Abstract Submitted
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3D Particle-in-Cell simulation of the ExB electron drift instability in Hall thrusters: effect of the dielectric surfaces on the anomalous transport GWENAEL FUBIANI, Univ Toulouse III, JEAN-PIERRE BOEUF, LAURENT GARRIGUES, LAPLACE CNRS University of Toulouse — Kinetic drift instabilities are the likely cause for the anomalous electron transport in Hall-effect thrusters (HETs). This work is a continuation of previous efforts to model drift waves in HETs with a Particle-In-Cell (PIC) algorithm [1]. The latter demonstrated the occurrence of an Electron Cyclotron Drift type Instability (ECDI). The model had a couple of simplifying assumptions in order to speed-up the calculation and pinpoint the mechanisms leading to the formation of the instability. The electron transport was decoupled from ionization and neutral transport, collisions with neutrals were neglected, the magnetic field had solely an axial profile and the simulation domain was 2D (axial-azimuthal plane). In this work, we address the impact of the ceramic walls on the properties of the instabilities. The simulations are performed with a 3D PIC model (parallelized using both OpenMP and MPI). We will analyse: (1) the characteristics of the instability and the anomalous transport versus the discharge power, (2) the effect of the applied discharge voltage on the plasma properties and lastly, (3) the incidence of the numerical capacitance on the convergence time of the simulation.

[1] J.P. Boeuf et al., Physics of Plasmas **25**, 061204 (2018)

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