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Analysis of Turbulence Dynamics in the H-mode edge using Phase Contrast Imaging on DIII-D[1] J. C. ROST, A. MARINONI, M. PORKOLAB, MIT-PSFC, K. H. BURRELL, GA — Analysis of Phase Contrast Imaging (PCI) measurements shows that the dynamics of electron density turbulence near the edge of high-performance plasmas are dominated by strong correlations between turbulent modes and spatial variation in turbulence parameters. These observations are not consistent with expectations for fully-developed turbulence (FDT), which describes a regime with weakly-correlated turbulent modes described by a few parameters (correlation lengths, mean wavenumbers in r, θ) that change slowly in space, although previous work [Rost et al, Phys. Plasmas **21** (2014) 062306] showed that a simple FDT model with velocity shear could explain important characteristics of the PCI measurements in QH-mode. Newer work, including an upgraded FDT model, more rigorous fitting criteria, and observations during ramps of poloidal rotation in QH-mode, provides additional constraints on turbulence location and radial structure, showing radially-limited turbulent modes in the E_r well driven by strong coupling to turbulent modes in the pedestal, violating assumptions of the local FDT model. Analysis of the data must therefore go beyond simplified parameters like correlation length and gyrokinetic modeling is needed to interpret short scale length turbulent regimes.

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Jon Rost
MIT-PSFC

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