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Kinetic simulations of a cylindrical Hall thruster[1] KONSTANTIN MATYASH, RALF SCHNEIDER, OLEKSANDR KALENTEV, Max-Planck-Institut fur Plasmaphysik, EURATOM Association, Greifswald, D-17491, Germany, YEVGENY RAITSES, NATHANIEL J. FISCH, Princeton Plasma Physics Laboratory, Princeton, New Jersey 08543, USA — A newly developed 2d3v Particle-in-Cell code with Monte Carlo (MC) Collisions is used to simulate the operation of the PPPL 100 W cylindrical Hall thruster (CHT). The model includes all relevant collisional processes (Coulomb collisions, electron-neutral elastic, ionization and excitation collisions; ion-neutral momentum transfer and charge exchange collisions). The dynamics of the background gas is self-consistently resolved with direct MC simulation. Secondary electron emission at the thruster walls is accounted through a probabilistic MC model. The anomalous electron transport perpendicular to magnetic field is included in the simulation via Bohm-type diffusion. The computational domain includes the thruster channel and the near-field plume region. The self-sustained and the current overrun modes of the CHT operation are studied and compared with experiments.

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Yevgeny Raitses
Princeton Plasma Physics Laboratory

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