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Comparison of Broad Spectrum Turbulence Measurements and Gyrokinetic Code Predictions on the DIII-D Tokamak[1] T.L. RHODES, W.A. PEEBLES, X. NGUYEN, E.J. DOYLE, L. ZENG, G. WANG, UCLA, M.A. VANZEELAND, ORISE, G.R. MCKEE, UW, J.C. DEBOO, J.S. DEGRASSIE, C.M. GREENFIELD, C.C. PETTY, P. GOHIL, GA — Density fluctuation measurements over a broad wavenumber range (1-35 cm^{-1}) have been performed on DIII-D which provide a new, more complete picture of tokamak turbulence behavior. This range corresponds to $k_\perp \rho_s \approx 0.2 \rightarrow 10$ and is relevant to ITG, TEM and ETG type instabilities. GKS linear stability calculations indicate the plasma unstable to ITG, TEM, and ETG consistent with the observed turbulent activity. Plasma perturbations utilizing neutral beams and electron cyclotron heating were used to modify the temperature, density, and density fluctuation behavior. The measured and calculated responses varied with wavenumber, supporting the need for broad wavenumber measurements. Additionally, the measurement and simulation show both similarities and differences. These differences could be due to complex interactions not contained in the linear code and are under investigation.

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