Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

Particle-in-cell simulations of electron transport in complex shape dc discharges[1] ALEX V. KHRABROV, IGOR D. KAGANOVICH, YEVGENY RAITSES, Princeton Plasma Physics Laboratory, Princeton, NJ, USA, VLADIMIR I. DEMIDOV, UES Inc., 4401 Dayton-Xenia Rd., Beavercreek, OH 45322, USA, DMYTRO SYDORENKO, University of Alberta, Edmonton, Canada — A region of dc discharge near cathode, or negative glow, exists in very nonequlibrium state. Three distinct groups of electrons play different roles in discharge self-organization [1]: 1) fast electrons from cathode produce ionization; 2) very cold trapped electrons make up the plasma density; and 3) intermediate electrons conduct the current. These non-equilibrium conditions provide considerable freedom to choose optimal plasma parameters for many applications by controlling electron energy distribution function (EEDF). The EEDF modification is achieved by making use of additional biased electrodes or cathode voltage forms in afterglow [2]. We have performed particle-in-cell simulations in 1 and 2D geometry to demonstrate possible control of EEDF.

[1] V. I. Kolobov and L. D. Tsendin, Phys. Rev. A **46,** 7837 (1992).
[2] V.I. Demidov, C.A. DeJoseph, and V. Ya. Simonov, Appl. Phys. Lett. **91**, 201503 (2007).

[1]This work was supported by AFOSR through STTR contract.

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Date submitted: 12 Jun 2009 Electronic form version 1.4