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[ ] Theory [X] Experiment

Multi-scale Fluctuation Behavior During Balanced NBI H-mode in the DIII-D Tokamak* T.L. Rhodes, W.A. Peebles, L. Schmitz, A.E. White, J. Hillesheim, G. Wang, L. Zeng, E.J. Doyle, *UCLA,* G.R. McKee, M.W. Shafer, *UW-Madison* – Using a unique array of diagnostics, the behavior of fluctuations over a broad range in wavenumber ($0 \leq k\rho_s \leq 10$) and for two different fields (density and electron temperature) during balanced NBI is examined. Simultaneous co- and counter-NBI is utilized to access H-mode with a minimum of total torque. The diagnostic set utilized includes FIR scattering, Doppler backscattering, correlation ECE, BES, reflectometry, and high-k mm-wave backscattering. Near r/a=0.6 high-k fluctuations ($k \sim 35$ cm^{-1}) increase substantially with NBI (x3) prior to and during the H-mode. Low-k temperature fluctuations also increase with NBI (r/a=0.6-0.7) prior to decreasing at the LH transition. In contrast, intermediate k density fluctuations appear relatively unchanged just prior to the LH. Analysis of flow activity (E_r, E_r shear, and zonal flow), transport behavior from power balance, and comparison to linear gyrokinetic stability calculations (including sensitivity studies) will be presented.

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