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Measurement of high-frequency, small scale density fluctuations in improved confinement RFP plasmas J.R. DUFF, B.E. CHAPMAN, J.S. SARFF, D. CARMODY, P.W. TERRY, D.J. DEN HARTOG, L.A. MORTON, UW-Madison, L. LIN, W.X. DING, D.L. BROWER, UCLA, MST TEAM — In standard MST RFP plasmas, core transport is governed by magnetic fluctuations associated with global tearing modes. Using pulsed parallel current drive, tearing is significantly reduced and smaller-scale fluctuations are likely important to electron particle and heat transport for these improved confinement plasmas. On MST, an 11-chord FIR laser-based interferometry diagnostic, with ~ 8 cm chord spacing, is used to measure electron density fluctuations with wavenumbers k<1-2 cm^{-1}. An upgrade underway will allow resolution up to k ~ 15 cm^{-1}. A fast magnetic coil array is employed for magnetic fluctuations. High-frequency (>50 kHz) small-scale (n>15) density and magnetic fluctuations have been observed in the edge plasma, where density and temperature gradients are largest. These fluctuations are distinct from tearing and have amplitudes that correlate with the density gradient and electron beta. The MST is well suited to explore beta scaling given the large dynamic range (9-26%) found in the device. Correlation of the measured density fluctuations with plasma parameters in high beta plasmas will serve to identify the drive and contribute to validation of gyrokinetic codes. Work supported by DOE and NSF.

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