

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Electron and Negative Ion Production Rates in Air Plasmas with Ionizing Radiation¹ C.A. ROMERO-TALAMAS, IREAP, University of Maryland, College Park MD 20782, W.C. YOUNG, University of Wisconsin, Madison, WI 53706, G.S. NUSINOVICH, R.C. ELTON, IREAP, University of Maryland, College Park MD 20782 — Electron and negative ion production rates during atmospheric discharges in the presence of ionizing radiation are investigated. Ionizing radiation creates free electrons and negative ions with number densities that may be orders of magnitude higher than background conditions. These high densities not only facilitate air breakdown between high-voltage electrodes or at the focal point of high-power electromagnetic beams, but also change the breakdown evolution and the neutrals recombination history after the power source is turned off. Time dependencies of breakdown and recombination rates on radiation levels and aerosol concentrations, are modeled and compared to measurements of breakdown between electrodes. This research is part of a wider effort to investigate the feasibility of a remote detection scheme for radioactive materials, utilizing sub-THz beams to produce air breakdown [G. S. Nusinovich, et al. *J. Appl. Phys.* **109**, 083303 (2011)].

¹Work supported by the Office of Naval Research.

C. A. Romero-Talamas
IREAP, University of Maryland, College Park MD 20782

Date submitted: 17 Jul 2012

Electronic form version 1.4