

**Abstract Submitted for the 52nd Annual Meeting
Division of Plasma Physics
November 8–12, 2010, Chicago, Illinois**

Category Number and Subject:

Theory Experiment

Multi-scale/Multi-field Turbulence Measurements to Rigorously Test Gyrokinetic Simulation Predictions on DIII-D,*

T.L. Rhodes, W.A. Peebles, L. Schmitz, E.J. Doyle, J.C. Hillesheim, L. Zeng, G. Wang, *UCLA*; C.H. Holland, G.R. Tynan, *UCSD*; A.E. White, *MIT*; G.R. McKee, Z. Yan, *U. Wisc.*; J.C. DeBoo, K.H. Burrell, C.C. Petty, *GA*; and D. Mikkelsen, *PPPL* – The progress in rigorously testing gyrokinetic turbulence simulations through a series of carefully designed experiments is described. A unique array of multi-field, multi-scale turbulence diagnostics is utilized, including new measurements of TEM-scale \tilde{n} , turbulence flows, $\tilde{n}_e - \tilde{T}_e$ crossphase, as well as previously available ITG and ETG scale \tilde{n} and low- k \tilde{T}_e . Turbulence and transport response to T_e/T_i was quantified for QH-mode, low-rotation Hybrid H-mode, and L-mode cases. Little variation with T_e/T_i of low- k through high- k \tilde{n} was found in L-mode; however, \tilde{T}_e varied strongly. In contrast, low- k \tilde{n} increased substantially with T_e/T_i in the Hybrid H-mode. These and other measurements, including particle transport via gas puff modulation, will be compared to linear and nonlinear gyrokinetic simulations.

*Work supported by US DOE under DE-FG02-08ER54984, DE-FG02-07ER54917, DE-FC02-99ER545412, DE-FG02-08ER54999, DE-FC02-04ER54698, and DE-AC02-09CH11466.