Study of the non-local electron kinetics in rare gas and reactive plasmas GORDON K. GRUBERT, DETLEF LOFFHAGEN, INP Greifswald, F.-L.-Jahn-Str. 19, 17489 Greifswald, Germany — The development of a time- and space-dependent hybrid model for the analysis and self-consistent modelling of capacitively coupled rf discharges between plane electrodes is in progress. This model includes the coupled solution of hydrodynamic equations for the charge carriers and neutral species in the plasma, an equation system for the external electrical circuit, the Poisson equation determining the internal electric field, and the time-dependent, spatially inhomogeneous Boltzmann equation providing transport and rate coefficients of the electrons. In the current presentation the kinetic behaviour of the electrons in axially inhomogeneous discharges in rare and molecular gases is discussed on the basis of the space-dependent electron Boltzmann equation. The analysis is performed by using the multi-term approximation of an expansion of the electron velocity distribution function in Legendre polynomials. Main details of an improved technique for solving the partial differential equation system resulting from the substitution of this expansion into the kinetic equation are represented. Results of the velocity distribution and relevant macroscopic properties of the electrons are reported and the impact of the spatial variation of the electric field is discussed.
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