Abstract Submitted
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**A Comprehensive Study of the Parametric Dependencies of Transport Using Gyrokinetic Simulations**[1] J.E. KINSEY, Lehigh U., R.E. WALTZ, J. CANDY, GA — Nonlinear gyrokinetic simulations are used to systematically study the effects of E×B shear, magnetic shear, safety factor q, $T_i/T_e$, collisionality, plasma beta, and elongation on turbulent energy, particle, and momentum transport due to ion temperature gradient (ITG) and trapped electron modes (TEM) in toroidal geometry using the GYRO code [1]. Previous work has tended to focus on studying ITG modes with adiabatic electrons for a single reference case. Here, we report on over 150 nonlinear kinetic electron simulations to be used for benchmarking and transport model development. Including kinetic electrons, we have verified that the effect of E×B shear on both ITG and TEM transport is well modeled by a simple quench rule. In simulations varying q, the ion and electron energy transport exhibit a linear q-scaling while the particle diffusivity is insensitive to q. The nonlinear results are compared against quasilinear (QL) diffusivity ratios to assess the accuracy of QL theory on a per-mode basis.

[1] J. Candy and R.E. Waltz, Phys. Rev. Lett. **91**, 045001 (2003).

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