Abstract Submitted
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Simulating the coupled evolution of drift-wave turbulence and the tearing mode[1] S.D. JAMES, University of Tulsa, D.P. BRENNAN, Princeton University, O. IZACARD, Lawrence Livermore National Laboratory, C. HOLLAND, University of California, San Diego — Numerical simulations of turbulence and MHD instabilities such as the tearing mode can be computationally expensive and only recently have simulations begun to address their coupled, self-consistent interactions. The disparate scales involved in simulating the coupled evolution of small-scale turbulence and the larger-scale tearing mode make this a challenging numerical problem. Using the newly developed code, TURBO, we have performed nonlinear simulations of Hasegawa-Wakatani drift-wave turbulence coupled to Ohm's law. An equilibrium with prescribed stability properties and turbulent drives is used to examine the impact of drift-wave turbulence on the stability of the tearing mode and the energy transport between them in the context of a turbulent resistivity and turbulent viscosity. We find that the spatial structure of the density flux and these transport coefficients are asymmetric in the poloidal direction and peaked away from the X-point in the presence of an island in a poloidal flow. Similar effects are seen in simulations of ITG turbulence in the presence of a magnetic island and we discuss the connections to our work.

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Spencer James
University of Tulsa

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