

# Vibrational excitation and dissociation of deuterium molecule by electron impact

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In the talk, a theoretical investigation, in the framework of Local-Complex-Potential approach, on electron-deuterium molecule resonant collisions - via the low-lying and the Rydberg states of D<sub>2</sub>-anion - will be presented for vibrational excitation, dissociative electron attachment and dissociative excitation processes.

Full sets of vibrationally resolved cross sections (Fig. 1), involving the ground electronic state and the first two electronic excited states of the D<sub>2</sub> molecule, are given for fusion plasma applications in their technologically relevant partially dissociated, detached divertor regimes. In particular, transitions between electronic excited states are also considered. Comparisons, where available, are made with cross sections present in the literature.

By using the calculated reaction rate, relaxation time for the ground electronic state of deuterium molecule will be also presented (Fig. 2).

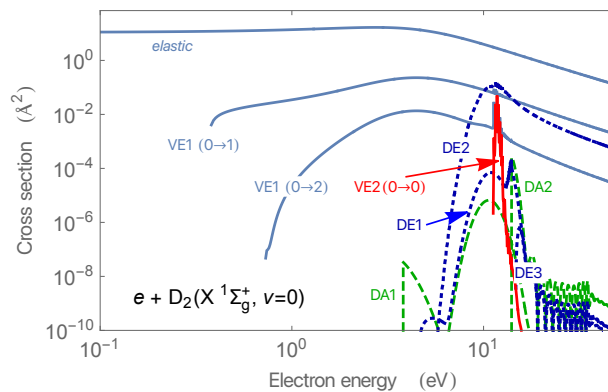


Fig. 1. State resolved cross sections for electron-deuterium molecule.

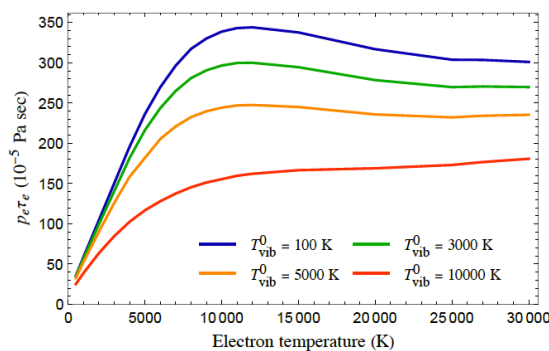


Fig. 2. Electron-D<sub>2</sub> relaxation time as a function of the electron temperature.