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Fluctuations, Electron Transport, and Flow Shear in 2D Axial, Azimuthal (z-θ) Hybrid Hall Thruster Simulations. EDUARDO FERNANDEZ, Eckerd College, NICOLAS GASCON, AARON KNOLL, MICHELLE SCHARFE, MARK CAPPELLI, Stanford University — Motivated by the inability of radial-axial (r-z) simulations to properly treat cross-field electron transport in Hall thrusters, a novel 2D z-θ model has been implemented. In common with many r-z descriptions, the simulation is hybrid in nature and assumes quasi-neutrality. Unlike r-z models, electron transport is not enhanced with an ad-hoc mobility coefficient; instead it is given by collisional or "classical" terms as well as "anomalous" contributions associated with azimuthal electric field fluctuations. Results indicate that anomalous transport dominates classical transport for most of the channel and near field, *except* in a strong electron flow shear region near the channel exit. The correlation between flow shear, fluctuation behavior, and electron transport will be examined, along with experimental data from the Stanford Hall Thruster. Our findings make a strong link to the turbulent transport suppression mechanism by flow shear seen in fusion devices. The scheme for combining the r-z and z-θ descriptions into an upcoming 3D hybrid model will be presented.

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