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Long-Wavelength Turbulence Scaling Properties in DIII-D[1] G.R. MCKEE, D.J. SCHLOSSBERG, M.W. SHAFER, University of Wisconsin-Madison, C.H. HOLLAND, University of California-San Diego, P. GOHIL, General Atomics
— The scaling properties of long-wavelength density fluctuations are investigated in DIII-D L-mode and H-mode plasmas utilizing the expanded high-sensitivity 2D Beam Emission Spectroscopy (BES) system. BES employs a 64-channel system that utilizes a radially-scannable 8x8 array sampling multiple radial and poloidal correlation lengths, allowing for full sampling of the 2D wavenumber spectrum. Measurements of turbulence as a function of several important dimensionless parameters (κ, T_e/T_i, ion mass, $\rho_\star$) are obtained, showing that fluctuation intensity increases strongly with decreasing plasma elongation (at constant q), consistent with increased thermal transport and reduced energy confinement. In contrast, increasing T_e/T_i increases momentum and thermal transport with little change in low-k density fluctuations. Measurements obtained during a $\rho_\star$ (ρ_i/a) scan in hydrogen will also be presented. Together, these measurements will be crucial for comparing with transport simulations, such as GYRO and TGLF.

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