Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

Nonlocal control of electron temperature in short-discharge plasma with active boundaries[1] V.I. DEMIDOV, WVU, S.F. ADAMS, AFRL, E. BOGDANOV, SPbSU, M.E. KOEPKE, WVU, A.A. KUDRYAVTSEV, SPbSU — It is known that boundaries are very important in formation of nonlocal plasma properties [1]. This study combines experimental and modeling demonstration of controlling electron temperature in a plasma with active boundaries. To demonstrate that, a short dc discharge with cold cathode and application of different voltages to the conducting discharge wall for argon plasma at 1 Torr pressure has been used in experiments and modeling. It is demonstrated in the model for this discharge that spatial distributions of electron density and temperature and argon metastable atom density depend on the dc voltage applied to different conducting parts of the wall. Applied voltage can trap within the device volume energetic electrons arising from atomic and molecular processes in the plasma. This leads to a modification in the heating of slow electrons by energetic electrons and as a result modifies the electron temperature. Conducted experiments also demonstrate that the measured electron temperature is a function of potential applied to the wall and it is possible to see increasing the electron temperature with increasing absolute value of the applied negative potential.

[1] E. Bogdanov, S. Adams, V. Demidov, A. Kudryavtsev, J. M. Williamson, Phys. Plasmas 17, 103502 (2010)

[1]This work was supported by the DOE OFES (Contract No. DE-SC0001939), GK 14.740.11.0893 and AFOSR.

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Date submitted: 18 Jun 2012 Electronic form version 1.4