Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Numerical Investigation of Propagation and Decay of Fast Ionization Waves Generated by Nanosecond Pulsed Discharge YIFEI ZHU, SVETLANA STARIKOVSKAYA, LPP, CNRS, Ecole Polytechnique-UPMC-UPSud-UPSay, NATALIE BABAEVA, Institute for High Temperatures, Russian Academy of Sciences, MARK KUSHNER, Electrical Engineering and Computer Science Dept., University of Michigan, ELECTRICAL ENGINEERING AND COMPUTER SCIENCE DEPT COLLABORATION, INSTITUTE FOR HIGH TEMPERATURES, RUSSIAN ACADEMY OF SCIENCES COLLABORATION, COLD PLASMA TEAM TEAM — Fast ionization waves (FIW) are an effective tool for studying plasma kinetics in nanosecond pulsed discharges. A numerical investigation of FIWs in air having high energy deposition was conducted in capillary tubes having different diameters using a two dimensional model. Continuity equations for charged and neutral species, the electron energy equation and Poisson's equation were implicitly integrated together with a propagator model for photoionization which includes both ionizing and non-ionizing absorption. The species and reactions included in the study were selected on the basis of a sensitivity analysis. The main goals of this work are to quantify how system parameters (e.g., pressure, voltage and specific energy deposition) affect the properties of the plasma in the early afterglow (tens to hundreds of nanoseconds) following the FIW.

Yifei Zhu
LPP, CNRS, Ecole Polytechnique-UPMC-UPSud-UPSay

Date submitted: 29 Jun 2016 Electronic form version 1.4