

Abstract Submitted
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Fluctuations and Transport in Two-Dimensional (Axial/Azimuthal) Hybrid Hall Thruster Simulations. NADINE WONG, KAYLA MARTIN, EDUARDO FERNANDEZ, Eckerd College — Simulations of Hall thrusters that aim to resolve the global discharge plasma generally use either fluid, or hybrid (fluid/PIC) models in the axial and radial coordinates. Those descriptions, which do not resolve azimuthal flows, employ ad-hoc electron transport parameters in order to reproduce experimental measurements. On the other hand, experiments, theory, as well as kinetic simulations indicate that azimuthal fluctuations likely play an important role in regulating such cross field “anomalous” electron transport.¹ In this work we report on results from an axial/azimuthal hybrid model which does resolve the azimuthal dynamics. Our findings indicate that while azimuthal fluctuations naturally emerge in the simulations, their phase is not optimal for transport, and as a result the overall simulated discharge current is well below that found in experiments. Work is underway to implement an electron transport model in the simulations in order to better reproduce experimental current levels.

[1] Lafleur, T., Baalrud, S. D., Chabert, P., Theory for the Anomalous Electron Transport in Hall Effect thrusters. II. Kinetic Model, Phys. Plasmas, Vol. 23, 2016, pp. 053503-053513.

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