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Experimental investigation of turbulent fluctuations with the scale of collisionless skin depth in NSTX plasmas[1] E. MAZZUCATO, R.E. BELL, J.C. HOSEA, B.P. LEBLANC, H.K. PARK, D.R. SMITH, J.R. WILSON, Princeton Plasma Physics Laboratory, C.W. DOMIER, N.C. LUHMANN, JR., U.C. Davis, W. LEE, Pohang University — Various numerical simulations support the conjecture that the ubiquitous problem of anomalous electron transport in tokamaks may arise from a turbulence driven by the electron temperature gradient, with large radial structures on the scale of the collisionless skin depth (δ_s). In this paper, we present results from measurements of turbulent fluctuations in the National Spherical Torus Experiment (NSTX), where the low level of ion transport anomaly makes plasma conditions uniquely suitable for the study of electron transport. Plasma density fluctuations are measured with coherent scattering of electromagnetic waves using a novel scattering geometry where the probing beam propagates obliquely to the magnetic field and the radial resolution of measured signals is greatly improved by the toroidal curvature of magnetic field lines. The onset of a broadband turbulence with a radial scale of $\sim \delta_s$ is observed during electron heating with high harmonic fast waves (HHFW). Numerical calculations are underway to identify the nature of observed fluctuations.

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