

Abstract Submitted  
for the DPP11 Meeting of  
The American Physical Society

**Azimuthal Dynamics and Transport in a Two Dimensional Hall Thruster Hybrid Model**<sup>1</sup> EDUARDO FERNANDEZ, Eckerd College, MARK CAPPELLI, Stanford University — Current Hall thruster simulation efforts aimed at modeling the global plasma discharge typically employ hybrid schemes in order to circumvent the stiff requirements of fully kinetic approaches. While such hybrid schemes capture the basic features of the plasma seen experimentally, they do not generate sufficient electron transport needed to sustain the discharge. As a result, the electron mobility is enhanced in a somewhat ad-hoc manner with models that employ adjustable coefficients. In this paper we present a hybrid model that aims to capture electron transport by resolving the azimuthal dynamics self consistently. Simulations show that transport-producing fluctuations are naturally excited in the plasma. The features of the model will be presented and compared with the more standard hybrid model, which does not resolve azimuthal physics. Initial steps of a three dimensional, hybrid simulation for Hall thrusters will be shown.

<sup>1</sup>Work supported by a 2011 AFOSR Summer Faculty Fellowship.

Eduardo Fernandez  
Eckerd College

Date submitted: 27 Jul 2011

Electronic form version 1.4