Abstract Submitted
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Studying the interaction mechanisms of the tearing mode and drift-wave turbulence[1] S.D. JAMES, University of Tulsa, D.P. BRENNAN, Princeton University, C. HOLLAND, University of California, San Diego, O. IZACARD, Lawrence Livermore National Laboratory — Understanding the mechanisms through which turbulence and MHD instabilities interact is vital to the success of magnetically confined fusion. Simulating the self-consistent evolution of turbulence and MHD instabilities is a challenging numerical problem due to the disparate scales involved. We use a newly developed code, TURBO, to perform nonlinear simulations of a three-field model which couples the evolution of drift-wave turbulence to Ohm's Law. TURBO evolves the density, vorticity, and magnetic flux in a slab geometry using an equilibrium with prescribed stability properties and turbulent drives. By imposing a propagating boundary condition on the magnetic flux we examine the dependence of an asymmetry in the density flux on the propagation velocity of the boundary condition. We present results showing the influence of the turbulence on the stability of the tearing mode and the energy transport between them via a turbulent resistivity. For the case of a static island in a poloidal flow, results indicate that the energy transport and density flux display a spatial asymmetry in the poloidal direction and are peaked away from the X-point. A recent study of ITG turbulence in the presence of a magnetic island found analogous effects and we discuss the relation to our work.

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