Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Nonlinear saturation of the ITG instability with fully kinetic ions MATTHEW MIECNIKOWSKI, Dept. of Physics, Univ. of Colorado, Boulder, BENJAMIN STURDEVANT, Princeton Plasma Physics Laboratory, YANG CHEN, SCOTT PARKER, Dept. of Physics, Univ. of Colorado, Boulder — We study the growth and saturation of the ion-temperature-gradient (ITG) instability in simulations with fully kinetic ions and adiabatic electrons. The ion trajectories are integrated using the full Lorentz force, fully resolving the cyclotron motion and capturing the corresponding finite Larmor radius effects. In slab geometry, the linear growth and nonlinear saturation characteristics show good agreement with analogous gyrokinetic simulations across a wide range of parameters, and the fully kinetic simulation correctly reproduces the nonlinearly generated zonal flow. We discuss our progress on the extension of this model to toroidal geometry to study more realistic turbulence. This work represents an important step towards the extension of kinetic modeling of plasma turbulence to regimes where the gyrokinetic ordering is violated or the gyrokinetic equations are questioned.

Matthew Miecnikowski
Dept. of Physics, Univ. of Colorado, Boulder

Date submitted: 14 Jul 2017 Electronic form version 1.4