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Hybrid modeling of the anomalous transport inside Hall thrusters[1] ALEJANDRO ALVAREZ LAGUNA, Laboratoire de physique des plasmas, Ecole Polytechnique, MARC MASSOT, centre de mathematiques appliques, PASCAL CHABERT, ANNE BOURDON, Laboratoire de physique des plasmas, Ecole Polytechnique — We present a hybrid strategy that combines the fluid and the kinetic descriptions for the simulation of Hall thrusters. The objective of the model is to selfconsistently capture, in an efficient manner, the important kinetic effects that are responsible for the anomalous transport of electrons across the magnetic field and the plasmawall interaction. The fluid model simulates the evolution of the macroscopic quantities. A novel numerical scheme will be presented in this work. The fluid description is computationally more efficient than the kinetic model. However, it fails to capture the anomalous transport. In PIC simulations, the distribution function of the electrons is observed to deviate from the Maxwellian distribution, which appears to have an important impact on the development of the instability. In the hybrid model, a MonteCarlo simulation is carried out in order to estimate the distribution functions of the species. The numerical algorithm can be applied to different low-temperature plasmas under low-pressure conditions applications.

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