Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Analysis of Electron Evolution in Air using Updated Cross Section Data (LA-UR-14-25207) ELISE PUSATERI, Los Alamos National Laboratory, Rensselaer Polytechnic Institute, HEIDI MORRIS, Los Alamos National Laboratory, WEI JI, Rensselaer Polytechnic Institute — For the purpose of modeling the time evolution of electron temperature in an Electromagnetic Pulse, a swarm model has been developed. This code uses an adaptive time step and solves a system of coupled differential equations for the electric field, electron temperature, electron number density, and drift velocity. Our comparisons with microwave and DC breakdown measurements have revealed that, for high values of E/p, the swarm model underestimates the equilibrium temperature that is achieved in experiments. Our initial work used energy and momentum transfer collision frequencies that were reported in Higgins, Longmire, and O'Dell (1973). We have updated the electron-air cross sections using those reported in the LXcat database as a part of the Plasma Data Exchange Project. New momentum and energy transfer collision frequencies, defined over a broader energy range, have been calculated using a two-term Boltzmann Equation solver, BOLSIG+. We report on the use of these updated collision frequencies in the swarm code and show the improvement in our calculation by comparing the results with experimental data.

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Date submitted: 11 Jul 2014 Electronic form version 1.4