

Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Paradoxical behavior of electron fluxes for local EDF at moderate and high pressures in DC positive column plasmas¹ ANATOLY KUDRYAVTSEV, St. Petersburg State University, ALEXANDER CHIRTSOV, SPbSPU, KIRIL KAPUSTIN, SPbSU — At moderate and high pressures when the characteristic discharge size L exceeds the electron energy relaxation length $l_e < L$, electron distribution function EDF could be found in local approach. This means that terms containing space derivatives and radial field are discarded from a solution to the kinetic equation and the EDF is factorized in the form $f(x,w) = F(w)N_e(x)$, where F is electron energy (w) distribution function EEDF and N_e is electron density. In these pressures, the energy balance of electrons is determined by the energy losses in elastic collisions and EEDF has the form of Druyvesteyn-Davydov distribution. Simulations for DC positive column plasmas revealed that electron fluxes are sensitive to energy dependence of elastic collision cross section. Paradoxical behavior of electron flux in spatial-energy space is presented. Electron flux in the elastic energy region (to the threshold of excitation) can be directed in different ways at different points in the radius (including against the direction of the external electric field).

¹This work was supported by the FZP and SPbGU.

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Date submitted: 02 Aug 2011

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