Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

Comparison of different fluid models for the atmospheric pressure DC glow microdischarge in helium[1] ANATOLY KUDRYAVTSEV, EUGENE BOGDANOV, KIRILL KAPUSTIN, ALEXANDER CHIRTSOV, St. Petersburg State University, Russia — One- and two-dimensional self-consistent fluid simulations of a DC microdischarge in helium at atmospheric pressure were performed. The plasmachemical model used includes five atomic and two molecular excited levels of helium and more than 80 reactions between them. Comparison of simulation results obtained by using this reaction set both with approach of Maxwellian and non-Maxwellian EDF with results from previous papers is presented. Simulations predict main observed properties of DC glow discharge, including formation of the normal current density when discharge occupies only part of cathode (the normal glow discharge). Gas heating was found to play an important role in shaping discharge profiles both in the cathode sheath and plasmas. Basic plasma properties such as density of charged and excited particles, electron and gas temperatures, electric field profiles etc. appeared to depend on choice of reaction set and EDF shape.

[1]Work partially supported by RFBR grants 09-02-01194 and 09-02-91225.

Anatoly Kudryavtsev
St. Petersburg State University

Date submitted: 11 Jun 2009 Electronic form version 1.4