

Abstract Submitted for the Forty-Seventh Annual
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Category Number and Subject: 5.6.2 DIII-D tokamak

Theory Experiment

Spatially Localized mm-Wave Backscattering Measurements of High-k Turbulence in the DIII-D Tokamak,* M.A. VanZeeland, *ORISE*, T.L. Rhodes, W.A. Peebles, X. Nguyen, *UCLA*, J.C. DeBoo, R. Prater, *GA*, M.A. Gilmore, *U. New Mexico*, W.M. Solomon, *PPPL* – A collective Thomson backscattering system has been installed on the DIII-D tokamak with the goal of measuring high-k turbulence such as expected from ETG modes. The diagnostic is based on microwave backscattering in X-mode polarization at 96 GHz to probe wavenumbers in the range of $\sim 30\text{-}40\text{ cm}^{-1}$. This system utilizes a DIII-D steerable ECH antenna for launching and complements a similar system located at the tokamak midplane as well as an array of other turbulence diagnostics. Fluctuation localization, beyond that typically achievable through collective scattering, is accomplished by taking advantage of wavenumber matching criteria. The radial distribution of $\sim 35\text{ cm}^{-1}$ turbulence in an Ohmic L-mode plasma is obtained and preliminary results presented. Application of a genetic algorithm to de-convolve the spatial distribution of fluctuations from scattered power measurements will also be discussed.

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