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Nonlinear Gyrokinetic Turbulence Simulations of Equilibrium ExB Shear Suppression of Transport,[*] J.E. Kinsey *Lehigh U.*, J. Candy, R.E. Waltz, *GA* – The effects of ExB velocity shear have been investigated in turbulence simulations with and without kinetic electrons using the GYRO code. GYRO is a physically comprehensive continuum global gyrokinetic code [1]. The impact of ExB shear stabilization in electrostatic flux-tube simulations is well modeled by a simple quench rule with the turbulent diffusivity scaling like $(1-\gamma_E/\gamma_{max})$ where γ_E is the ExB shear rate and γ_{max} is maximum linear growth rate without ExB shear [2]. The quench rule was originally deduced from adiabatic electron ion temperature gradient simulations. We find it also applies in the presence of kinetic electrons for long wavelength driven transport. Without parallel velocity shear, the electron and ion transport is quenched near $\gamma_E / \gamma_{max} = 2$. When the destabilizing effect of parallel velocity shear is included in the simulations, consistent with purely toroidal rotation, the transport may not be completely quenched by any level of ExB shear because the Kelvin-Helmholtz drive increases γ_{max} faster than γ_E increases.

[1] J. Candy and R.E. Waltz, Phys. Rev. Lett. **91**, 045001 (2003).
[2] R.E. Waltz, et al., Phys. Plasmas **2**, 2408(1995); *ibid* **1**, 2229 (1994).

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