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Core Turbulence Structures and ρ_* Scaling Properties in H-Mode Plasmas[1] G.R. MCKEE, R.J. FONCK, D.K. GUPTA, D.J. SCHLOSSBERG, M.W. SHAFER, U. Wisc.-Madison, J. CANDY, C.C. PETTY, M.R. WADE, R.E. WALTZ, GA — The characteristics of long-wavelength density fluctuations ($k_\perp \rho_i < 1$) are examined in the core region ($0.5 < \mathrm{r/a} < 0.9$) of H-mode discharges and compared to turbulence in L-mode discharges. Measurements are obtained with the upgraded 16-channel (4-radial $\times$ 4-poloidal), high-sensitivity beam emission spectroscopy system at DIII-D. The ρ^* scaling of turbulence structures in hybrid scenario H-mode plasmas demonstrates that the radial correlation lengths scale closely with the local ion gyroradius, as predicted theoretically and observed in L-mode plasmas. Eddy spatial structures, in contrast, differ dramatically between L and H-mode plasmas, with H-mode turbulence exhibiting a highly tilted structure in the radial-poloidal plane, as measured via 2D spatiotemporal correlations. Whether this difference results from flow-shear, radial propagation, or inherent turbulence dynamics will be investigated via comparison to measured flow shear, as well as with comparisons of GYRO simulations.

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