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Current Driven Instabilities and Anomalous Mobility in Hall-effect Thrusters[1] JONATHAN TRAN, University of California, Los Angeles, DANIEL ECKHARDT, ROBERT MARTIN, Air Force Research Laboratory Edwards AFB — Due to the extreme cost of fully resolving the Debye length and plasma frequency, hybrid plasma simulations utilizing kinetic ions and quasi-steady state fluid electrons have long been the principle workhorse methodology for Hall-effect thruster (HET) modeling. Plasma turbulence and the resulting anomalous electron transport in HETs is a promising candidate for developing predictive models for the observed anomalous transport. In this work, we investigate the implementation of an anomalous electron cross field transport model for hybrid HET simulations such a HPHall. A theory for anomalous transport in HETs and current driven instabilities has been recently studied by Lafleur et al. This work has shown collective electron-wave scattering due to large amplitude azimuthal fluctuations of the electric field. We will further adapt the previous results for related current driven instabilities to electric propulsion relevant mass ratios and conduct a preliminary study of resolving this instability with a modified hybrid (fluid electron and kinetic ion) simulation with the hope of integration with established hybrid HET simulations.

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