

Electron-driven molecular processes in the edge plasmas of fusion devices: new state-to-state cross sections and rate coefficients

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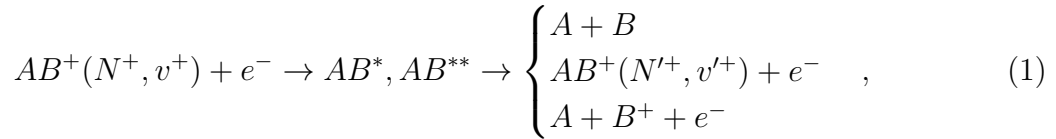
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Dissociative recombination, elastic scattering, (ro-)vibrational excitation, vibrational de-excitation and dissociative excitation [1]:



are dominant elementary processes in numerous cold ionized gases. Here N^+/v^+ stand for the rotational/vibrational quantum numbers of the cation, AB^* for a bound excited (mostly Rydberg) state of the neutral, and AB^{**} for a dissociative (mostly doubly- or multiply-excited) state of the neutral.

The quantum interference between the direct mechanism - capture into the doubly-excited states AB^{**} - and the indirect one - temporary capture into a Rydberg state AB^* - induces resonances in the cross section.

The Multichannel Quantum Defect Theory (MQDT) [1, 2] is the most suitable approach for these processes, efficiently handling channels - open for the direct process and closed for the indirect one - and the corresponding channel mixing via electronic and vibronic interactions. We will provide new cross sections and rate coefficients for H_2^+ , and isotopologues [3, 4, 5], BeH^+ and isotopologues [6, 7, 8], and N_2^+ [9].

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