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Turbulence and anomalous electron transport in the Electron Cyclotron Drift Instability

Abstract
The nonlinear evolution of the The Electron Cyclotron Drift Instability (ECDI) driven by the electron EB drift in partially magnetized plasmas and anomalous electron transport in two dimensions are studied using particle-in-cell (PIC) simulations. PIC simulations were performed for the parameters typical of the Hall-eect thruster in the two-dimensional azimuthal-radial geometry to investigate the role of the boundaries conditions, electric and magnetic eld magnitudes, sheath losses and nite-length on the mode development and anomalous electron current. The saturated state of turbulence and resulting anomalous electron current are studied. Nature of the anomalous current and contribution of dierent wavelength are investigated. It is shown that the magnitude of the anomalous current can be explained as a EB drift of magnetized electrons in
uctuating elds.

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