

Anomalous electron transport inside Hall thruster as result of correlation among azimuthal drift, electron-wall interaction and axial acceleration.

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There are still many missing elements to complete the physical picture at the basis of the Hall thruster functioning. The origin of the anomalous electron cross-field transport ascribed to electron-cyclotron drift instability remains decoupled from the strong electron-wall interaction and ion acceleration. The radial dynamics induces sheath instability, which is often represented as local phenomena and represented in reduced radial dimensional models, while the ion acceleration is responsible for instability saturation. This study represents the first attempt to correlate these different mechanisms contributing to the electron transport by means of a fully kinetic and self-consistent 3D particle simulation the Hall thruster channel.