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Reflectometry and Backscattering for Broad-k_r Microturbulence Measurements in NSTX[1] S. KUBOTA, W.A. PEEBLES, UCLA, S.J. ZWEBEN, T.S. HAHM, PPPL — On NSTX, the unique combination of reflectometry hardware (FM-CW, fixed-frequency, and correlation reflectometers) is well-suited to turbulence measurements. Recently, the FM-CW reflectometers have been used as radial backscattering diagnostics for probing microturbulence over a broad range of radial wavenumbers (k_r∼0−20 cm^{-1}). This new method utilizes the reflection from the cutoff layer to determine a detailed reconstruction of the density profile. Time-of-flight information is then used to map the backscattered signal to radial locations away from the cutoff layer, allowing visualization of the turbulence intensity in k_r vs R (major radius) space with excellent space and time resolution. Further details of the method are demonstrated using modeled turbulence and the GPU-accelerated UCLA 1-D and 2-D FDTD full-wave codes. Initial measurements during the L-H transition show a steep drop in the turbulence intensity over a broad range of k_r and localized to a narrow spatial region around the edge transport barrier location.

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