 Crothers D.S.F. 1096 Crowe A. 803 Crubellier A. 1267, 1726 Cu M.-F. 165 Cubaynes D. 234, 484, 493, 572, 682 Cubric D. 415 Cui L. L. 276 Cui Q. 1320 Cui Y. 1299, 1334 Cummings A. 433, 453, 554 Cuneo M. E. 152 Curdt W. 290, 293 Currell F. J. 22, 841 Curtis L. J. 258, 652 Custidiano E. R. 1066 Cvejanovic D. 898 Cvejanovic S. 898 Czarnota M. 1180 Czasch A. 435, 475, 688, 977 D'Errico C. 1198, 1681 D'Inaco J. P. 1190 Da Costa R. F. 805, 825 Da Paixao F. J. 805 Da Pieve F. 443 Da Silva L.S.S. 870 Da Silveira E. F. 1491 Dacic M. 1748 Daerr H. 1202 Dai W. 956 Dai X. 498, 1679 Dai Z. W. 460 Daido H. 338 Dal Cappello C. 838, 869, 892, 904, 909, 934 Dalgarno A. 329, 1075, 1145, 1177, 1195, 1208, 1340

Dall R. G. 339 Damache S. 1610 Danared H. 763, 1061 Daniel F. 1282 Daniell M. L. 792 Danielsson M. 965 Dapor M. 1566, 1635 Darling G. R. 1565 Das B. P. 274, 367 Das J. N. 655, 746 Dauvergne D. 1595 David C. 1625 Davidson P. M. 1594 Davila J. M. 46, 231, 344 Davis J. W. 1448, 1449, 1452, 1547 Davis V. T. 395, 424 Daw A. 848 Davou F. 1281 De Barros A.L.F. 1077, 1217 De Castro A. 620 De Castro A.R.B. 386, 387 De Castro Faria N. V. 1077, 1217, 1222 De Fanis A. 417, 430, 435, 491, 555, 568, 613, 619, 685 De Fazio D. 1306, 1313 De Filippo E. 1494, 1648 De Jesus V.L.B. 602 De Juan Pardo E. 1458, 1548 De Mauro C. 336 De Morisson Faria C. F. 614, 1714 De Natale P. 336 De Oliveira E. M. 825 De Ruette N. 737 De S. 1353 De Simone M. 15, 157, 247, 415, 507, 562, 599, 628 De Souza G.G.B. 921 DeHarak B. A. 175, 1012 DeJonghe R. 221 DeMille D. 35 Deb N. C. 28, 371, 732 Decleva P. 591 Defazio P. 1144 Defrance P. 920, 936 Deiwiks J. 1397 Del Val J. A. 620 Del Zanna G. 1, 137, 139, 458, 638, 808, 941 Delahaye F. 922 Della Negra S. 1076 Delsart C. 286, 571 Dembczynski J. 113 Demekhin Ph. V. 248, 277, 437, 553, 566, 594 Demonchy C. E. 1595 Deng J. K. 764, 844, 856 Deng X.-H. 201 Denton C. D. 1607, 1645, 1647 Derbov V. L. 783

Dere K. P. 942 Derevianko A. 21 Desclaux J. P. 223 Desequelles P. 1076 Desgardin P. 1385 Desgroux P. 1372 Deshmukh P. C. 345, 663, 886 Destombes J. L. 1372 Deutsch H. 881 Deutsch M. 559 Dey R. 892, 1162 Dhara A. 1227, 1295 Dhont G. 1280 Di Pietro A. 1653 DiChiara A. 913 Diakomichalis N. 961 Diamant R. 559 Dias A. A. 661 Diaz C. 1544 Dib A. 1610 Dickinson A. S. 1116 Diehl A. 1098, 1251 Dietrich D. D. 79 Diez Muino R. 1367, 1437 Dimitrijevic M. S. 1035, 1360, 1748, 1752 Dimitrovski D. 1710 Dimopoulou C. 976, 1003, 1108 Dimova M. G. 1668 Ding B. W. 1334 Ding D. J. 1492 Ding X. B. 47 Dinh T. H. 1662 Dion C. M. 1262, 1721 Divall E. J. 511, 541, 1685, 1699 Dixit G. 30, 345 Djuric N. 1158 Djurovic S. 1712 Do N Varella M. T. 825 Dobrinic J. 1329 Docenko O. 1088, 1261 Doebeli M. 1650 Doering J. P. 847 Doerner R. 435, 475, 573, 688, 1348 Doerner R. P. 1378 Dogar A. H. 1398 Doherty B.J.S. 413, 1747 Dolmatov V. K. 482, 696 Domaracka A. 864, 1007 Domcke W. 843 Dominguez I. 428 Dong C. Z. 47, 142, 211, 1211 Dong F. 1143, 1304 Dong G. 712, 1038 Dorn A. 976, 977, 1003 Doron R. 128 Doschek G. A. 64, 701, 708, 1025, 1031 Dostovalov R. V. 1379

Douillet D. 448, 1671 Doyle B. L. 1174 Drag C. 286, 571 Draganic I. N. 33, 241, 259 Drake G. W. F. 38, 48, 56, 119, 146, 164, 187, 305 Drake J. J. 131 Draxler M. 1512, 1618 Dreissigacker S. 1562 Drewsen M. 1272, 1728 Droba A. 1376 Drozdowski R. 1239, 1711 Drozdziel A. 1575 Du J. 1334 Du S.-B. 200 DuBois R. D. 822, 1153 Duan Y. M. 826 Dubernet M.-L. 1119, 1282 Dubey R. K. 1298 Dubois A. 1147, 1183 Dubois M. 56 Dubus A. 1437, 1476, 1490 Duerr M. 976, 977 Duffy D. M. 1462, 1627 Duggan J. L. 1155 Duguet A. 995 Dujardin G. 1420 Dulieu O. 1260, 1262, 1263, 1665, 1721, 1722 Dumitriu I. 81 Dundas D. 1747 Dundvor I. 1147, 1183 Dunford R. W. 258, 490, 539, 1697 Dunham H. R. 1477, 1516 Dunne P. 453, 554 Dunning F. B. 999, 1434, 1475, 1477, 1516, 1521 Dunseath K. M. 758, 1288, 1658, 1735 Dupree A. K. 130 Durr M. 1003 Dutta C. M. 1086, 1195 Duvenbeck A. 1603 Dvke J. M. 661 Dyubko S. F. 320 Dziczek D. 902 Dzuba V. A. 19, 76, 91 Eberhardt W. 20 Echenique P. M. 1367 Eckardt J. C. 1624, 1644 Eckstein W. 1450 Edah G. 674 Eden S. 1189 Efremov V. A. 320 Efremov V. P. 1583 Ehara M. 467 Ehlerding A. 763, 890 Ehrenreich T. 1158 Ehresmann A. 248, 277, 427, 437, 452, 553, 566, 594, 659, 660

Eichler J. 1023 Eichmann U. 603 Eidelman S. I. 149 Eidelsberg M. 470 Eidem O. 1083 Eides M. I. 311 Eikema K. S. E. 238 Eikema K.S.E. 670 Eisebitt S. 20 Eissner W. 698, 701, 716, 720, 900, 1017, 1025, 1040, 1046 Ekers A. 455, 1117 Ekinci Y. 1408 Ekloew N. 992 Ekstrom U. 538 El Ghazaly M. A. 890 El-Sherbini Th. M. 160, 722 Eland J.H.D. 618, 657 Elantkowska M. 113 Elazzouzi S. 934 Eleon C. 56 Elizarov A. Yu. 896 Elo H. 4, 62 Embry T. A. 1468 Emfietzoglou D. 1503, 1611 Emmanouilidou A. 597, 690 Emmons E. D. 246, 266, 279, 321, 623 Endstrasser N. 1531 English E.M.L. 511, 541, 1685, 1699 Engstrom L. 213 Enomoto K. 1339 Epp S. W. 60 Ergler Th. 602, 607 Eritt M. 1205 Erman P. 551 Ernst W. E. 1259 Eronen T. 172 Errea L. F. 1122, 1215, 1220, 1245 Erwin D. A. 768 Esaulov V. A. 1472, 1537 Eschner A. 588 Espey B. R. 130 Esry B. D. 425, 543, 1064, 1190, 1204, 1236, 1689, 1701 Esteves D. 88 Evans C. 1429 Even U. 282 Eyler E. E. 35, 489, 1072, 1257, 1719 Fabian B. 754, 785, 897 Fabrikant I. I. 648, 880, 982 Faenov A. Ya. 267, 873, 1583 Fahev K. 329 Fahy K. 31, 94, 260, 360 Fainstein P. D. 1328 Falck A. S. 870 Falcone G. 1502, 1569 Falkowski A. 913

Fama M. 1536 Fan J. 374 Fang L. 514, 1690 Fang Y. 1492 Fantz U. 1548 Faraggi M. N. 1363, 1579 Farenzena L. S. 1491 Farias D. 1544 Farias E. E. 121, 156 Farizon B. 926, 1189 Farizon M. 1189 Farrag A. 335 Farrar J. M. 1138, 1321 Farrokhpour H. 507, 562 Faure A. 1006, 1118, 1282, 1285 Faussurier G. 484 Faye N. A. B. 92, 269 Fazinic S. 1329 Feautrier N. 391, 1119, 1280 Federman S. R. 470, 652 Fedor J. 926 Fehrenbach C. W. 93 Feifel R. 20, 657, 673 Feil S. 926 Feinberg B. 519 Feldhaus J. 60 Feldman U. 25, 33, 64, 290, 293 Felfli Z. 27, 392, 520, 928 Felter T. E. 1429 Fendel P. 149, 236, 644 Feng H. 956 Feng S. 1312 Feng X. 400, 481 Ferber R. 1088, 1261 Ferger T. 1094, 1223 Ferguson S. M. 1080, 1157 Ferlaino F. 1198, 1681 Ferland G. J. 138, 281, 291, 468, 1302 Fernandez J. 1176 Fernandez-Jimenez M. T. 1172, 1173 Fernandez-Varea J. M. 861, 1584, 1647 Ferreira J. L. 1429 Ferreira L. G. 740, 777, 906 Ferreira-Rodrigues A. M. 921 Fertman A. 1583 Fertman A. D. 1605 Fettouhi A. 1597, 1599 Feuerstein B. 602, 607 Feyer V. 157, 579, 599 Field D. 1124 Figger H. 394, 410 Figuera P. 1653 Figueroa E. A. 1644 Filipovic D. M. 736, 778, 780, 794, 912, 924 Filippi M. 1635 Fillion J. H. 470 Fillion J.-H. 53

Fink R. F. 588 Finkenthal M. 971 Fiol J. 1235, 1250 Fiorentino M. 328 Fiori M. 1237 Fischer B. 1464 Fischer C. F. 726 Fischer D. 1094, 1108, 1223, 1287, 1338 Fischer M. 236, 644 Fisher V. I. 980 Fisichella M. 1653 Fitzpatrick M. J. 1147, 1147, 1148 Fivet V. 364 Flambaum V. V. 19, 91, 192, 1662 Flechard X. 1165 Flemming E. 431 Florescu A. I. 985 Florescu-Mitchell A. I. 890 Flower D. R. 1248 Focke P. 1097 Focsa C. 1372 Fogle M. 806, 992 Foley E. L. 883, 1706 Folkmann F. 234, 434, 484, 493 Follath R. 20 Fontes C. J. 858 Foord M. E. 138, 152, 281, 468 Forest D. H. 172 Forrey R. C. 1137, 1208, 1271, 1291, 1302, 1340 Forster E. 338 Forsythe D. G. 1369 Fortov V. E. 1583 Foster M. 634, 832, 1093, 1207, 1338 Foumouo E. 605, 674 Fournier K. B. 152, 267, 334, 971 Fournier P.-G. 1399 Franz K. 894 Frechard X. 1176 Fregenal D. 1097 Fremont F. 760, 867, 953, 1084, 1147, 1165, 1176 Friar J. L. 232, 265 Fricke B. 211 Fritioff K. 763 Fritzsche S. 80, 83, 98, 110, 142, 211, 226, 299, 380, 399, 403, 417, 443, 494, 568, 580, 672, 735, 1104, 1211, 1349 Froelich P. 1208, 1340 Froese Fischer C. 3, 26, 158 Froese-Fischer C. 584 Frommhold L. 650, 1082, 1292, 1661, 1739 Fry D. 1196 Fu H. B. 1334 Fu J. 810, 1147, 1148 Fuentes B. E. 1161 Fuhr J. 225 Fuhr J. R. 373 Fujii A. 278

Fujimoto M. M. 748, 837, 870 Fujimoto N. 1498, 1649 Fujita Y. 935 Fujitani T. 1564 Fujiwara K. 555 Fukuda Y. 267 Fukushima Yu. 186 Fukuyama Y. 1275 Fulling S. 239 Funaba H. 31 Furmann B. 113 Fursa D. 1005 Fursa D. V. 736, 773, 803, 908, 970, 1003, 1013, 1028, 1359 Furst J. E. 631 Furukawa T. 1324 Furukawa Y. 609 Fussmann G. 128 Gadea F. X. 676, 985, 1256 Gagliardi M. A. 1602 Gaigalas G. 229 Galassi M. E. 1108 Gallagher A. 1432 Gallagher T. F. 504, 1680 Gallardo M. 116, 150, 255 Galster U. 1089 Gangopadhyay S. 489 Gao J. 741, 756, 818, 819, 832, 895, 927 Gao Z. M. 1334 Garcia A. J. 1626 Garcia E. A. 1431 Garcia G. 1300, 1588, 1620 Garcia J. 244 Garcia-Lopez G. 1172, 1173 Garcia-Molina R. 1584, 1607, 1612, 1645, 1647 Gardner L. D. 848 Gardner M. D. 172 Garfunkel E. 1364, 1580 Garg M. L. 1150 Garibotti C. R. 579, 1237 Garnir H.-P. 364 Garrido F. 1543 Gaubert G. 56 Gaupta M. 802 Gauyacq D. 53 Gauyacq J. P. 1441, 1684 Gavin J. 822 Gay T. J. 631, 933 Gayet R. 429, 1105, 1147 Gaynor L. 433 Ge Z.-M. 270, 317 Gedeon S. 647, 954 Gedeon V. 647, 954 Gee P. 1158 Geil R. D. 1500 Geissel H. 1597, 1599 Gejo T. 580

