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Progress in GYRO Validation Studies of DIII-D H-mode Plasmas¹ 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.

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