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Millimeter-Wave Reflectometry on NSTX¹

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UCLA operates a suite of millimeter-wave/microwave reflectometers on NSTX for routine measurements of electron density profiles and fluctuations. The systems consist of an FMCW reflectometer (12—50 GHz, O-mode cutoff range of 1.2×10^{12} to $3.0 \times 10^{13} \text{ cm}^{-3}$), fixed- and variable-frequency quadrature reflectometers (12—18, 28 and 50 GHz), and a radial correlation reflectometer (20—30 GHz). The capabilities of the current system include measurements of the density profile evolution, fluctuation levels, turbulence radial correlation lengths, and the magnetic field strength. The reflectometers have documented fast changes in the profile and turbulence characteristics during L- to H-mode transitions. Fluctuations associated with CAEs during NBI are routinely observed. In a recent experiment, correlation length scaling in L-mode were investigated in connection with impurity transport dependence on rho-star and toroidal rotation. A brief summary of recent results will be presented. Ongoing and proposed upgrades will be discussed.

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