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**Limitation of the local approximation for EDF determination on the periphery of the high pressure plasmas** KIRILL KAPUSTIN, MIKHAIL KRASILNIKOV, ANATOLY KUDRYAVTSEV, St. Petersburg State University — Local approximation is widely used for the calculation of electron distribution function (EDF). In this approximation, terms which correspond to spatial gradients and ambipolar electric fields in a Boltzmann kinetic equation can be omitted, and EDF can be factorized in a product of electron density, which depends on radius and time and on part of EEDF, which depends on kinetic energy. In this case, EEDF is a function of local parameters such as heating (current-carrying) electric field, gas temperature, density of excited particles *etc.* These simplifications of calculations of the kinetic equation make this approximation widely used. In this work, physical formation mechanisms of EEDF in a high pressure positive column glow discharge are discussed. It is shown that criterion of applicability of local approximation depends not only on ratio between energy relaxation length and characteristic plasma dimension but also on ratio between heating and ambipolar electric fields. So that, in the gas periphery where ambipolar electric field becomes larger then axial electric field, the local approximation for EEDF is not valid even at a high pressures. This work was supported by RSCF and SPbSU.

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