Abstract Submitted for the 53rd Annual Meeting
Division of Plasma Physics
November 14–18, 2011, Salt Lake City, Utah

Category Number and Subject:

[**x**] Theory [ ] Experiment

Progress in GYRO Validation Studies of DIII-D H-mode Plasmas,* C. Holland, *UCSD*; K.H. Burrell, C.C. Petty, J. Candy, *GA*; C.T. Holcomb, *LLNL* – The need for a validated predictive capability of turbulent transport in ITER is now widely recognized. However, to date most validation studies of nonlinear codes such as GYRO have focused upon low power L-mode discharges, which have significant differences in key dimensionless parameters such as β and $\rho_* = \rho_s/a$ from more ITER-relevant H-mode discharges. In order to address this gap, the results of nonlinear GYRO simulations of a range of DIII-D H-mode discharges (including quiescent H-mode, hybrid, and steady state discharges) are presented. These H-mode studies focus upon three physics effects, motivated by key differences between L- and H-mode plasmas. The first is the linear and nonlinear effects of finite β in plasmas where $\beta_N = \beta/(I/aB)$ varies from 1.5–2.5, 3–5 times higher than typical L-mode values. Second is the impact of nonlocality at typical DIII-D H-mode ρ_* values, which in contrast to typical L-modes can be non-negligible. Third is the stabilizing effect of a significant density of energetic particles.

*Work supported by US DOE under DE-FG02-07ER54917, DE-FC02-04ER54698, DE-FG02-95ER54309, and DE-AC52-07NA27344.