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Incorporating a Turbulence Transport Model into 2-D Hybrid Hall Thruster Simulations EUNSUN CHA, MARK A. CAPPELLI, Stanford Univ, EDUARDO FERNANDEZ, Eckerd College — 2-D hybrid simulations of Hall plasma thrusters that do not resolve cross-field transport-generating fluctuations require a model to capture how electrons migrate across the magnetic field. We describe the results of integrating a turbulent electron transport model into simulations of plasma behavior in a plane spanned by the E and B field vectors. The simulations treat the electrons as a fluid and the heavy species (ions/neutrals) as discrete particles. The transport model assumes that the turbulent eddy cascade in the electron fluid to smaller scales is the primary means of electron energy dissipation. Using this model, we compare simulations to experimental measurements made on a laboratory Hall discharge over a range of discharge voltage. Both the current-voltage trends as well as the plasma properties such as plasma temperature, electron density, and ion velocities seem agree favorably with experiments, where a simple Bohm transport model tends to perform poorly in capturing much of the discharge behavior.

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