Gel'mukhanov F. 587, 629 Geltman S. 1273 Gemmell D. S. 490 Geppert Ch. 104 Geppert W. D. 890, 965 Gerasimov V. G. 320 Gervais B. 867, 1099, 1165, 1176, 1623 Gharaibeh M. F. 169, 188, 266, 279, 321, 506, 523, 623, 671, 863, 972 Ghatak J. 1396 Ghebregziabher I. 913 Gheysen S. 313 Ghimire S. 397, 1660 Gianturco F. A. 815, 1185, 1191, 1269 Giapis K. P. 1366, 1394 Gibson G. N. 514, 1690 Gibson N. D. 81, 168, 181, 406, 515, 681 Gidcumb S. 1371 Gidcumb S. M. 1369 Gien T. T. 917 Giglio E. 1099, 1165, 1176 Gilbody H. B. 1067 Gillaspy J. 331 Gillaspy J. D. 33, 41, 94, 107, 153, 173, 184, 188, 260, 329, 360, 506, 943, 1179 Gilliam S. 1371 Gilliam S. B. 1369 Gilmer G. H. 1555 Gimenez X. 1139 Giot L. 1595 Girard A. 682 Giri K. 1351 Giroud C. 252 Gisselbrecht M. 448, 476, 1671 Giuliani M. 255 Giusfredi G. 336 Glans P. 115, 806, 937, 992 Glass-Maujean M. 431, 551, 659, 660 Glaz W. 510, 1201 Glazov D. A. 411 Glazov L. G. 1405, 1501, 1637 Gleeson M. A. 1393 Gleizes A. 957 Gligoric G. 1481 Glosik J. 911, 1578 Glowacki P. 113 Gluch K. 926 Gnaser H. 1205, 1438 Goddard R. 310 Godehusen K. 598 Godet J.-L. 510, 1201 Godunov A. L. 239, 1028, 1232, 1359 Goetz J. R. 967, 977 Gogtas F. 1131 Gohle C. 236 Gojska A. 1211 Gokov S. P. 1493

Goldberg E. C. 1431 Goldfarb F. 286 Goldstein W. H. 152 Golovin A. V. 446, 549 Golser R. 1205, 1438 Golubev A. A. 1605 Golubeva A. V. 1451 Gonzalez A. D. 314 Gonzalez M. 1127, 1139, 1309 Gonzalez Martinez A. J. 78, 154, 259, 950, 951 Gonzalez Pascual C. 1431 Gonzalez V. R. 422, 620, 782, 1677 Gonzalez-Arrabal R. 1620 Gonzalez-Lezana T. 1128, 1130, 1301 Gonzalez-Martinez A. J. 241 Gonzalez-Sanchez L. 1185, 1269 Gonzalo A. B. 620 Goodman F. O. 1646 Gorczyca T. W. 81, 242, 244, 314, 400, 810 Gordeev A. 1540 Gordillo N. 1620 Gordon M. J. 1366, 1394 Gorfinkiel J. D. 905, 1243 Gorodetsky A. E. 1457 Goryl M. 1376 Goryunov O. Yu. 1653 Goswamy J. 473 Goto M. 127 Gotoh S. 1323 Gou B. 327, 721 Gou B. C. 29, 161, 276 Gou B.-C. 125 Gou F. 1393 Gou Q. 1352 Goudarzi M. 1167 Gould H. 631 Gould P. L. 1072, 1257, 1719 Govil I. M. 1150 Graczyk M. 1632 Grande P. L. 1175, 1335, 1364, 1404, 1533, 1580, 1640 Grandin J. P. 1176 Grandin J.-P. 1219 Gravielle M. S. 1363, 1509, 1545, 1579 Grav M. D. 1124 Gray S. K. 1308, 1309 Greene C. H. 743, 986, 1006, 1009 Greene J. P. 305 Greene M. B. 99 Greenwood J. B. 1344 Gribakin G. F. 188, 424, 506 Grieser M. 132, 814 Grieves G. A. 1415 Griffin D. C. 739, 767, 839, 868, 879, 923, 974, 1051Grill V. 1531 Grisenti R. E. 475

Gritsyna V. T. 1493 Gritsyna V. V. 1493 Groenenboom G. C. 1075 Grosjean A. 1282 Grossmann F. 226 Grove D. A. 1609, 1629 Grucker J. 1444 Gruener F. 1596 Grum-Grzhimailo A. N. 572, 887 Grun N. 324 Gu J. P. 1086, 1278 Gu J.-P. 1078 Gu M. F. 8, 40, 49, 50, 132, 133, 134, 257, 464, 654, 715, 813, 814, 833, 1039 Gu Y. 338 Guan J. 478 Guan X. 497, 533, 1695 Gubbini E. 603 Guerrero A. 1300 Guetersloh S. B. 1633 Guevara N. L. 1657, 1743 Guimaraes M. N. 1669 Guinea W. E. 792 Gulley M. S. 395, 424 Gulyas L. 1229, 1230, 1356 Gumberidze A. 1211, 1349, 1595 Gumus H. 1643 Guo C. 440, 622, 643, 694 Guo H. 1133, 1218 Gupta G. P. 66, 87, 102, 196, 352, 359, 361, 707, 713, 733 Gupta M. 852 Gurtler P. 386 Gusarevich E. S. 1233 Gustafsson B. 298 Gustafsson K. 1633 Gustafsson M. 650, 1292, 1739 Gustafsson T. 1364, 1580 Guth G. 292 Gutierrez F. A. 1514 Guvetand O. 448, 1671 Gwinner G. 132, 814, 955, 1738 Haas M. 644 Haasz A. A. 1448, 1449, 1452, 1547 Habibi M. 88, 169, 671, 972 Hack W. 1310 Haensch T. W. 410, 644 Hagmann S. 1164, 1211, 1494, 1518, 1648 Hahto S. 239 Haimberger C. 1263, 1722 Hajaji A. 760, 867, 953, 1084 Halfmann T. 202, 282, 486 Halka M. 246, 395, 424 Hall R. I. 618 Haller E. 331 Haller E. E. 292 Hallett W. A. 79

Halmova G. 905, 1243 Halvick P. 1316 Hamada H. 1564 Hamasha S. 308 Hamasha S. M. 162 Hamberg M. 965 Hammond P. 630 Hamrita H. 1076 Hamza A. V. 1386 Han K.-L. 1305, 1318, 1332, 1742 Han X.-Y. 124, 800, 975 Han Y.-C. 540, 1698 Hanif M. 32, 207, 283 Hankel M. 1308, 1318 Hanne G. F. 792, 908, 970 Hannemann S. 670 Hanni J. 1028, 1359 Hansch T. W. 149, 236 Hansen J. P. 1147, 1183, 1716 Hansen S. 308 Hansen S. B. 267 Hanssen J. 770 Hanstorp D. 395, 424, 763 Haq S.-U. 574, 586 Haque A.K.F. 755, 828, 835, 946, 978 Haranger F. 1520, 1543 Harman Z. 78, 154, 324, 950, 951 Harries J. R. 467, 630 Harris C. 308 Hartigan P. 463 Hasan A. 1093, 1207, 1354 Hasan A. A. 1338 Hasan V. G. 1206, 1240 Hasegawa S. 180, 186, 517 Hashimoto N. 1371 Hasizume K. 1538 Haskopoulos A. 510, 1201 Hasselkamp D. 452, 1113 Hatakeyama A. 1339 Hatamoto T. 467, 587, 619 Hatano Y. 1538 Hattass M. 475, 688 Havener C. C. 104 Haxton D. J. 862, 1065 Havaishi T. 114 Hayashi M. 1317 Hazlett K. 773 He B. 1063, 1289 He G.-Z. 1742 He L. M. 163 He L.-M. 270, 271 He Z. 1641 Hearne S. M. 1414 Heber O. 846, 989, 1205 Heeter R. F. 138, 152, 281, 468 Heilbronn L. H. 1633

441, 494, 522, 524, 672 Heinecke E. 572 Heinola K. 1558 Heinzen D. J. 1257, 1719 Hellberg F. 763, 890 Hellhammer R. 1101, 1231, 1543 Helm H. 483, 1089 Henderson D. 305 Hennecart D. 867, 1165, 1219 Henriksson K.O.E. 1562 Hentges R. 547 Hentz A. 1175, 1335, 1364, 1404, 1533, 1580, 1640 Henvk M. 1418 Heredia J. G. 406 Heredia-Avalos S. 1584, 1607, 1612, 1645, 1647 Hergenhahn U. 417, 430, 491, 568 Hernandez C. L. 1249 Herrero V. J. 1130 Herrmann M. 236, 644 Hershkowitz N. 75 Hertlein M. P. 519 Hervieux P. A. 770 Hervieux P.-A. 759 Hess W. P. 1418 Hey J. D. 589 Hibbert A. 28, 111, 112, 366, 368, 371, 391, 461, 585, 711, 732, 809, 1053 Hikosaka Y. 106, 442, 617 Hilico L. 1241 Hill B. P. 1159 Hill K. W. 9 Himbert M. E. 669 Hinkle J. D. 1203 Hino T. 1402, 1456 Hinojosa G. 169, 266, 279, 321, 428, 671, 972 Hippler R. 1397 Hirayama T. 1377, 1421 Hirohata Y. 1402, 1456 Hirsch G. 1078, 1086 Hisamatsu H. 1379 Hishikawa A. 563, 1708 Hisi A.N.S. 825 Hitz D. 682 Hiyama M. 576 Hjelte I. 588 Ho H. C. 177 Ho S. C. 389 Hoashino M. 587 Hochlaf M. 662, 1111 Hodges J. T. 1178 Hoehr C. 1108 Hoekstra R. 1100, 1107, 1114, 1125, 1206, 1240, 1524Hoerndl M. 955, 1738 Hoffman A. 1375 Heinasmaki S. 15, 51, 110, 299, 376, 390, 399, Hoffmann D.H.H. 1583

Hoffmann J. 80 Hogervorst W. 238, 1194 Holczer T. 133, 464 Holland G. E. 33 Holland O. W. 1155 Holler L. 1259 Holloway S. 1565 Holt R. J. 56, 305 Holtgrave J. C. 1060 Holzwarth R. 236, 644 Hom B. J. 487 Homem M.G.P. 779, 793 Honvault P. 1141, 1301, 1316 Hooker C. J. 511, 541, 1685, 1699 Hopf C. 1551 Horacek J. 843, 973 Horbatsch M. 1345 Horner D. A. 645 Horstmever R. 291 Horvat V. 1330 Hosaka K. 549 Hoshina K. 563, 609, 1708 Hoshino M. 398, 467, 613, 619, 629, 673, 876, 961, 962, 963 Hossain S. 1058 Hotop H. 202, 209, 282, 615, 880, 894, 982 Houamer S. 838, 909 Houfek K. 843 Hsiao J.-T. 222, 582 Hsu C.-Y. 1384 Hsu G. Y. 1499 Hsu J. Y. 1154, 1591, 1592, 1616 Hu J. 1742 Hu M.-H. 34, 36 Hu S. X. 499 Huang G. 338 Huang J. 63, 227 Huang K.-N. 222, 582 Huang L. 1464 Huang S. 649 Huang Y. 1257, 1719 Huang Y. R. 764, 856 Huber K. 754 Huber K. P. 466 Hubrig S. 295 Hudson C. E. 434, 812, 938 Hudson L. T. 41 Huetz A. 448, 476, 1671 Hunn J. D. 1369, 1371 Hunt A. W. 1602 Hunt J. F. 1274 Husarik J. 926 Huskins E. L. 913 Hussain S. 527, 586, 633, 646 Hussey M. J. 787, 819, 927 Hutton R. 12, 210, 213, 627

Huttula A. 51

Huttula M. 37, 98, 108, 110, 204, 494, 522, 668, 672 Huttula S.-M. 98, 204, 441, 668 Ibuki T. 278, 404, 569 Ichihara A. 1023 Ichikawa T. 609 Ide-Ektessabi A. 1401 Iga I. 748, 779, 793, 799, 837, 870 Igarashi A. 1356 Igarashi E. 1453 Ignjatovic Lj. M. 1068 Ikegami S. 1651 Illescas C. 1156, 1245 Imai M. 144, 224, 1163, 1636 Imai T. W. 1078 Inal M. K. 403 Ince-Cushman A. 9 Indelicato P. 103, 223, 306 Ingram R. 292 Inguscio M. 336, 1198, 1681 Innocenti F. 661 Inokuti M. 1628 Inoue N. 267 Ionescu D. C. 1211 Ip W. 1499 Ip W. H. 1384 Irimia A. 158, 726 Irodionovich Kikiani B. 1323 Irving R. E. 652 Ishida Y. 171 Ishihara T. 876 Ishii K. 1498, 1601, 1641, 1649 Ishikawa A. 57 Ishikawa K. L. 378 Ishikawa Y. 7, 13, 214, 264 Ishiyama S. 1482 Isla M. 384 Istomin A. Y. 408, 550 Itakura R. 609 Itano W. M. 190 Itikawa Y. 1024 Ito F. 542, 1700 Ito K. 106, 466, 617 Ito S. 593 Ito T. 1426 Ito Y. 593 Itoh A. 1357, 1601, 1641 Ivanov I. A. 418, 536, 575, 1696 Ivanov O. V. 1103, 1585 Ivanov V. G. 149 Ivanov V. K. 454, 570 Ivanova E. P. 54 Ivanovic N. 1481 Ivkovic M. 899, 1238 Iwamae A. 127 Iwata Y. 1633 Iza P. 1491

