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Low Energy Electron Molecule Collisions¹

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Low energy electron molecule collisions are important in many technological, environmental and biological processes. Electrons are known to be the ‘drivers’ of technological processes based around gas discharges, from lights and lamps to surface processing plasmas. In such environments electrons are responsible for much of the vibrational and electronic excitation that results in photon emissions, for the formation of long-lived metastable species, and for the production of highly reactive free radicals through processes such as dissociative attachment. Electron collisions also play an important role in our atmosphere and those of all planets and stars. In recent years low energy electrons have also been shown to play a vital role in cell and tissue damage caused by ionizing radiation. One of the key goals for collision physics, both experiment and theory, is to provide accurate, absolute cross sections for such low energy charged particle collisions - elastic scattering, vibrational excitation, near-threshold electronic excitation. This talk will focus on some recent advances in these areas. This work is done in collaboration with James Sullivan, Violaine Vizcaino, Stan Newman, Julian Lower, Subhendu Mondal, Chris Colyer, Michael Brunger, Todd Maddern and Leigh Hargreaves.

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