Abstract Submitted
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2D (axial-azimuthal) Particle-In-Cell simulations of Hall Effect Thrusters[1] THOMAS CHAROY, ANTOINE TAVANT, ANNE BOURDON, PASCAL CHABERT, Laboratoire de Physique des Plasmas, Ecole Polytechnique — Even though Hall-Effect Thrusters(HET) have been intensively studied for the past few decades, electron transport across the magnetic field is still not well understood. Recent studies have shown that Electron Cyclotron Drift Instabilities(ECDI) could be a main cause of the anomalous transport observed. To get more insights on this phenomena, we modified a highly-parallelized 2D Particle-In-Cell Monte Carlo Collision (PIC MCC) model, called LPPic, that was previously used to simulate the radial-azimuthal plane of an HET, in order to study the axial-azimuthal one. Comparisons with the theory developed by Lafleur et al. have been conducted. In a HET, electrons are injected at the cathode to ionize the neutral gas coming from the anode and this injection needs to be properly modeled in an axial-azimuthal simulation. Two emission conditions have been previously investigated in an axial-radial code by Szabo et al. while using an "artificial permittivity" to speed-up the code, which is not needed in LPPic. Another one was recently proposed by Boeuf et al. with a simplified simulation case that was used to get a 2D PIC benchmark of ExB discharges. Through the analysis of this case, we were able to better understand the impact of this cathodic emission model on the discharge behavior.

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