Izawa M. 1323 Jablonski A. 966, 1463 Jacob W. 1551 Jacobi J. 319, 523, 785, 863 Jacobsen T. S. 234 Jagutzki O. 475, 1348 Jahnke T. 475, 688 Jakas M. M. 1066 Jaklanen P. 1409 Jaksch D. 926 Jaksic M. 1329 Jakubassa-Amundsen D. H. 1297 Jalbert G. 1077, 1222, 1237 Jamieson D. N. 1414 Jamieson M. J. 1145 Jamil Y. 574 Janby D. 516 Janev R. K. 1020, 1197, 1247 Jang Z.-K. 459 Jankala K. 37, 110, 494, 672 Jankowski P. 1118 Janssens R. V. F. 56, 305 Janzen P. H. 848 Jaroshevich A. S. 80 Jarosz A. 113 Jaskola M. 1180 Jaspers R. 252 Jelisavcic M. 984 Jenkins E. B. 462 Jennerich R. M. 203 Jensen H.J.Aa. 1279 Jensen J. 1061, 1083, 1609, 1629 Jentschura U. D. 78, 154, 182, 254, 644, 950, 951 Jess D. B. 46, 344 Jeynes C. 1168 Jha A. K. S. 72, 148 Jha A.K.S. 728, 959 Jha J. 439 Jha L. K. 816 Jha P. 72, 728 Jiang C. L. 305 Jiang G. 63, 86, 118, 216, 227, 581 Jiang W.-C. 738 Jiang Y. H. 416, 525, 547 Jiang Z. 375 Jiang Z. K. 460 Jiao H. 1563 Jimenez-Mier J. 82, 438 Jin F. 762 Johansson S. 636, 641 Johansson S. G. 44, 141 Johnson N. G. 1071, 1085 Johnson P. V. 784, 850, 884 Johnson W. R. 16, 21, 76, 174, 177, 330, 706 Joly A. G. 1418 Jonauskas V. 138, 152, 240, 281, 468 Jones G. H. 1125

Jones H. R. A. 140 Jones R. R. 388 Jones S. 377, 823, 1151, 1338 Jonsell S. 1208, 1340 Jonsson P. 26, 206, 217 Joseph B. 1396 Joshi Y. N. 198 Joshipura K. N. 817 Jouin H. 1514 Joulakian B. 909 Joulakian B. B. 783 Jovicevic S. 899, 1238 Ju L. 1332 Juarez A. M. 415, 628 Juaristi J. I. 1363, 1367, 1579 Juarros E. 1199, 1264, 1682, 1723 Juettemann F. 908, 970 Juncar P. 669 Jung E. C. 924 Jung R. O. 745 Jungen M. 1089 Junglen T. 1691 Jupen C. 252 Juranic P. N. 535, 537 Jureta J. 898 Jureta J. J. 920, 936 Jurvansuu M. 525 Kabachnik N. M. 409, 417, 430, 443, 491, 518, 560, 568, 635, 1707 Kabadavi O. 1643 Kadhane U. 1193, 1229, 1290, 1328 Kadyrov A. S. 998, 1181 Kaelberg A. 1083 Kaellberg A. 763, 937, 1061, 1287 Kahane S. 729 Kahn S. M. 10, 40, 50, 133, 309, 464, 654, 833 Kahoul A. 1166 Kai T. 556, 885 Kaindl G. 416, 525, 547 Kaiser M. 519 Kaiser R. I. 653 Kajita M. 1355, 1750 Kalantaryan O. V. 1392 Kalashnikov M. 603 Kalish R. 1414 Kalkiuchi T. 1373 Kallman T. R. 244, 297 Kalyar M. A. 656 Kambara T. 171 Kamber E. Y. 1080, 1157 Kaminska M. 890, 965 Kaminski P. 483 Kamke W. 483 Kammer S. 248, 452, 475, 594, 688 Kammer Sv. 427 Kampp M. 931 Kamta G. L. 674

Kamyshan A. S. 1485 Kanai Y. 171 Kanashenko S. L. 1457 Kanazawa K. 1379 Kaneda M. 1601, 1641 Kaneko T. 1498, 1649, 1651 Kanevasu T. 106 Kanik I. 850 Kanter E. P. 490 Kao C.-C. 559 Kapplinger J. 1085 Karam J.-C. 1444 Karim K. R. 755, 828, 835, 946, 978 Karolewski M. A. 1388, 1465 Karpuskiene R. 714 Karr J. Ph. 1241 Karshenboim S. G. 149, 235 Karstens W. 1628 Kaschiev M. S. 1668 Kasemo B. 1419 Kashenock G. Yu. 570 Katai R. 127 Katanforoush A. 544, 1703 Katayama I. 171 Kato D. 31, 199, 212, 829, 841, 915 Kato H. 961, 962, 963 Kato K. 563, 1708 Kato M. 580, 1479, 1510, 1527, 1639 Kato T. 31, 47, 136, 142, 199, 212, 639, 829, 915, 1042, 1049, 1361 Kato Y. 338 Kaur S. 801 Kavcic M. 1091 Kawahara H. 962 Kawall D. 35 Kawamura T. 1460 Kawasuso A. 1559 Kawatsura K. 144, 224, 593, 627, 1163, 1615, 1636 Kawazoe S. 556, 885 Kayama E. 820 Kazakov S. M. 778 Kazansky A. K. 401, 409, 430, 491, 518, 560, 635, 1707 Kazansky K. 683 Kc edziera D. 59, 90 Kedzierski W. 795, 1010 Keenan F. P. 5, 42, 45, 46, 66, 131, 135, 136, 138, 152, 231, 268, 281, 315, 342, 344, 352, 468, 639, 640, 642, 733, 1018, 1032 Keim M. 1098, 1107, 1113 Keinonen J. 1381, 1446, 1558, 1562 Keiser A. N. 203 Keitel C. H. 78, 154, 644, 950, 951 Kelemen V. I. 778 Kelkar A. 1328 Kelkar A. H. 1229

Kelleher D. E. 340 Keller A. 394 Kelley R. L. 191, 309, 833, 873 Kenmotsu T. 1460, 1470 Kennedy E. T. 284, 433, 453 Kentsch U. 226 Kenvon S. J. 130 Kerber F. 328 Kessel Q. 1158 Kessler T. 104 Khajuria Y. 752, 886 Khakoo M. A. 773, 830, 850, 855, 994 Khalal-Kouache K. 1513 Khan B. A. 502 Khan S. A. 1483 Khan S. F. 221 Kharchenko V. 329 Kheifets A. 579 Kheifets A. S. 381, 408, 418, 475, 485, 536, 550, 575, 683, 977, 1696 Khemliche H. 1507 Khodyrev V. A. 1620 Khoma M. V. 1197 Khriplovich I. B. 300 Kido Y. 1471 Kieslich S. 132, 814 Kikkawa S. 186 Kilbane D. 284, 433, 453, 484 Kilbourne C. A. 191, 309, 833, 873 Kilcoyne A. L. D. 88, 169, 188, 266 Kilcoyne A.L.D. 506, 523, 631, 671, 863, 972 Kildiyarova R. R. 197, 198 Kilic H. S. 348 Kim D. S. 101 Kim Y. S. 101 Kim Y.-K. 184, 943, 960, 961, 962 Kimberg V. 629 Kimpton J. A. 41, 167 Kimura K. 1395, 1497 Kimura M. 749, 761, 876, 1078, 1086, 1126, 1186, 1195, 1212, 1278 Kin S. 1203 King B. V. 1412, 1435 King G. C. 415, 628, 875 Kingston A. E. 111, 366, 585 Kink I. 213 Kinnane M. N. 41, 167 Kinsho M. 1571 Kirby K. 153, 877, 949, 1199, 1264, 1682, 1723 Kirby K. P. 77 Kirchner T. 1059, 1098, 1107, 1113, 1345, 1354, 1356Kirsch R. 1595 Kirschner T. 1100 Kishimoto N. 1621 Kisielius R. 138, 152, 281, 468, 788 Kislov V. V. 1317

Kita S. 1323 Kitagawa M. 1654 Kitajima M. 398, 417, 555, 568, 613, 619, 999 Kitazawa S.-I. 1482 Kivimaeki A. 551, 599 Kivimaki A. 15, 83, 157, 208, 299, 693 Kjeldsen H. 234, 434, 664 Kjeldsen T. K. 530 Klamroth T. 1374 Kleiman U. 382, 552, 561 Klein D. 1231 Kleinert J. 1263, 1722 Kleyn A. W. 1393 Klos J. 1293 Klosowski L. 902 Klucharev A. N. 455, 1117 Klumpp S. 248, 277, 427, 437, 452, 553, 566, 594, 659, 660 Kneip R. 431 Knight D.J.E. 669 Knoebel R. K. 1599 Knoeckel H. 1088, 1261 Knoop S. 1100, 1107, 1206, 1240 Knopp H. 319 Knyazheva G. 1617 Kobayashi E. 1373, 1422 Kobayashi H. 1400 Kobayashi S. 1572 Kobayashi Y. 1564 Koch C. P. 1266, 1267, 1725, 1726 Kocsonya A. 1327 Kohguchi H. 1341 Kohl J. L. 848 Koike F. 31, 47, 142, 180, 338, 517, 580 Kojima T. M. 171 Kokkin D. L. 658 Kokoouline V. 743, 986, 1006, 1009 Kolachevsky N. 236, 644 Kolachevsky N. N. 149 Kolarova R. 1511, 1512 Kollmus H. 1338, 1518 Kolodyazhnaya M. 1409 Kolodziej J. J. 1376 Kolorenc P. 843, 973 Komaki K. 144, 224, 1163, 1636 Komarov F. F. 1485 Komasa J. 185 Kondagari S. 239 Konjevic N. 899, 1238 Kono K. 1621 Kononenko S. I. 1392 Konstantinov E. S. 1379 Konte A. 92, 269 Kontur F. J. 1434, 1475, 1521 Korica S. 447 Korista K. T. 810 Korman A. 1180

Korobov V. I. 503 Korol V. A. 84 Korolov I. 911, 1578 Korostiy S. 1583 Kosloff R. 1266, 1267, 1725, 1726 Kosugi M. 278, 576 Kotakoski J. 1381 Kotochigova S. 77, 254 Kouchi N. 567, 987 Kouzakov K. A. 752, 869 Koval A. V. 449, 1672 Kover A. 380 Kowalski A. 1532 Kovano I. 402, 435, 685 Kozhuharov C. 1164, 1211, 1349, 1595 Kozlov M. G. 84, 188, 192, 506 Krachmalnicoff V. 336 Kraft S. D. 1265, 1724 Krajewska K. 648 Kramer K. 754 Kramida A. E. 85, 122 Krantz C. 80 Krasnov A. A. 1379 Krassig B. 490 Krause H. F. 104, 1368, 1447, 1528, 1546, 1553, 1557Krause M. O. 438 Kreckel H. 737, 989 Krems R. 1145 Krems R. V. 1294 Krieger K. 1459 Krishnakumar E. 914 Krishnamurthi V. 1071 Krishnamurthy M. 439 Kroener D. 1374 Kroes G.-J. 1565 Kroesen G.M.W. 1751 Kroger S. 286 Krok F. 1376 Krstic P. S. 1149, 1224, 1468, 1530, 1557 Krueger B. 791 Krug A. 1666 Kruk J. W. 294 Krzykowski A. 113 Kubicek K. 58 Kubo H. 1048 Kubo T. 171 Kubozuka K. 435 Kuhlmann M. 60 Kuiri P. K. 1396 Kukk E. 51, 299, 376, 398, 399, 417, 441, 522, 524, 555, 568 Kukla K. W. 258 Kulcinski G. L. 1370 Kulevoy T. V. 1605 Kumar A. 1150, 1229, 1290, 1328 Kumar Chauhan R. 556, 885

Kumar M. 1483 Kumar R.T.R. 1440 Kumar S. 473, 1134 Kumar T.J.D. 1134 Kunc J. A. 768, 1225 Kunert T. 405, 612 Kung A. H. 96 Kuo Y.-P. 444 Kupliauskiene A. 887 Kurahashi M. 1570 Kurcewicz J. 1599 Kurcewicz W. 1599 Kurepa J. 898 Kurnaev V. A. 1451 Kurokawa Y. 57, 1087 Kurpeta J. 1599 Kusakabe T. 1186 Kusanagi S. 1400 Kutana A. 1394 Kuybeda R. P. 1605 Kuzmin V. 1608, 1642 Kuznetsov Yu. A. 1430 Kwato Njock M. 401 Kwato Njock M. G. 495, 695 L'Hoir A. 1595 La Tessa C. 1633 LaGattuta K. J. 512, 1686 Laarmann T. 386, 387 Laasch W. 386 Lablanquie P. 106, 442, 617, 618, 1737 Labrim H. 1385 Labzowsky L. N. 2 Lagorio C. 255 Lagutin A. E. 1485 Lagutin B. M. 248, 277, 437, 452 Lahmam-Bennani A. 904, 934, 995 Lahmar S. 1111 Laikhtman A. 1375 Lamaze G. P. 1369 Lambert D. L. 298 Lambourne J. G. 618 Lambropoulos P. 379, 564, 675, 1709 Lamehi-Rachti M. 1167 Laming J. M. 79, 153, 329 Laming M. 331 Lammich L. 737, 989 Lamour E. 1623 Lancaster J. C. 1434, 1475, 1477, 1516, 1521 Landers A. 606 Landers A. L. 256, 1058 Landi E. 6, 25, 70, 134, 147, 159, 243, 290, 293, 350, 356, 704, 705, 709, 710, 716, 717, 718, 720, 724, 727, 731, 734, 807, 813, 1029, 1030, 1033, 1036, 1040, 1041, 1043, 1046, 1047, 1052, 1055, 1057Landis D. 292 Lane C. D. 1541

