Abstract Submitted
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Incorporation of the electron energy equation into the hybrid Monte Carlo - fluid model for glow discharge: the applicability and reliability of the model ENDER EYLENCEOGLU, ISMAIL RAFATOV, Middle East Technical University, Ankara, Turkey, ANATOLY KUDRYAVTSEV, Saint Petersburg State University, St.Petersburg, Russia — A modification of the conventional hybrid Monte Carlo - fluid model for glow discharge, which incorporates the electron energy equation, is considered. In the proposed model electrons are separated into two groups, namely, high energetic fast and low energetic slow (bulk) electrons. Density profiles of ions, slow electrons, and meta-stable particles are determined from the solution of corresponding continuity equations. Fast electrons, which are responsible for ionization and excitation events in the discharge, are simulated by the Monte-Carlo method. The temperature profile for slow electrons is obtained from the solution of the energy balance equation. The transport (mobility and diffusion) coefficients as well as the reaction rates for slow electrons are determined as functions of the electron temperature. Test calculations are carried out for the direct current glow discharge in argon within two-dimensional geometry. Comparison of the computed results with those obtained from the conventional fluid and hybrid models and the experimental data is done, the applicability and reliability of the proposed model is studied in details.

Ender Eylenceoglu
Middle East Technical University, Ankara, Turkey

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