

A higher order fluid model for streamer discharges

A. Markosyan, S. Dujko, W. Hundsdorfer, U. Ebert

A third order hydrodynamic model is developed for the streamer dynamics by closing the system of 4 moments of the Boltzmann equation. The transport and reaction coefficients for the model were obtained by solving a multi-term Boltzmann equation. The electric field generated by the space charge is calculated with the Poisson equation. Simulations of the planar streamer ionization fronts in N₂ at 1Torr and room temperature are performed both with the classical so-called “minimal model”, where mean field approximation is used, and with the present model and compared.