Lanford W. A. 1613 Lange J. 1265, 1724 Lange M. 1005 Langley A. J. 511, 541, 1685, 1699 Lantschner G. H. 1624, 1644 Lanzano G. 1494, 1648 Lapicki G. 1146, 1150, 1155, 1180, 1229 Lapierre A. 78, 154, 241, 259, 411, 950 Laricchiuta A. 1020 Larson A. 750, 1009, 1074 Larsson M. 763, 890, 965 Lattuada M. 1653 Lau S. P. 1464 Laulan S. 605 Launay J.-M. 1141, 1301 Laurent G. 1165, 1176 Lavollee M. 476 Lawicki A. 1532 Lawler J. E. 341 Lawson K. D. 5 Lazauskas R. 1209 Lazur V. Yu. 1197 Le A.-T. 1062, 1214 Le Bigot E.-O. 184, 254, 260, 329, 943 Le Padellec A. 1140 LeGarrec J. L. 890 LePadellec A. 1076 Lebius H. 1520, 1543 Lecesne N. 56 Leckrone D. S. 459 Leclercq C. 760, 1084 Lecointre J. 920 Lederer S. 1406, 1445, 1487, 1517 Lee B.-J. 1467 Lee C. S. 1384, 1499 Lee D. 75 Lee H. T. 1449, 1452 Lee J. M. 389 Lee K. F. 608, 692 Lee L. C. 469 Lee M.-T. 748, 779, 793, 799, 837, 870 Lee S. 1384, 1499 Lee S.-H. 1143, 1304 Lee S.-Y. 1132 Lee T. G. 242, 1090 Lee T.-G. 1244, 1254, 1291, 1302 Lee Y. T. 96 Lee Y.-P. 469 Lefebvre R. 676 Legare F. 608, 692 Legendre S. 1099, 1101, 1165, 1176 Lein M. 500, 1736 Leininger T. 985 Leitkin P. 1540 Leitner D. 246, 623 Lemaire J. L. 470, 484, 493, 682 Lemaire P. 233

Lemell C. 1406, 1487, 1525 Lemennais P. 760 Lemeshko M. P. 553, 566 Lenka H. P. 1396 Leonard M. 1236 Leone S. R. 487, 498, 1679 Lepine F. 684 Leprince P. 867 Lepson J. K. 10, 165 Lerch E.-B.W. 498, 1679 Lercher G. 328 Lestinsky M. 39, 80, 1001 Leung K.-L. 239 Levchuk S. 1459 Levenson E. 169, 523, 671, 863, 972 Levin J. C. 246 Levin S. B. 1083 Levinton F. M. 883, 1706 Lewen F. 218 Li A. H.-T. 1184 Li F. 1390, 1523 Li G. 1362 Li G. Q. 764, 844 Li H.-L. 24 Li J.-M. 124, 800, 975 Li P. 24, 201 Li X. 1717 Li X.-R. 34 Li Y. 1126, 1138, 1352 Li Y.-W. 1563 Li Z. 1460 Liang G. 68, 354, 712, 1038, 1056 Liang G.-Y. 325 Liang J. H. 1450, 1591, 1592, 1616 Liang M.-C. 469 Liebermann H.-P. 1126, 1212, 1278 Liedahl D. A. 152 Liesen D. 1164, 1595 Likonen J. 1558 Lima M.A.P. 740, 777, 805, 825, 830, 906, 963, 964Limbachiya C. G. 817 Lin C. C. 745 Lin C. D. 393, 426, 1028, 1062, 1214, 1359 Lin C.-D. 242 Lin S. Y. 1133, 1218 Lindblad A. 390, 524 Lindenblatt M. 1603 Lindgren I. 337 Lindner F. 687, 1745 Lindroth E. 115, 312, 322, 937, 992, 1196 Linert I. 875, 1002 Linsmeier Ch. 1459, 1529, 1560 Liontos I. 592 Lioubimov V. 171 Lipsky L. 307 Lique F. 1119, 1120, 1280, 1284, 1293

Lisak D. 1178 Lischke T. 467, 629 Litvinov Yu. 1599 Litvinyuk I. 606 Litvinyuk I. V. 396, 397, 616, 1659, 1660 Liu C. 688 Liu C. L. 1063, 1247, 1289 Liu C.-N. 475, 1062 Liu G. F. 1433 Liu J. 891 Liu K. 1143, 1304 Liu L. 1138, 1321 Liu M. 1016 Liu M. T. 826 Liu P. 609 Liu S. H. 1384, 1499 Liu W.-K. 621 Liu X. 477, 614, 1714 Liu X. J. 398, 467, 629 Liu X.-J. 402, 509, 587, 738, 853 Liu Y. 34, 104, 210 Liu Y. C. 1384 Liu Y. W. 1334 Livesay R. J. 1599 Livingston A. E. 258 Livshits A. 1538 Ljung G. 457, 636 Llovet X. 861 Loch S. D. 132, 754, 757, 767, 806, 814, 839, 868, 879, 947, 1051 Lodha G. S. 526 Loginov A. V. 304 Lohmann B. 552, 792, 832, 840 Long X. 1016 Lopes A. R. 906 Lopez Vieyra J. C. 1657 Lopez-Encarnacion J. M. 7 Lou N. 546, 1705 Louc S. 1189 Louver Y. 669 Lovis C. 43 Lower J. 831, 931, 944, 993, 1005 Lozano J. 1158, 1344 Lozano J. A. 412 Lu H. 423 Lu H.-C. 444, 469 Lu H.-Z. 385 Lu K. T. 389 Lu M. 88, 169, 523, 671, 863, 972 Lu R.-F. 1305 Lu Y. 327, 1132 Lu Y. X. 1334 Lu Z.-T. 56, 305 Lubell M. S. 246, 623 Luc-Koenig E. 1267, 1726 Lucarelli F. 1172, 1173 Lucas J. M. 1139, 1306

Lucht S. 553 Ludde H. J. 1345 Ludlow J. A. 739, 754, 757, 767 Ludwig Th. 1239, 1711 Luedde H. J. 1098, 1100, 1107, 1113 Lugosi L. 329 Lugovskov A. V. 1667 Lukic D. 39, 80, 471 Lukic D. V. 1001 Lukomski M. 795, 1010 Luna H. 484, 1059, 1347 Lundberg H. 140, 237, 375, 457, 459, 641 Lundeen S. R. 93, 95 Lundqvist M. 459 Lundy M. E. 1085 Luo G.-N. 1559 Luo Z. 1016 Luque Raigon J. M. 116 Lyapin V. 1617 Lyras A. 592 Lysaght M. A. 453 Lyubchik Y. 140 Ma C. W. 14 Ma D.-x. 374 Ma H.-R. 24 Ma X. 1349 Maatta M. 51, 441, 522 MacAdam K. B. 320, 881 MacAskill J. A. 795 MacGillivray W. R. 480, 792 Macaulay-Newcombe R. G. 1448, 1449, 1452 Mace J. 1366 Macek J. H. 377, 823, 1151, 1152, 1224, 1226 Machacek J. R. 631 Machado L. E. 799 Machida M. 402, 435, 626 Machin L. 1283, 1286 Mack A. 1291 Mackel V. 60 Macri P. 429, 1105 Madden N. 292, 331 Maddern T. 961 Madey T. E. 1417, 1430 Madine M. 450, 691, 1674 Madison D. H. 377, 741, 751, 756, 804, 818, 819, 823, 832, 895, 927, 944, 1003, 1093, 1151, 1207, 1338 Madsen C. B. 529, 1694 Madsen L. B. 516, 529, 530, 1272, 1277, 1694, 1728, 1730 Madzunkov S. 806, 888, 992, 1196 Maerk T. D. 881, 926, 1189, 1531 Magalhaes S. D. 1222 Maggio A. 331, 1653 Magnuson M. 588 Magunov A. I. 267 Mahapatra D. P. 1396

Maharjan C. M. 396, 397, 606, 616, 1659, 1660 Mahmood S. 465, 574, 586, 656 Maier H. 1548 Mainos C. 1444 Majima T. 1357 Majumder S. 30, 345 Majus D. 178 Makarenko B. 1426, 1427 Makinen A. 37 Makochekanwa C. 398, 467, 761, 876, 963 Makonyi K. 184, 260, 329, 943, 1179 Makris M. G. 379 Malegat L. 401, 495, 683, 695 Maletta S. 1502, 1569 Malik F. B. 946, 978 Malkiewicz T. 1617 Malone C. P. 850 Mammeri S. 1383, 1589 Manakov N. L. 408, 550 Mancusi D. 1633 Mandal C. R. 1227, 1295 Mandal S. 30 Mandelbaum P. 128 Mandic L. 1329 Mann R. 1518 Manson S. T. 391, 482, 663, 696 Mansouri A. 838, 909 Manthe U. 1311 Maguet A. 448, 632, 1276, 1671, 1692 Mar S. 422, 620, 782, 1677, 1712 Marcassa L. G. 1665 Marchuk O. 252 Marian J. 1555 Marienfeld S. 880 Marinetti F. 1269 Marinkovic B. P. 736, 778, 780, 794, 888, 912, 924 Marion M. 263, 1079 Markhotok A. A. 215 Markin S. N. 1508, 1511, 1512, 1618 Markowski L. 1416 Markwick-Kemper A. J. 1577 Marler J. P. 771 Marmar E. S. 334 Maroulis G. 510, 1201 Marques J. P. 103, 223 Martensson-Pendrill A.-M. 337 Martin E. 590 Martin F. 631, 645, 1176, 1544 Martin I. 1702 Martin N. L. S. 175 Martin N.L.S. 1012 Martin W. C. 285 Martinet G. 1076 Martinez H. 1161, 1170, 1249 Martinez R. 1127, 1139, 1309 Martinez S. 1077, 1097

Martins M. 60, 525, 598 Mase K. 1373, 1422, 1423 Maseberg J. W. 933 Mashkova E. S. 1436, 1486, 1495, 1522 Masnou-Seeuws F. 1267, 1726 Mason H. E. 704, 1029 Mason N. J. 926 Materer N. F. 1391 Mathur D. 439 Matranga M. 331 Matrasulov D. U. 1233 Matsiev D. 1505 Matsudo T. 580 Matsumoto J. 1005 Matsumoto M. 467, 555, 587 Matsumoto Y. 1461 Matsunami N. 1484 Matsuo Y. 1275 Matsuoka L. 180, 186, 517 Mattes M. 250, 326 Matthews A. 1032 Mattioli M. 971, 1026 Matveev V. I. 1233 Maunoury L. 846, 1520, 1543 Mawhorter R. J. 1344 Maydanyuk N. V. 1207, 1338 Mayer J. W. 1171 Mayer M. 1450, 1451 Mayo R. 1673 Mazon K. T. 870 Mazouffre S. 333 Mazziotti D. A. 1073 Mazzitelli G. 971, 1026 Mazzotti D. 336 McBane G. C. 1310 McCann J. F. 1747 McCarroll R. 1109 McCarthy T. J. 1106 McConkey J. W. 795, 1010 McCorkindale J. C. 221 McCreadv D. E. 1609 McCullough R. W. 1067, 1125 McCurdy C. W. 645, 862, 1065 McDaniel F. D. 1155 McDonald J. W. 1386 McDonald R. 79 McEachran R. P. 924 McGrath C. 795, 1347 McGuire J. H. 1028, 1232, 1359 McKenna J. 511, 541, 1685, 1699 McKoy V. 435, 613, 765, 836, 872 McLaughlin B. M. 246, 279, 424, 623, 809, 1053 McLaughlin K. W. 631 McLean W. 1429 McNamara J. M. 1194 Mebel A. M. 469, 1317 Medina A. 1222

Medina C. 773 Meharg K. J. 1747 Mehta D. 473 Mehta R. 1150 Meijer G. 1678 Meiners J. C. 489 Meis C. 1403 Meissl W. 1496 Mejia-Ospino E. 1300 Melendez M. 1000 Melero Garcia E. 551 Melero-Garcia E. 599 Melikechi N. 489 Mello R. N. 1085 Melo W. S. 1059, 1253 Mendenhall M. 1500 Mendez L. 1122, 1215, 1220, 1245 Mendez-Martinez E. 82 Mendoza C. 244, 297 Menendez J. M. 1702 Menmuir S. 551 Merabet H. 11, 239, 1028, 1359 Meremianin A. V. 408, 550 Merkt F. 170, 209, 218, 615 Merlet C. 861 Meyer F. W. 1368, 1447, 1528, 1546, 1553, 1557 Meyer M. 202, 572 Meyer W. 414 Mezdari F. 1076 Micha D. A. 1331 Michelin S. E. 748, 837, 870 Michizono S. 1572 Mickat S. 248, 427, 452, 553, 594 Miculis K. 414, 455, 1117 Midorikawa K. 378, 563, 1708 Mielewska B. 875 Mihajlov A. A. 1068 Mihelic A. 20, 157, 1737 Mihesan C. 1372 Mikhailov I. A. 1009 Mikosza A. G. 874, 889, 1004 Mikoushkin V. M. 1226, 1346 Milisavljevic S. 780 Miljaeva E. 1540 Millar T. J. 1577 Miller J. 1633 Miller J. D. 1257, 1719 Miller K. 1158 Milligan R. O. 231 Milne-Brownlie D. S. 832 Milosavljevic A. R. 778, 888 Milosevic D. B. 667, 687, 1741, 1745 Milstein A. I. 300 Minami T. 1090, 1244 Minic M. 898 Minniti M. 1407, 1489, 1504, 1519, 1535 Miraglia J. E. 1439, 1509, 1582, 1622, 1626

Miranda J. 1634 Miron C. 588 Mironov V. 154, 241, 259, 950 Miserque F. 1385 Miskovic Z. L. 1365, 1478, 1581, 1638, 1646 Misra D. 1193, 1229, 1328 Mistrov D. A. 619 Mitchell J.B.A. 890 Mitnik D. M. 1051 Mitric R. 1268, 1727 Mitroy J. 1228 Mittig W. 1595 Miura T. 1421 Miwa Y. 1559 Miyamoto Y. 1186 Miyauchi H. 1454, 1455 Miyoshi T. 1103, 1325, 1326, 1585, 1630, 1631, 1652Mizumaki M. 593 Mizuno T. 1357 Moccia R. 109, 595 Modugno G. 1198, 1681 Moeller T. 386, 387 Mogendorff V. P. 1182 Mohamed T. 992 Mohan M. 72, 148, 728, 959 Mohanty B. P. 1150 Mohr P. J. 254 Mokler P. H. 22, 60, 1164, 1595 Molinari E. 1567 Mondal S. 766, 775, 827 Moneta M. 1655 Monreal R. C. 1472, 1537 Montaigne H. 890 Montanari C. C. 1439, 1622 Montenegro E. C. 749, 851, 1059, 1253, 1347 Montenegro M. 900 Moore D. 1071 Moore I. D. 172 Moore J. H. 847 Moreno-Marin J. C. 1612, 1647 Morgenstern R. 1100, 1107, 1206, 1240, 1524 Mori M. 1422 Moribayashi K. 569 Morimoto Y. 1401 Morioka Y. 114 Morishita T. 242 Morishita Y. 402, 404, 569, 580 Morita N. 1275 Morita S. 127 Moriwaki Y. 1275 Morokuma K. 871, 948 Morozov V. A. 1546 Morris A. 661 Morrissey D. J. 1599 Morton D. C. 48, 164, 187 Moser H. O. 1464

