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Category Number and Subject:

[**X**]Theory [ ]Experiment

Parametric Dependencies of Transport Using Gyrokinetic Simulations Including Kinetic Electrons,* J.E. Kinsey, *Lehigh U.*, R.E. Waltz, J. Candy, *GA* – Nonlinear gyrokinetic simulations are used to systematically study the effects of ExB shear, magnetic shear, safety factor q, Ti/Te, collisionality, plasma beta, and shaping on turbulent energy, particle, and momentum transport due to ion temperature gradient (ITG) and trapped electron modes (TEM) using the GYRO code [1]. Previous work has tended to focus on ITG modes with adiabatic electrons for a single reference case. Here, we report on over 300 nonlinear kinetic electron simulations to be used for benchmarking and transport model development. In simulations varying q, the energy transport exhibits a linear q-scaling while the particle diffusivity can be insensitive to q. For shifted circle geometry, the effect of ExB shear on both ITG and TEM transport is well modeled by a simple quench rule. The quench rule needs to be modified, however, for real geometry. 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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[**X**]Oral [ ]Poster

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