

NIST Radiative Data for Injected Impurities

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Nowadays the Atomic Spectra Database (ASD) at the National Institute of Standards and Technology (NIST) represents the only collection of evaluated and recommended spectroscopic data for many atoms and ions. As for the primary injected impurities in magnetic fusion research, it does offer hundreds of spectral lines and energy levels for such elements as N, Ne, Ar and others (Fig.1). However, not all ionization stages of these elements are well represented yet. For instance, (almost) no data for radiative transition probabilities are available in ASD for highly-charged ions Ar IX through Ar XVII. In other cases, the fundamental data on spectra wavelengths is clearly outdated and thus calls for significant updates. In this talk I will present an overview of ASD data for primary injected impurities, the potential pathways for improvement of data coverage, and basic principles and methods to generate evaluated sets of spectroscopic data for those elements of importance.

NIST Atomic Spectra Database - Lines Holdings

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	*	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	+	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og
* Lanthanides		57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	
+ Actinides		89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	

Color vs. number of lines:

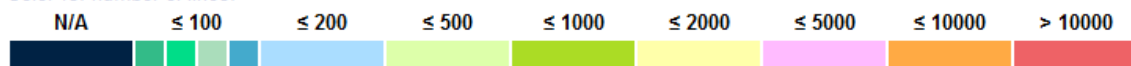


Figure 1. Line holdings in NIST ASD v.5.10 (2023).