Moshammer R. 602, 607, 1094, 1108, 1221, 1223, 1338, 1518 Moskovkin D. L. 183, 1733 Mosnier J.-P. 284 Motohashi K. 1110 Motoki S. 446 Moussa D. 1610 Mozejko P. 864, 1007 Msezane A. 87, 131, 196 Msezane A. Z. 27, 359, 392, 407, 520, 665, 707, 713, 928 Mu Z.-D. 272, 316 Mueller A. 246, 523, 623, 785, 814, 863, 897, 1001 Mueller A. M. 487, 1650 Mueller P. 56, 305 Mueller U. 1089 Muenzenberg G. 1599 Mukherjee D. 274, 367 Mukoyama T. 593, 626, 627 Muktavat K. 908, 970, 997 Muller A. 39, 80, 132, 319, 321 Munjal H. 919, 1011 Munoz-Marquez M. A. 1175, 1404 Munoz-Martin A. 1617 Murakami I. 136, 199, 212, 639, 829, 915, 1042 Murakami T. 1633 Murakami Y. 930 Muramoto T. 1460, 1470 Muranaka T. 1165 Murata M. 567 Muratov V. I. 1392 Murnick D. E. 1106 Muroga T. 1402 Murphy M. T. 141 Murphy N. 433, 453, 554 Murray A. J. 772, 787, 819, 927 Murray D. J. 789 Murray R.J.A. 1664 Murray S. 292 Musielok J. 347, 363 Mutin T. 1583 Mutin T. Yu. 1605 Mwakikunga B. 1488 Myers T. 438 Naab F. 1155 Nabekawa Y. 563, 1708 Nagano M. 1498, 1649 Nagaoka S. 278 Nagaoka S.-I. 1373, 1423 Nagasaka T. 1402 Nagata K. 1424 Nagata S. 1615 Nagata T. 180, 186, 517, 820 Nahar S. N. 179, 637, 860, 900 Nair K.G.M. 1625 Naja A. 760
Naji E. A. 1140 Najjari B. 976, 1003, 1094, 1112, 1252 Nakagawa K. 555, 568, 613, 619 Nakahata T. 1453 Nakai Y. 171, 1357 Nakajima K. 1395, 1497 Nakajima T. 531 Nakamoto A. 1395 Nakamura I. 1564 Nakamura N. 22, 841, 935, 1424, 1443, 1526 Nakamura T. 171 Nakamura Y. 1538 Nakano H. 609 Nakashima H. 57, 1087, 1633 Nakatsuji H. 57, 467, 1087 Nakazaki S. 556, 700, 885, 930 Nambu A. 1373, 1422 Nanbu K. 1350 Nandi D. 914 Nandi T. 1150, 1211 Napiwotzki R. 294 Nascimento V. A. 1665 Nataraj H. S. 367 Natarajan A. 318 Natarajan L. 318 Nava S. 1172, 1173 Nave G. 140, 237, 328 Nayak S. V. 505 Ndao A. S. 92, 269 Nedeljkovic Lj. D. 1576 Nedeljkovic N. N. 1576 Neerja 707 Nefedov V. I. 699, 702, 723 Nehari D. 1258, 1720 Neill P. 308 Neill P. A. 1121 Nekab M. 1166 Nekkab M. 904 Nelson A. J. 1429 Nemov A. S. 1436, 1486, 1495 Nest M. 1374 Nesterenko V. O. 486 Neumann N. 519 Newell W. R. 511, 541, 961, 1685, 1699 Nevens G. 313 Ngassam V. 849 Nicolas C. 662 Nicole C. 684 Niederhausen T. 1200, 1387, 1683 Nielsen K. E. 457 Nieto P. 1544 Niga P. 554 Niita K. 1633 Nikjoo H. 1503, 1611 Nikkinen J. 51, 83, 98, 299, 380, 399, 441 Nikolic D. 322, 992 Nikolopoulos L.A.A. 379, 564, 675, 1709

Nikulin V. K. 723 Nilsson H. 457, 459, 636 Ning C. G. 764, 844, 856 Ning Y. 1063, 1289 Nishihara K. 31 Nishikawa Y. 1453, 1455 Nishimura T. 1471 Nishio K. 1636 Nishiura M. 1461 Niu Y.-Y. 540, 1698 Noakes T.C.Q. 1175, 1335, 1404, 1533 Noble C. J. 788, 809, 882, 996, 1053 Noda K. 171, 1103, 1325, 1326, 1585, 1630, 1631, 1652Noda N. 1454 Noga J. 1282 Nohara H. 841 Nolen J. A. 1599 Nomura M. 1538 Nordberg J. 535 Nordlander P. 1086, 1195 Nordlund K. 1381, 1446, 1447, 1554, 1562 Norman P. 538 Norrington P. H. 138, 281, 468 Nortershauser W. 74 Nortier A. 1399 Noureddine A. 1169 Novikov N. V. 1473 Novotny O. 890, 911, 1578 Nyman G. 1311 Nzevimana T. 1140 O'Connor D. J. 1632 O'Connor T. P. 56, 305 O'Keeffe P. 202 O'Malley S. M. 275, 445 O'Mullane M. 252 O'Mullane M. G. 1051 O'Rourke S.F.C. 1096 O'Sullivan G. 31, 94, 360, 433, 453, 554 Obara S. 180, 186, 517, 820 Oberg K. J. 129 Obreshkov B. 1442, 1568 Oda T. 1455 Odagiri T. 567, 987 Oddershede J. 1279, 1590 Odeurs J. 313 Oehrwall G. 390, 524 Oezdemir Y. 677 Ogawa H. 1498, 1599, 1649 Ogilvie J. F. 444, 1279 Ogiwara N. 1571 Ogorodnikova O. V. 1451 Oguri K. 876 Ogurtsov G. N. 1226, 1346 Oh D. 1541 Ohashi H. 31, 278 Ohata T. 1498, 1649

Ohmura H. 542, 1700 Ohno K. 278 Ohsawa D. 1095 Ohtani S. 22, 171, 841, 935, 1424, 1443, 1526 Ohyabu N. 1538 Oide K. 1379 Okada K. 171, 278, 404, 569, 580 Okada Y. 1095 Okamoto A. 1461 Okavasu S. 1484 Okazawa T. 1471 Okino T. 609 Okudaira K. K. 1373, 1422 Okuno K. 1453, 1454, 1455 Olalde-Velasco P. 82, 438 Oliaiy P. 1167 Oliva A. 1407, 1489, 1504, 1519 Oliveira H. L. 748, 870 Oliver P. 112, 368 Olkhov R. V. 1314 Olmez G. 1157 Olson R. E. 263, 1069, 1079, 1121, 1160, 1188, 1235, 1250 Ono T. 1460 Oohashi H. 593 Orban A. 1230 Orban I. 115, 937 Orel A. E. 744, 750, 774, 849, 854, 878, 903, 1074 Orlando T. M. 1415, 1541 Orlov D. A. 80 Orsic-Muthig A. 1164, 1349 Ortiz M. 1673 Osaki H. 186 Osamura Y. 653 Osborne C. 259 Osborne C. J. 22 Oshima N. 171 Osipov T. 606 Osipowicz T. 1632 Osmekhin S. 51, 390, 441 Ostashko V. V. 1653 Osterdahl F. 763, 890, 965 Osterheld A. L. 332 Ostrovsky V. N. 516, 1083, 1676 Otranto S. 579, 1069, 1188, 1235, 1250 Ott H. 1240 Ottinger Ch. 1532 Ouaskit S. 1189 Oubre C. 1195 Ouichaoui S. 1383, 1589, 1610 Oujia B. 1256 Oura M. 402, 593, 626, 627 Ouziane S. 1169 Ovchinnikov S. Yu. 1152, 1224, 1226, 1346 Ovsiannikov V. D. 1228 Ovsyannikov V. P. 226 Oya Y. 1453, 1454, 1455

Oyaidzu M. 1453, 1454 Oyama T. 404, 569 Ozdemir L. 55 Pacheco A. B. 1331 Pachucki K. 100, 155, 176, 185 Pacquet J. Y. 1543 Padilla S. 116, 255 Pajek M. 1180 Pajerowski D. 913 Pakhomova T. 178 Palaniyappan S. 913 Palmeri P. 65, 67, 69, 71, 230, 244, 297, 351, 353, 355, 364, 460 Palov A. P. 1124 Pan L. 194, 275, 445 Panajotovic R. 736, 944, 984, 993 Pandey A. C. 1483 Pandev G. 298 Pandey M. K. 1298 Paniagua M. 1128 Panigrahi B. K. 1625 Pansini F. 1653 Papa M. 1653 Pape A. 1169 Pardo A. 590 Pardo R. C. 305 Parente F. 103, 223, 306 Parenti S. 233 Parikh N. 1371 Parikh N. R. 1369 Parilis E. S. 1436, 1495 Parke E. 1085 Parker J. S. 413, 1747 Parkinson G. S. 1175, 1335, 1404, 1533 Partanen L. 108, 204, 668 Pascual-Izarra C. 1588 Pashov A. 1088, 1261 Passeggi M.C.G. 1431 Pathak A. 1503, 1611 Patnaik B. 1371 Patnaik B. K. 1369 Pattard T. 420 Patte P. 306 Paul H. 1604, 1606, 1656 Paul S. 655, 746 Paulus G. G. 687, 1745 Pauly N. 1437, 1476, 1490 Pavicic D. 394, 410 Pavlenko Y. V. 140 Pavlov L. I. 486 Pavlychev A. A. 619 Pawelec E. 333 Payne D. 791, 792 Payne G. L. 232, 265 Pazdzersky V. A. 449, 1672 Pazsit I. 1501 Peacher J. L. 741, 756, 818, 819, 895, 1093

Pechkis H. K. 1257, 1719 Pedersen H. B. 737, 989 Pedlow R. T. 1096 Pegg D. J. 395, 424, 763 Pehlke E. 1603 Pejcev V. 736, 778, 780, 794, 912, 924 Pelaez R. J. 422, 620, 782, 1677, 1712 Pelan J. C. 808 Pellegrini P. 1199, 1682 Penent F. 106, 234, 617, 618, 1737 Peng F. 86, 216, 581 Peng H. B. 1492 Peng L.-Y. 528, 1693, 1747 Peng X. 1016 Peng Y. 1330 Peng Y.-L. 800 Pennanen V. 525 Pepe F. 43 Perales F. 1444 Perazzolli C. 776 Pereira J.A.M. 1614 Perera H. 1271 Peres G. 331 Perez C. 422, 782 Perez J. A. 1160 Pergiegiaj A. 1632 Perkowski J. 1617 Perotti L. 1734 Perri M. 406 Persaud A. 1488 Pershin V. I. 1605 Persson E. 999 Persson P. 1632 Perumal A. N. 1330 Pesic Z. 1543 Pesic Z. D. 1101, 1231 Pessoa O. 748 Peters T. 202, 209, 282, 615 Petitjean P. 296 Petrongolo C. 1144 Petrov I. D. 202, 209, 248, 277, 282, 437, 594, 615 Pettersson J.B.C. 1542 Pezzi R. P. 1640 Pfeifer T. 487 Phalen D. J. 1070 Phaneuf R. 266 Phaneuf R. A. 88, 169, 188, 246, 279, 319, 321, 428, 434, 506, 523, 623, 671, 863, 972 Phillips K. J. H. 147, 243 Piacentini J. J. 870 Piancastelli M. N. 588 Piatkowski L. 113 Pichl L. 1126, 1212 Pichler G. 436 Pickering J. C. 140, 237 Pikuz Jr. S. A. 1583

Pikuz T. A. 267, 873, 1583 Pindzola M. S. 382, 383, 521, 561, 578, 678, 739, 754, 757, 767, 790, 806, 839, 855, 865, 868, 879, 893, 947, 974, 1051, 1070, 1090, 1244 Pineda J. C. 1634 Pinkham D. 388 Pinkse P.W.H. 1691 Piraux B. 605, 674 Piron J. P. 1385 Pita S. 1595 Piwinski M. 902 Plaja L. 1692 Plaksin O. A. 1621 Plasil R. 911, 1578 Plenge J. 487 Plimmer M. D. 669 Plunien G. 2, 61, 253, 262, 411 Podobedova L. I. 340 Poisson L. 662 Poizat J.-C. 1595 Pollack E. 1158 Polozkov R. G. 454 Pomeroy J. M. 33, 41, 94, 107, 153, 173, 260, 360 Ponce L. 632, 1276 Pons B. 1215, 1245 Poopalasingam S. 221 Poparic G. B. 859 Popov Yu. V. 752, 869 Popovic L. C. 1748, 1752 Popovic S. 845 Poree F. 867 Porter F. S. 191, 309, 833, 873 Portillo M. 1599 Portillo S. 821 Poschinger U. 1266, 1725 Pospieszczyk A. 979, 1336 Possnert G. 1593, 1609, 1629 Potvliege R. M. 532, 679, 1744 Poyato J.M.L. 590 Povgin M. 525, 547 Prabhudesai V. S. 914 Pradhan A. K. 179, 860, 900, 922 Prajapati I. A. 526 Pranszke B. 1532 Prawer S. 1414 Predojevic B. 794, 912 Prideaux A. 751, 944 Primetzhofer D. 1508, 1511, 1512 Prince K. C. 15, 157, 247, 507, 599 Prior M. H. 519 Prudente F. V. 1669 Pruemper G. 398, 402, 417, 430, 467, 491, 568, 587, 629 Pruss-Hunzinger S. 250 Ptasinska-Denga E. 864, 1007 Pu S. S. 1115

