

Abstract Submitted
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A Particle-in-Cell - Monte Carlo Collision (PIC-MCC) Model for Simulations of Electron Impact Collisions in Gas Mixtures¹ SUDHAKAR MAHALINGAM, YONGJUN CHOI, SETH VEITZER, PETER STOLTZ, Tech-X Corporation — A PIC-MCC model has been developed to numerically model electron impact collisions with neutral gases. This model includes elastic collisions (such as scattering, and large-angle scattering), inelastic collisions (such as excitation, and ionization) and Bremsstrahlung collisions. Collision cross sections data are based on the Evaluated Electron Data Library (EEDL) dataset, obtained from the International Atomic Energy Agency Nuclear Data Services. The EEDL library contains collision cross sections and generation data for electrons and photons for atoms with $Z = 1 - 100$ for incident electron energies from 10 eV (or threshold) to 100 GeV. Additionally, we have included elastic scattering cross section for electron energies below 10 eV from other experiments so that the PIC-MCC model can be used for studying low temperature plasmas. Researchers may also specify a user-defined model of cross sections to match their own measurements. We will show results for gases and parameters relevant to the plasma processes in Hall thruster applications.

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