Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Nonlinear Gyrokinetic Turbulence Simulations of the NSTX Spherical Torus J. LUC PETERSON, G.W. HAMMETT, D. MIKKELSEN, S. KAYE, E. MAZZUCATO, R. BELL, B. LEBLANC, Princeton Plasma Physics Laboratory, H. YUH, Nova Photonics, D. SMITH, University of Wisconsin, J. CANDY, R.E. WALTZ, E.A. BELLI, G.M. STAEBLER, J. KINSEY, General Atomics — The National Spherical Torus Experiment provides a unique environment for the study of electron turbulence and transport. We present nonlinear GYRO[1] simulations of microturbulence in NSTX discharges and make comparisons between numerically simulated and experimentally measured levels of electron-scale turbulence. In particular we examine the effects of magnetic shear, $\mathbf{E} \times \mathbf{B}$ shearing and collisionality on turbulence driven by the Electron Temperature Gradient (ETG) mode, while paying attention to the roles of electromagnetic fluctuations, kinetic ions and realistic experimental NSTX parameters. We also investigate the interplay between electron turbulence and transport using the TGYRO[2] simulation suite. This work is supported by the SciDAC Center for the Study of Plasma Microturbulence, DOE Contract DE-AC02-09CH11466, and used the resources of the National Center for Computational Sciences at ORNL, under DOE Contract DE-AC05-00OR22725.

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Date submitted: 26 Jul 2010 Electronic form version 1.4