Puettner R. 246, 416, 525, 547, 623 Puri N. K. 1150 Purkait M. 1227, 1295 Putterich T. 289 Puzynin I. V. 869 Pysanenko A. 911, 1578 Pyszniak K. 1575 Pyykko P. 26 Qayyum A. 1398 Qi J. 1257, 1719 Qi J. B. 1021 Qu Z.-W. 1310 Quarles C. A. 821 Quastel A. D. 1448 Quinet P. 65, 67, 69, 71, 230, 351, 353, 355, 364, 460Quinn P. D. 1335, 1533 Rabadan I. 1122, 1220 Rabalais J. W. 1426, 1427 Rabli D. 1109 Rachlew E. 551 Rackham E. J. 1129 Radics B. 41 Radtke R. 128 Rafiq M. 527, 633 Rai S. N. 1212 Raineri M. 116, 150, 255 Raisanen J. 1327, 1409 Rajagopalan S. 1625 Rajasekar P. 1391 Rajput J. 1353 Rakhimov Kh. Yu. 1233 Ralchenko Y. 173, 372 Ralchenko Yu. 3, 25, 33, 107, 120, 199, 212, 829, 915Ramsbottom C. 152 Ramsbottom C. A. 788, 882, 1014, 1018, 1032, 1053Ran Q. 1505 Rancova O. 240 Rander T. 376, 390, 494, 522, 524 Rangan C. 1664 Rangwala S. A. 1691 Ranitovic P. 396, 397, 606, 1659, 1660 Rao N. K. 298 Rappaport M. L. 1205 Rasul B. 1531 Ratliff L. P. 329, 1179 Rauch T. 294 Rauhala E. 1327 Rawat P. 779, 793 Rav C. 1595 Ray D. 606 Rayez J. C. 1316 Razpet A. 1593 Reader J. 33, 107, 122, 328 Reading J. F. 1148

Rebrion-Rowe C. 890 Rebuli D. B. 1488 Reddish T. J. 476, 795, 1010 Reed K. J. 873 Refaie A. I. 335 Rehm K. E. 305 Reichardt G. 20 Reid R.H.G. 1053 Reiff E. 294 Reijonen J. 239 Reinelt M. 1529, 1560 Reinhard P.-G. 486 Reinhardt J. 1444 Reinhed P. 1061, 1083, 1287 Reinhold C. O. 1468, 1530, 1557 Reinhold E. 280 Reinkoester A. 447 Rempe G. 1691 Ren M. Q. 1632 Ren S.-T. 200 Ren X. G. 764, 844, 856 Ren X. H. 1115 Repnow R. 132, 814 Rescigno T. N. 645, 774, 862, 878, 903, 1065 Rethfeld B. 1603 Reuschl R. 1211 Reyes A. 1331 Reyna Almandos J. 116 Revna Almandos J. G. 150, 255 Rhodes C. K. 221 Riahi R. 957 Riaz M. 283, 465 Riccardi P. 1407, 1489, 1502, 1504, 1519, 1535, 1569Rice J. E. 9, 334 Richard P. 242, 314 Richard-Viard M. 1474 Richards E. S. 1321 Richter M. 611 Richter R. 157, 247, 507, 551, 562, 599, 1737 Richter T. 572, 598 Ricsoka T. 380 Ricz S. 380 Rieger T. 1691 Riera A. 1122, 1215, 1220, 1245 Rist C. 1282 Ristic Z. 1481 Rivarola R. D. 1108 Riviere P. 1544 Roati G. 1198, 1681 Robbins D. L. 873 Robert J. 1444 Roberts J. R. 260 Robicheaux F. 382, 383, 521, 561, 678, 739, 790, 893, 947, 974, 1070, 1687 Robin A. 1524 Rocha A. B. 753, 1237

Rodrigues G. C. 223, 306 Rodriguez F. 422, 620, 782, 1677 Rodriguez V. D. 429, 1105 Roehrich J. 1619 Roesler M. 1367, 1476, 1490 Rogers B. R. 1500 Rognlien T. 1555 Rolles D. 447 Roncero O. 1128, 1301 Roncin P. 1507 Roquemore L. 165 Rosa C. 1136 Rosa M. R. 328 Rosandi Y. 1428 Rose S. J. 138, 152, 281, 468 Rosler M. 1437 Rosmej F. B. 1717 Rosmei O. N. 1583 Rost J. M. 475, 547, 597, 688, 690 Rostas F. 470 Rostohar D. 364 Roth B. 1202 Roth J. 1450, 1451, 1458, 1552, 1556 Rothard H. 1494, 1518, 1520, 1543, 1595, 1648 Roudnev V. 1204, 1689 Roudskoy I. V. 1605 Roueff E. 456, 1283, 1286 Rousseau P. 1507 Roussel-Chomaz P. 1595 Rov A. 1353 Roy A. C. 892, 1162 Roy B. N. 816 Royal J. 744, 854 Rozet J.-P. 1595, 1623 Rubanov S. 1414 Rubensson J.-E. 20 Rubin R. H. 291 Ruczkowski J. 113 Rude B. 279, 681 Rudenko A. 602, 607 Rudi S. A. 1502, 1569 Ruf M.-W. 880 Ruiz C. 1692 Ruiz J. 470 Rul M.-W. 982 Rumpf K. 1259 Ruocco A. 443 Rutherford A. M. 1462, 1627 Ruzic D. N. 1382, 1550 Ryabchikova T. 1748 Ryabtsev A. N. 85, 198 Rvabtsev I. I. 455, 1117 Ryan S. G. 641 Ryans R. S. I. 131, 231 Ryde N. 298 Rzadkiewicz J. 1211 Saalfrank P. 1374

Sabel H. 206, 217 Sabin J. R. 1590 Sabzyan H. 544, 1703 Sadeghi N. 333 Sadeghpour H. R. 1187, 1216 Saenz A. 451, 604, 1208, 1340, 1675, 1746 Safronova A. S. 17, 162, 205, 308, 370 Safronova M. S. 16, 143, 177, 219, 488, 706 Safronova U. I. 11, 16, 17, 143, 162, 199, 205, 212, 219, 308, 334, 370, 706, 829, 915, 1042 Safvan C. P. 1353 Sagara A. 1454 Saha B. C. 755, 835, 946, 978 Saha H. P. 600, 789 Saha S. 502 Sahal-Brechot S. 1035, 1360, 1731 Sahana M. B. 1440 Sahoo B. K. 30, 345, 367 Sahu G. 1396 Saieswari A. 1134 Saint-Laurent M.-G. 56 Sainz R. M. 1715 Saito N. 402, 435, 580, 685 Saito Y. 1572 Saitoh Y. 1482 Sakai Y. 935 Sakamoto N. 1498, 1599, 1649 Sakaue A. 127 Sako T. 563, 1708 Sakuma Y. 1527 Sakurai M. 1421, 1424, 1443, 1526 Saleem M. 527, 633, 646, 656 Salin A. 1544 Saloman E. B. 123, 323 Salomonson S. 337 Salonen E. 1447, 1549 Salumbides E. J. 280, 670 Salvat F. 966, 1463 Salvermoser M. 1106 Salzborn E. 754, 785, 897, 1098, 1251 Salzmann W. 1266, 1725 Samela J. 1381 Samori S. 278 Sampson D. H. 703, 1027 Samraoui K. 1189 Samson A. M. 1019 Sanches I. P. 779, 793 Sanchez S. d'A. 825 Sanderson J. H. 621 Sandner W. 603 Sandoval R. 1514 Sandstroem J. 395, 424, 763 Sanfelix P. C. 1565 Sang R. T. 480 Sankari A. 15, 83 Sankari R. 15, 51, 208, 247, 376, 380, 390, 398, 399, 441, 494, 522, 524, 693

Sansonetti C. J. 52, 99, 323, 328 Sansonetti J. E. 285 Sant'Anna M. M. 428, 1059, 1217, 1222, 1253, 1347 Santos A.C.F. 1059, 1217, 1253, 1347 Santos A.C.S. 822 Santos A.M.S. 748 Santos E. 1135 Santos J. P. 223, 306 Santra R. 539, 1697 Sanz-Vicario J. L. 312, 631 Sapirstein J. 174, 193 Sarasola A. 1534 Sarma L. 866 Sarmiento R. 255 Sasaki A. 31 Sasao M. 1461 Sataka M. 144, 224, 706, 1048, 1163, 1484, 1636 Sathish N. 1503 Sathyamurthy N. 1351 Sato K. 31 Sato S. 1641 Sato T. 1633 Sato Y. 1095, 1103, 1325, 1326, 1585, 1630, 1631 Satoh S. 1601 Saugout S. 565 Sauvage T. 1385 Savin D. W. 39, 80, 132, 810, 814, 1001 Savukov I. 215 Sayler A. M. 425, 543, 1236, 1701 Sazhina I. P. 568 Schaefer-Bung B. 1268, 1727 Schafer M. 170, 218 Schappe R. S. 945 Scharf O. 229 Schartner K. H. 427, 437 Schartner K.-H. 248, 277, 452, 553, 566, 594, 1113 Schectman R. M. 652 Scheer J. A. 1480 Scheid W. 324 Scheidenberger C. 1599 Scheier P. 926, 1531 Schenkel T. 1386, 1488 Scheuermann F. 754, 897 Scheuermann F. A. 785 Schiffer J. P. 305 Schill R. 427, 553, 594 Schill R. H. 452 Schiller S. 1202 Schinke R. 1310 Schinner A. 1296, 1333, 1597, 1606, 1656 Schiopu R. 324 Schipakov V. A. 239 Schipakov V. S. 1232 Schippers S. 39, 80, 132, 319, 321, 523, 623, 814, 863, 1001

Schiwietz G. 1175, 1335, 1364, 1397, 1404, 1533, 1580, 1640 Schlachter A. S. 169, 246, 266, 279, 321, 428, 434, 523, 623, 671, 863, 972 Schlachter F. S. 395 Schlathoelter T. 1114 Schlueter M. 1551 Schmidt E. W. 39, 80, 1001 Schmidt H. T. 1061, 1083, 1287 Schmidt L. 435 Schmidt L.Ph.H. 475, 1348 Schmidt R. 405, 612 Schmidt T. W. 658 Schmidt-Boecking H. 475, 688, 1061, 1348 Schmoranzer H. 248, 277, 427, 431, 437, 452, 553, 566, 594, 659, 660 Schmutz H. 218 Schneider D. H. 1488 Schneider D.H.G. 1386 Schneider I. F. 1126 Schneider J. R. 60 Schneider T. 475, 688 Schnell M. 39, 132, 814, 1001 Schnopper H. 292, 331 Schnopper H. W. 329 Schoeffler M. 475, 1164, 1348 Schoeffler M. S. 688 Schoessler S. 475, 688 Schow E. 773 Schroeter C. D. 602, 607 Schuch R. 115, 806, 937, 992, 1061, 1083, 1196, 1287, 1440 Schuessler H. A. 171 Schultz D. R. 104, 1090, 1244, 1289, 1302 Schulz J. 110, 376, 386, 387, 390, 494, 522, 524, 672 Schulz M. 1093, 1094, 1207, 1221, 1223, 1338, 1354Schustereder W. 1531 Schwalm D. 132, 737, 814, 989 Schwarzkopf O. 20 Schwob J. L. 128 Scofield J. 241 Scofield J. H. 332, 833, 950, 1121 Scopel M. A. 870 Scott D. 1391 Scott M. P. 788, 809, 882, 1053 Scuderi V. 1653 Scully S. W. J. 246, 266, 321 Scully S.W.J. 523, 623, 749, 851, 863 Seah M. P. 1380 Sebban S. 338 Seccombe D. P. 476, 795 Seely J. E. 25 Segal D. M. 74 Seiersen K. 846 Sekiguchi T. 1425

Seliger M. 955, 1738 Selles P. 401, 495, 683, 695 Semenov S. K. 549, 555, 587, 629 Senthil V. 749, 851 Seo J. 1373 Seredyuk B. 1067, 1125 Serio S. 331 Serov V. 394 Serov V. V. 783 Severn G. 75 Sevic D. 736, 778, 780, 794, 888, 912 Sevila I. 1215 Shabaev V. M. 61, 89, 154, 183, 253, 259, 262, 411, 1733 Shah M. B. 749, 851, 1347 Shaikh N. M. 586 Shanker R. 766, 775, 827 Shao J. X. 1299, 1334 Sharapov V. M. 1457 Sharkov B. Yu. 1605 Sharma A. 1296 Sharma L. 908, 970 Sharma V. 526 Sharon R. 559 Shchekinova E. 545, 1704 Sheffer Y. 470 Sheinerman S. A. 419 Shelyuto V. A. 149, 311 Shemansky D. E. 477 Shen L. 956 Shertzer J. 842, 952 Shevchenko D. I. 1493 Shevelko V. P. 897, 1095, 1103, 1325, 1326, 1585, 1630, 1631, 1652 Shi J. 1410 Shi J.-R. 325 Shi T. 1352 Shi W. 623 Shibata H. 144, 224, 1163, 1636 Shibata K. 1379, 1460 Shibata T. 1571 Shibuya K. 1471 Shigemasa E. 106, 442, 617 Shigin P. 1540 Shiles E. 1628 Shimakura N. 1322, 1323, 1324 Shimano A. 820 Shimizu M. 1641 Shimoda T. 1324 Shimoyama I. 1425 Shinde N. 1527 Shinto K. 1461 Shirai T. 122, 1022, 1024, 1048, 1358 Shluger A. L. 1418 Shmakov A. N. 1379 Shokouhi F. 1167 Shpatakovskaya G. V. 73

