

Recent progress in theoretical description of excitation and dissociative processes in collisions of electrons with molecular ions

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I will give a short overview of recent progress in successful theoretical description of various processes taken place in collisions of electrons with molecular ions at energies below a few eV: dissociative recombination, rotational, vibrational, and electronic excitation of the ions, molecular photoionization. The theory based on first principles only (and, sometimes, heavy numerical calculations) is now able to give reliable cross sections for these processes for ions up having up to approximately 10 atoms. The progress in the theoretical description of the processes is crucial for various applications, where molecular plasma is involved.