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GRYO simulations of turbulent transport in NSTX L-mode plasmas[1] D.R. MIKKELSEN, S.M. KAYE, Princeton Plasma Physics Laboratory, J. CANDY, R.E. WALTZ, General Atomics — We present simulations of long-wavelength, drift-kinetic plasma turbulence in reversed-shear L-mode discharges in NSTX. This work extends studies of core plasma turbulence to low aspect ratio, in plasmas where finite ρ_* effects (i.e., profile variations, and 'non-local' effects) are expected to be important. In such plasmas the fluctuations can more easily produce large scale deviations from the background density and temperature, and it is essential to remove these deviations with an 'adaptive source' model. We demonstrate that the simulation results are converged with respect to the parameters of the 'adaptive source' model before the source affects the overall transport. These electrostatic simulations include a fully drift-kinetic treatment of both electrons and ions. The GYRO simulations of a dozen plasma conditions consistently exhibit several characteristics: the predicted ion heat flux is strongly dominant, contrary to TRANSP analysis of the experimental data; non-adiabatic electron effects are very strongly destabilizing; and the ExB shear is strongly stabilizing (as expected) but in some discharges the residual predicted heat fluxes are comparable to the heating power. We will explore whether those simulations that are completely quenched by ExB shear are close to marginal stability.

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