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Progress towards measurement of ETG turbulence on NSTX D.R.
SMITH, R.E. FEDER, E. MAZZUCATO, H.K. PARK, Princeton Plasma Physics Laboratory, L. LIN, C.W. DOMIER, M. JOHNSON, N.C. LUHMANN, JR., Department of Applied Science, University of California at Davis — Installation of the high- k scattering system on NSTX is nearly complete. The system will measure density fluctuations on scales relevant to electron temperature gradient (ETG) turbulence. System components include a backward wave oscillator source providing ~ 150 mW at 280 GHz and a superheterodyne receiver with five simultaneous detection channels and noise temperatures of ~ 5000 K. The system is configured for tangential scattering with the probe beam and five scattered beams lying nearly on the toroidal midplane. The scattered beams will sample radial density fluctuations with wavenumbers $k_r \leq 20$ cm $^{-1}$. The 6 cm diameter probe beam provides good k -space resolution at $\Delta k_r \leq 0.7$ cm $^{-1}$. Excellent spatial localization can be achieved at small scattering angles due to the large toroidal curvature of the spherical torus geometry. Steerable launch and detection optics can position the scattering volume either near the magnetic axis at $\rho \approx 0.1$ or near the edge at $\rho \approx 0.8$. The system will measure fluctuations with $k_r \rho_e \leq 0.6$ and $\tilde{n}/n \geq 10^{-4}$ to investigate the existence of ETG turbulence. The connection between ETG turbulence and electron thermal transport remains a controversial issue. *This work was supported by the U.S. Department of Energy under contract numbers DE-AC02-76CH03073 and DE-FG02-99ER54518.

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