Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Gyrokinetic turbulence and transport with kinetic electrons in NSTX plasmas W.X. WANG, S. ETHIER, T.S. HAHM, S.M. KAYE, W.W. LEE, J. MANICKAM, G. REWOLDT, W.M. TANG, Princeton Plasma Physics Laboratory, Princeton, NJ 08543 — Nonlinear gyrokinetic turbulence simulations for shaped plasmas have shown that ITG driven turbulence, even without the supression due to the equilibrium shear flow, drives insignificant ion energy transport in NSTX (about the the neoclassical level). This distinct feature is in contrast to the anomalous transport level for DIII-D simulations, where ITG turbulence is shown to drive a high level of transport (10 x neoclassicallevel), even though the mean turbulence fluctuation amplitude for these two machines are actually comparable. This remarkable difference in turbulent transport properties is further investigated by taking into account the effects of kinetic electrons. Here, full electron dynamics is simulated using the split-weight scheme in our new global simulation code. The equilibrium EXB shear flow is shown not to completely suppress the fluctuations in the well-developed nonlinear turbulence regime while it can stabilize ITG instability linearly. Also reported are our ITG/TEM simulations of NSTX and DIII-D discharges with the focus on energy loss through the electron channel and the comparison of the nonlinearly saturated k-spectra with the experimental measurements. This work was supported by U.S. DOE Contract DE-AC02-76-CH03073 and the SciDAC GPS Center.

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Date submitted: 21 Jul 2007 Electronic form version 1.4