Shrivastava S. 1488 Shu W. M. 1559 Shulga V. I. 1466 Shuman E. S. 504, 1680 Sicilia E. 1535 Sideras-Haddad E. 1488 Sidky E. Y. 1156 Siedschlag Ch. 420 Sieger M. T. 1541 Siekhaus W. J. 1429 Sielanko J. 1575 Sienkiewicz J. E. 786 Sierpowski D. 1164, 1211, 1349 Sierra J. D. 1127, 1309 Sigaud G. M. 1059, 1253, 1347 Siggel-King M.R.F. 628 Sigmund P. 1296, 1333, 1597, 1637 Sihver L. 1633 Sikler G. 259 Silkin V. M. 1363, 1534, 1579 Silva L. 1222 Silver E. 153, 173, 292, 331 Silver E. H. 329 Silver J. D. 79 Silwal R. 189 Simic Z. 1748 Simon M. C. 1496 Simoni A. 1198, 1681 Simonsson A. 1083, 1287 Sindona A. 1407, 1489, 1502, 1504, 1519, 1535, 1569Singh A. K. 72, 728 Singh B. 432 Singh F. 1483 Singh N. 473 Singh P. 473 Singh R. K. 526 Singh Y. P. 1193, 1229, 1290 Sinha C. 769, 1663 Sisourat N. 1183 Siakste J. 1441, 1684 Skobelev I. Yu. 267 Skog P. 1440 Skogvall B. 1219 Smale L. F. 41 Smirnov I. B. 1586 Smith A. J. 873 Smith D. Y. 1628 Smith I.W.M. 1314 Smith J. M. 511, 541, 1685, 1699 Smith M. A. 425, 543, 1701 Smith N. 463 Smith P. L. 466 Smith R. K. 877 Smith S. C. 1308 Smith S. J. 412, 1158, 1344 Smith W. F. 1147

Smith W. W. 1158 Snead L. L. 1369, 1371 Sneden C. 341 Snow E. L. 95 Sobeck J. S. 341 Sobocinski P. 1101, 1147, 1219, 1231 Soda K. 1527 Soderstrom J. 20 Soff G. 253 Soga F. 1095 Sokell E. 94, 360, 400, 415, 481, 628 Sokolik A. A. 1598 Sokolovski D. 27, 928, 1313 Solleder B. 1525 Solov'ev E. A. 1710 Solov'yov A. V. 454 Solovyev D. A. 2 Song M.-Y. 31 Song S. 118, 216, 581 Song S. Q. 86 Song X. 221 Song Y.-H. 1365, 1478, 1581, 1638 Song Z.-Y. 200 Sorensen S. L. 588, 686 Soret J. 1084 Sorg M. 250, 326 Soria Orts R. 78, 154, 241, 259, 288, 950 Sorokin A. A. 611 Sorokin A. I. 1495 Souda R. 1479, 1510, 1639 Sounda S. 1227, 1295 Southworth S. H. 490 Spiegelman F. 1260 Spielfiedel A. 1119, 1120, 1280, 1284 Spillmann U. 1164, 1211, 1349 Sprenger F. 39, 1001 Sprengers J. P. 280 Springer P. T. 152 Srigengan B. 511, 541, 1685, 1699 Srivastava R. 556, 780, 781, 866, 885, 902, 908, 912, 970, 997 Sroubek Z. 1411, 1413 Staanum P. 1265, 1724 Stachowska E. 113 Stachura Z. 1164 Stadlmann J. 1599 Staicu-Casagrande E. M. 737, 904, 1140 Stancil P. C. 651, 1078, 1137, 1271, 1278, 1289, 1291, 1302, 1315, 1342, 1740 Stanke M. 59, 90 Starace A. F. 408, 528, 550, 648, 1693 Stark G. 466 Starke P. 1548 Starodub D. 1364, 1580 Stary F. 250 Stas R.J.W. 1194 Staudte A. 475, 573, 688

Stauffer A. D. 781, 866, 908, 912, 924, 970, 997 Stebbings S. L. 511, 541, 1685, 1699 Stefani G. 443 Stefanska D. 113 Steinbauer E. 1618 Stelbovics A. T. 874, 889, 990, 998, 1010, 1013, 1037, 1181 Stenstroem K. 1632 Stepanovic M. 898 Stevenson M. A. 792, 840 Stiebing K. E. 1348 Stochkel K. 1061, 1083, 1287 Stocker M. 1650 Stodiek W. 9 Stoecklin T. 1081 Stoehlker T. 735, 1349 Stoehlker Th. 1164, 1233, 1595 Stohlker T. 1211 Stohlker Th. 211, 292 Stokely C. L. 999 Stolterfoht N. 1058, 1080, 1101, 1219, 1231, 1343, 1543Stoof H.T.C. 1258, 1720 Storchi L. 657 Stracener D. W. 104 Strakhova S. I. 572 Stranges S. 507, 562, 661, 1737 Strasser D. 487, 737, 989 Streib K. L. 1171 Strub E. 1619 Stuart S. J. 1468, 1530, 1557 Stuchbery A. E. 1594 Sturrus W. G. 95 Stwalley W. C. 1072, 1257, 1719 Stysin A. V. 1600 Su G. L. 764, 844, 856 Su H. 200 Suarez J. 1215, 1245 Suarez S. 1077, 1097 Subbotin A. V. 1103, 1585 Subramanian K. P. 526 Suda T. 1455 Sueoka O. 761, 963 Suetsugu Y. 1379 Sugai H. 144, 1163, 1636 Sugar J. 122 Sugawara H. 1461 Sugisaki M. 1538 Suharyanto 1572 Sukhorukov V. L. 202, 209, 248, 277, 282, 427, 437, 452, 553, 566, 594, 615 Sulai I. A. 56 Sulik B. 1084, 1101, 1219, 1230, 1231, 1343 Sullivan J. P. 630, 824 Summers H. P. 252, 1051 Sun G. 1650 Sun J.-M. 509, 738, 853

Sun W. G. 956 Sun X. 1570 Sun Y. S. 1021 Sun Z. 546, 1705 Sun Z. W. 460 Sunami T. 555 Sundaravel B. 1625 Sunderland A. G. 1053 Sundvor I. 1716 Suno H. 1049, 1212, 1361 Sur C. 274 Suresh M. 511, 541, 1685, 1699 Surko C. M. 771 Surzhykov A. 403, 735, 1104, 1211, 1349 Sushko P. V. 1418 Suta T. 1179 Suter M. 1650 Suter M. T. 1542 Sutton S. 795, 1010 Suzor-Weiner A. 985 Suzuki I. H. 278, 402, 404, 569, 580 Suzuki M. 1395, 1497 Suzuki R. 876, 999 Suzuki S. 1322 Suzuki T. 1341 Svendsen A. 846, 890 Svensson S. 376, 390, 494, 522, 524, 588, 672 Syty P. 786 Szabo C. I. 41, 184 Szabo C.I. 943 Szalewicz K. 1118 Szczepkowski J. 1259 Szmytkowski C. 864, 1007 Szoekefalvi-Nagy Z. 1327 Szymkowiak A. 191 Szymkowiak A. E. 309 Szymonski M. 1376 Tabata T. 1022, 1024, 1048, 1358 Tabayashi K. 404, 569 Tabet J. 1189 Tabrizchi M. 507, 562 Tachenov S. 1349 Tachibana T. 1421 Tachiev G. 726 Tachiev G. I. 158 Tachiya M. 542, 1700 Taglauer E. 1508, 1512 Tahara F. 555 Taieb R. 448, 632, 1276, 1671, 1692, 1716 Taioli S. 968 Takacs E. 41, 184, 260, 329, 331, 943, 1179 Takahashi E. J. 563, 1708 Takahashi M. 446, 549, 752 Takahashi N. 1110 Takahashi S. 1424, 1443, 1526 Takahashi T. 1110 Takahashi Y. 1324

Takahiro K. 144, 224, 593, 627, 1163, 1615, 1636 Takahisa K. 1324 Takamine A. 171 Takasaki F. 1379 Takashima R. 180, 517 Takayanagi T. 935 Takeshima N. 627 Takeuchi S. 1461 Tamanis M. 1088, 1261 Tamenori Y. 278, 398, 402, 404, 467, 569, 580, 626, 673 Tan J. N. 33, 41, 94, 107, 153, 173, 260, 329, 360 Tan M. 1412, 1435 Tan X. M. 220, 557 Tanaka H. 398, 417, 467, 555, 568, 587, 613, 619, 629, 673, 876, 924, 961, 962, 963 Tanaka M. 1324, 1373 Tanaka N. 1461 Tanaka S. 1373, 1455 Tanaka T. 417, 467, 555, 568, 587, 613, 619, 629, 673, 1323 Tanaka Y. 1401 Tanarro I. 1130 Tang C. 1016 Tang C. H. 826 Tang H. 338 Tang X. D. 305 Tanino H. 761 Tanis J. A. 256, 1058, 1084, 1219, 1343 Tankosic D. 1752 Tanner J. D. 641 Tannian B. E. 999 Tanuma H. 31 Tarantelli F. 657 Tarisien M. 1099, 1165, 1176, 1595 Tartari A. 432 Tashenov S. 1164, 1211 Tashiro M. 871, 948 Tate D. A. 203 Tawara H. 78, 154, 241, 259, 329, 749, 897, 950, 951, 1022, 1024, 1071, 1103, 1156, 1179, 1186, 1325, 1326, 1496, 1585, 1630, 1631, 1652 Tayal S. S. 346, 369, 666, 796, 907, 969, 1015 Tayal V. 66, 102, 352, 361, 733 Taylor B. N. 254 Taylor K. T. 413, 1747 Tazawa M. 1484 Tchaplyguine M. 376, 390 Tear S. P. 1175, 1404 Teeuwen J. 795 Telega S. 815 Temkin A. 952 Tennyson J. 830, 871, 905, 948, 968, 1006, 1234, 1243, 1282 Teolis B. D. 1410, 1536 Teplova Ya. A. 1473 Teramoto T. 549

Terao-Dunseath M. 758, 1288, 1658, 1735 Terasawa M. 1573 Terracol S. 309 Terry J. L. 334 Testa E. 1595 Teubner P.J.O. 961 Teuler J. M. 401 Teulet Ph. 957 Theiss A. 1098 Themelis S. I. 798, 1670 Theodosiou C. E. 1045 Therssen E. 1372 Thijsse B. J. 1467 Thomas J.-C. 56 Thomas R. 988 Thomas R. D. 763, 890, 965 Thomas R. J. 46, 231, 344, 705, 1030 Thomason M. A. 822 Thome L. 1543 Thompson J. S. 395, 424 Thompson R. C. 74 Thorn D. B. 40, 654, 873 Thorn P. A. 961 Thumm U. 1200, 1387, 1442, 1568, 1683 Tiedtke K. 611 Tielens A.G.G.M. 1125 Tiemann E. 1088, 1261 Timmers H. 1632 Timonova M. 1467 Tirasoglu E. 474 Titze J. 475, 688, 1348 Tobiyama H. 841 Tobola R. 1293 Toekesi K. 1091 Toennies J. P. 1408 Toffoli D. 591 Tohyama Y. 820 Toker Y. 1205 Tokesi K. 329, 1525 Tokman M. 992 Toleikis S. 1164, 1595 Tolstikhina I. Yu. 897, 1103, 1325, 1326, 1585, 1630, 1631, 1652 Tomellini M. 1567 Tona M. 1424, 1443, 1526 Tong L. 1350 Tong X. M. 393, 396, 397, 426, 1659, 1660 Tong X.-M. 497 Tonzani S. 1009 Tooke B. 1207, 1354 Topcu T. 561, 974, 1687 Tordoff B. 172 Torok S. 652 Torri A. 1327 Tosaki M. 1168 Toshima N. 1252, 1255, 1718 Tougaard S. 1405

Toulemonde M. 1595 Toumert I. 1169 Trabert E. 8, 13, 65, 67, 69, 71, 145, 191, 214, 230, 349, 351, 353, 355 Traeskelin P. 1446, 1447 Tran Bich N. 333 Trassinelli M. 1211 Trassl R. 1098 Trautmann D. 1180, 1290 Tretvakov D. B. 455, 1117 Treusch R. 60 Trevisan C. S. 774, 878, 903 Trevisanutto P. E. 1418 Tribedi L. C. 1193, 1229, 1290, 1328 Trickl T. 96 Trigueiros A. G. 121, 156 Trinczek M. 241, 261, 950 Tripathi A. 1483 Tripathi A. N. 707 Tripathi D. N. 1298 Tripp T. M. 462 Trotsenko S. 1211 Trottier A. 621 Truscott A. G. 339 Trzaska W. H. 1617 Trzhaskovskaya M. B. 699, 702, 723 Tseng H. C. 1028, 1359 Tsuchida H. 1357, 1601, 1641 Tsuchiva B. 1615 Tsuge S. 820 Tsumori K. 1461 Tsurubuchi S. 1110 Tuboltsev V. 1409 Tufan M. C. 1643 Tully J. A. 1102 Tungate G. 172 Tupitsin I. 241 Tupitsyn I. 77 Tupitsyn I. I. 61, 78, 154, 259, 304, 411, 896, 950.951 Turbiner A. V. 1657, 1743 Turci C. C. 921 Turcu I.C.E. 511, 541, 1685, 1699 Turek M. 1575 Turri G. 249, 443, 681, 683 Tyagi A. K. 1625 Ubachs W. 238, 280, 670 Udagawa Y. 752 Uddin M. A. 755, 828, 835, 946 Udem Th. 236, 644 Udris A. 714 Ueda H. 267 Ueda K. 398, 402, 417, 430, 435, 467, 491, 555, 568, 587, 613, 619, 629, 673, 685 Ueno N. 1422 Uhlmann M. 405, 612 Ullmann F. 226

