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2D Core Turbulence Properties on DIII-D,* M.W. Shafer, G.R. McKee, R.J. Fonck, D.J. Schlossberg, Z. Yan, *U. Wisconsin*; C. Holland, *UCSD*; A.E. White, *ORISE* — Quantitative measurements of the inherently 2D turbulence characteristics in magnetized plasmas are compared with nonlinear simulation. This comparison substantiates key aspects of the ExB shear model of turbulence suppression that explains enhanced confinement. The critical dynamics underlying turbulent transport occur in the plane perpendicular to the magnetic field ($k_{\|}<<k_{\perp}$). These localized long-wavelength ($k_{\perp}\rho_i<1$) density turbulence measurements are obtained in the core ($0.3<r/a<0.9$) of DIII-D L-mode plasmas with a 2D rectangular array of Beam Emission Spectroscopy channels. Radial and poloidal correlation lengths are found to scale with the ion gyroradius and demonstrate a poloidally elongated eddy structure. $S(k_r,k_\theta)$ spectra are compared with GYRO simulations: key features (wavenumber peak, correlation lengths) compare well, however the simulations indicate a sheared eddy structure at outer radii that is not observed. Measured local decorrelation and shearing rates are also compared.

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