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Measurements of the Wavenumber Spectrum of Multi-scale Turbulence in the Core of DIII-D H-mode Plasmas[1] L. SCHMITZ, G. WANG, J.C. HILLESHEIM, W.A. PEEBLES, T.L. RHODES, E.J. DOYLE, L. ZENG, UCLA, C. HOLLAND, UCSD, A.E. WHITE, ORISE, G.R. MCKEE, U. Wisconsin-Madison, J.C. DEBOO, J.S. DEGRASSIE, K.H. BURRELL, C.C. PETTY, General Atomics — The wavenumber spectrum and spectral index of multi-scale turbulence ($0.5 \leq k_\theta \rho_s \leq 6$) in the core of L- and H-mode DIII-D plasmas have been determined by Doppler Backscattering (DBS). A comparison is made to quasi-linear spectra from the trapped gyro-Landau fluid code (TGLF) to assess the contributions of ITG and TEM/ETG turbulence to transport fluxes ($0.4 \leq r/a \leq 0.8$). Initial results of comparisons to spectra calculated via nonlinear gyrokinetic (GYRO) simulations are also presented. In high temperature, low density plasmas, ITG-scale and intermediate-scale core turbulence is found reduced by at least an order of magnitude across the L- to H-mode transition ($T_i/T_e \geq 2$). This reduction is attributed to the combined effects of reduced turbulence drive and increased core $E \times B$ flow shear in H-mode.

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