Ullrich J. 22, 58, 60, 78, 154, 241, 259, 261, 411, 602, 607, 950, 951, 976, 977, 1003, 1094, 1108, 1221, 1252, 1255, 1338, 1496, 1518, 1718 Ullrich M. 1223 Ulrich A. 1106 Ulrich B. 397, 606, 1660 Umeda N. 935, 1621 Umesh T. K. 472 Unipan M. 1524 Urbain X. 737, 1140 Urban E. 945 Urbassek H. M. 1428, 1469 Urer G. 55 Urpelainen S. 110, 672 Uschmann I. 338 Uzer T. 545, 649, 1704 Lazur V. 647, 954 Vafaee M. 544, 1703 Vafaee Z. 544, 1703 Vainonen-Ahlgren E. 1558 Vainshtein L. 979, 1336 Valdes D. 1472, 1537 Valdes J. E. 1508 Valentin C. 448, 1671 Valiron P. 1118, 1282, 1285 Vall-llosera G. 599 Van Boeyen R. W. 847 Van Duijn E.-J. 670 Van Ginhoven R. M. 1403 Van Harrevelt R. 1311 Van Hemert M. C. 1123 Van Hoof P. A. M. 152, 281 Van Kampen P. 284, 433, 453 Van Oosten D. 1258, 1720 Van Zoest T. 319, 321 Van de Meerakker S.Y.T. 1678 Van der Hart H. W. 413, 450, 501, 691, 1674 Van der Straten P. 1258, 1720 Van der Zwan E. 1258, 1720 Vane C. R. 104, 1546 Vanhaecke N. 1678 Vanne Y. V. 451, 1208, 1675 Vanroose W. 645 Varenne O. 1399 Varentsov V. 171 Varga D. 380 Varma H. R. 663 Vasilyev A. A. 1042 Vassen W. 1194 Vassilev G. 1444 Vatasescu M. 1262, 1721 Vdovic S. 436 Veiteinheimer E. 748 Velasco A. M. 1702 Veniard V. 448, 632, 1276, 1671, 1692 Vergara L. I. 1368, 1447, 1528, 1546, 1553, 1557 Verma N. 148, 959

Verma P. 1164 Vernhet D. 1595, 1623 Verschl M. 326 Vial J.-C. 233 Vicic M. D. 859 Vidal R. A. 1410 Viefhaus J. 447, 547 Viggiano A. A. 890 Vigren E. 965 Vikor Gy. 1440 Vilkas M. J. 7, 13, 214, 264 Villari A. C. C. 56 Villeneuve D. M. 573, 608, 692 Villette J. 1393 Vincke M. 1713 Vinitsky P. S. 752, 869 Vinitsky S. I. 783, 1668 Vinodkumar M. 817 Virgiliev Yu. S. 1486, 1495 Viswanathan B. 1625 Viti S. 140 Vitug G. 773 Vo Ky L. 391 Voertler K. 1562 Vogel L. 1265, 1724 Vogel M. 74 Vogel Vogt C. M. 258 Vogelius I. S. 1272, 1728 Voitkiv A. B. 1092, 1094, 1112, 1213, 1252, 1255, 1718 Volant C. 1494, 1648 Vollbrecht M. 338 Vollweiler F. 277, 437 Volotka A. V. 78, 154, 411 Von Goeler S. 9 Von Hellermann M. G. 252 Von Oertzen W. 1600 Von Oppen G. 1239, 1711 Voronin A. 1081 Vorov O. 747 Vos M. 245 Voss S. 475, 688 Vrakking M.J.J. 684 Vredenbregt E.J.D. 480, 1182 Vrinceanu D. 1187, 1216 Vucic S. 532, 679, 1744 Vuskovic L. 845 Wabnitz H. 386, 387 Wacker L. 1650 Wada M. 171, 1461 Wadehra J. M. 1020 Wagenaars E. 1751 Wague A. 92, 269 Wahab M. A. 1164 Wahlgren G. M. 459 Wahlstroem P. 1480 Wakai E. 1559

Walker B. C. 913 Walter C. W. 81, 168, 181, 406, 515, 681 Walter M. 967 Walters G. K. 1475 Walters H.R.J. 1232 Wampler W. R. 1174 Wang D. 1072, 1142, 1257, 1719 Wang F. 161, 327, 478, 721, 1115 Wang G. 118 Wang G.-L. 126 Wang J. 496, 643, 1563 Wang J. C. 88 Wang J. G. 1063, 1247, 1278, 1289 Wang K. 435, 613 Wang L.-B. 56, 305 Wang L.-R. 222, 582 Wang M.-S. 800, 1742 Wang P. 616 Wang P. Q. 425, 543, 1701 Wang Q. 528, 1693 Wang S. 338, 850 Wang S. W. 1492 Wang S.-G. 1563 Wang S.-M. 540, 1698 Wang T. 374 Wang T. S. 1492 Wang W. 195, 220, 557, 1135, 1136, 1312 Wang X. 1632 Wang X.-L. 124 Wang Y. 891, 918 Wang Y. D. 29 Wang Y. S. 1021 Wang Y.-D. 200 Wang Y.-N. 34, 1365, 1478, 1581, 1638 Wang Z.-W. 34, 36, 273, 317 Warczak A. 1349 Ward S. J. 842 Wargelin B. J. 310, 877, 1121 Watanabe H. 22, 841, 1443, 1526 Watanabe K. 1538 Watanabe N. 549, 752, 847 Watson J.K.G. 610, 901 Watson R. L. 1330 Watt F. 1464 Weber T. 688 Weber Th. 475, 1348 Weber W. J. 1403, 1593, 1609, 1629 Weck P. F. 1136, 1270 Weckenbrock M. 475, 688 Wee A.T.S. 1464 Wehlitz R. 82, 438, 471, 535, 537, 663 Wei H. L. 14 Wei Q.-Y. 272, 316 Weick H. 1599 Weidemueller M. 1265, 1266, 1724, 1725 Weigold E. 944, 993 Weijers-Dall T.D.M. 1632

Weiner J. 1665 Weller R. A. 1500 Wellhofer M. 60 Wells E. 606, 1071, 1085, 1156 Welsh M. J. 1203 Wendt K. 104 Weng M. S. 1296 Went M. R. 245, 792 Wenz H. 1202 Werner A. 1113 Werner K. 294 Werner L. 248, 427, 452, 553, 566, 594, 659, 660 Wernet P. 598 Wernli M. 1118, 1282, 1285 West J. B. 434 Wester R. 1265, 1266, 1724, 1725 Wethekam S. 1477, 1506, 1515, 1516 Wettergren K. 1419 Whelan C. T. 931, 1232 Whiteford A. 252 Whiteford A. D. 767 Whitfield S. B. 82, 438, 471, 663 Whitlow H. J. 1632 Whyte D. G. 1452 Wiedenhoeft M. 400, 481 Wiehle R. 483 Wiese W. L. 225, 358, 373 Wiesenfeld L. 1118, 1282, 1285 Williams I. D. 511, 541, 1685, 1699 Williams J. F. 874, 889, 1004 Williams S. 845 Wills A. A. 400, 481 Wilson A. N. 1594 Wilson N. J. 938, 1034 Wimmer C. 475, 688 Windholz L. 1259 Window A. J. 1335, 1533 Winkler M. 926, 1599 Winnewisser G. 218 Winstead C. 765, 836, 872 Winter H. 1406, 1445, 1487, 1506, 1515, 1517 Winter HP. 1406, 1487, 1496, 1517 Winters D. F. A. 74 Wippel V. 1259 Witte S. 238, 670 Witthoeft M. C. 808, 941, 1051 Witzel B. 483 Wodtke A. M. 1505 Woerner H. J. 615 Wohrer-Beroff K. 1076 Wojtowicz A. 1575 Wolf A. 39, 80, 132, 737, 814, 955, 989, 1001, 1738Wolf P. J. 1060 Wolff W. 1217, 1222 Wollnik H. 171 Wood T. J. 1175, 1404

Woodall J. 1577 Woodruff D. P. 1175, 1335, 1404, 1533 Worner H. J. 209 Wrathmall S. A. 1248 Wright G. M. 1452 Wright L. E. 95 Wu J. 601, 622, 643, 694, 762, 910 Wu K. J. 1429 Wu Q. 119, 164, 187, 1749 Wu S. 12, 1362 Wu X.-L. 125 Wu Y. 826 Wucher A. 1603 Wuilleumier F. J. 234, 484, 493, 572, 682 Wujec T. 363 Wunnenberg A. 282 Wurth W. 60 Wurz P. 1480 Wyer J. A. 749, 851 Xia J. F. 425, 543, 1701 Xiao G. 1390, 1397, 1523 Xiao G. Q. 1299, 1492 Xie Z. 1307 Xingyu G. 1464 Xiong Z. 228 Xu H. 375 Xu H. L. 237, 459, 460 Xu K.-Z. 509, 738, 853, 935 Xu X. 1299 Xu X. J. 1021 Xu Z. 534, 1717 Yabuzaki T. 1339 Yagi S. 1527 Yagishita A. 446, 549 Yakshihnskiy B. V. 1417 Yamada C. 935, 1424, 1443, 1526 Yamada T. 1402 Yamakawa K. 267 Yamamoto K. 404, 569, 1571 Yamamoto N. 31 Yamamoto S. 1482 Yamanishi T. 1559 Yamano Y. 1572 Yamanouchi K. 563, 609, 1708 Yamaoka H. 402, 580, 593, 627, 1461 Yamasaki S. 1497 Yamauchi Y. 1402, 1421, 1456, 1570 Yamazaki Y. 171 Yan J. 1063, 1289 Yan Z.-C. 38, 146, 1187, 1210, 1216 Yang B. 1137, 1271, 1315 Yang F. J. 1021 Yang F. L. 23 Yang G. 513, 577, 1688 Yang M. 1319 Yang X. D. 195, 220, 557 Yang Z. 1390, 1523

Yang Z. H. 1299 Yang Z.-H. 200 Yao L. 1332 Yao N. 1599 Yarmoff J. A. 1411, 1413, 1433 Yarzhemsky V. G. 699, 702, 723 Yasui S. 1324 Ye A. 118 Yerokhin V. A. 18, 61, 89, 182, 253, 262 Yi G.-C. 1464 Yi Y.-G. 23 Yiannopoulou A. 489 Yong D. 298 Yoo J. 1464 Yoshida A. 171 Yoshida F. 180, 186, 517 Yoshida H. 398 Yoshida H. P. 555, 568 Yoshida S. 955, 1738 Yoshii H. 114 Yoshikawa A. 1453, 1454 Yoshino K. 466 Yoshiyasu N. 1443, 1526 Yosoi M. 1324 Young L. 490, 539, 1697 Young P. R. 130 Younis W. O. 160, 722 Yousif Al-Mulla S. Y. 958 Yousif F. B. 1249 Yu I. 1325, 1630 Yu K.-Z. 125 Yu Y. C. 1154, 1591, 1592, 1616 Yuan J. 151, 357, 601, 719, 730, 762, 910, 1044, 1054Yuan J.-M. 287 Yuan K.-J. 540, 546, 1698, 1705 Yuan Z.-S. 509, 738, 853, 935 Yudin G. L. 548 Yung Y. L. 469 Yurkov M. V. 60 Zaccanti M. 1198, 1681 Zadro M. 1653 Zaharova J. 1261 Zaidi A. A. 621 Zajfman D. 737, 989, 1205 Zalavutdinov R. Kh. 1457 Zamkov M. 242, 396, 1659 Zanchet A. 1316 Zappa F. 1077, 1217, 1531 Zapukhlyak M. 1100, 1354 Zastrow K.-D. 252 Zatsarinny O. 81, 492, 583, 596, 647, 796, 810, 857, 894, 898, 907, 954, 1005, 1008 Zatsarinny O. I. 742, 887 Zecca A. 776 Zehnder A. 209 Zehnder O. 615

Zeidler D. 573 Zeippen C. J. 922 Zeitlin C. J. 1633 Zemih R. 1383, 1474, 1589 Zeng H. 622, 643, 694 Zeng J. 68, 151, 354, 357, 712, 719, 730, 762, 1038, 1044, 1054, 1056 Zeng J. L. 257, 715, 1039 Zeng J.-L. 287, 325 Zeng X.-T. 200 Zepeda-Ruiz L. A. 1555 Zetner P. W. 784, 884 Zettergren H. 1061, 1083, 1287 Zhan W. 1390, 1523 Zhang D. H. 211, 1132, 1303 Zhang H. 14, 881, 1528 Zhang H. L. 703, 858, 1027 Zhang H. Q. 1299 Zhang J. 257, 715, 725, 1039, 1050 Zhang J. Y. 14 Zhang J.-Y. 534, 1187, 1216 Zhang J.Z.H. 1320 Zhang M. 125, 276 Zhang P. 221 Zhang R. 1426 Zhang S. F. 764, 844, 856 Zhang T.-y. 374 Zhang X. 534, 1307, 1390, 1523 Zhang X. A. 1299 Zhang X. Q. 1320 Zhang Y. 1305, 1523, 1593, 1609, 1629 Zhang Y. P. 1299 Zhanga X. 1362 Zhao G. 68, 151, 257, 287, 325, 354, 357, 715, 719, 725, 730, 762, 1039, 1044, 1050, 1054, 1056 Zhao J. 221 Zhao L. B. 651, 1078, 1278, 1740 Zhao Q. 63, 227 Zhao Y. 1312, 1390, 1523 Zhao Y. T. 1299, 1492 Zhao Z. X. 393, 1729 Zhaunerchyk V. 890, 965 Zheng N.-w. 374 Zheng W. 653, 1432 Zheng Y. 513, 577, 1688 Zhong J. 719, 1044 Zhong J. Y. 257, 715, 725, 1039, 1050 Zhou B.-L. 1210 Zhou H.-L. 391 Zhou S.-G. 132, 814 Zhou X. X. 393 Zhou X.-X. 126 Zhou Y. 891, 918 Zhou Y.-J. 317 Zhou Z. 97, 105 Zhu C. 1177 Zhu H. 1310

Zhu J. J. 29 Zhu J.-M. 1210 Zhu L.-F. 509, 738, 853, 935 Zhu Y.-X. 270, 271 Zhurenko V. P. 1392 Ziegler T. 478 Zikic R. 899, 1238 Zilitis V. A. 301, 303 Zimina A. 20 Zimmermann B. 435, 613 Zimmermann M. 236 Zimmermann P. 572, 598 Zimmermann S. 1469 Zinkstok R. T. 670 Zinkstok R. Th. 238 Ziskind M. 1372 Zitnik M. 20, 157, 683, 1737 Zolotarev K. V. 1379 Zou Y. 210, 627 Zouros T. J. M. 242, 314 Zouros T.J.M. 1230, 1518 Zrafi W. 1256 Zrost K. 602, 607 Zschornack G. 226 Zubek M. 875, 1002 Zucchiatti A. 1172, 1173 Zuin L. 661 Zuloaga J. 1646