Abstract Submitted
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Measurement of high-frequency density fluctuations in improved confinement RFP plasmas[1] J.R. DUFF, B.E. CHAPMAN, J.K. ANDERSON, J.S. SARFF, University of Wisconsin - Madison, L. LIN, W.X. DING, D.L. BROWER, University of California at Los Angeles — In standard RFP plasmas, transport is dominated by global magnetic tearing modes. For improved-confinement plasmas using inductive current profile control (PPCD), smaller-scale fluctuations at higher frequencies (>50 kHz) may become more important as the global tearing modes are significantly reduced. In particular, drift-wave-like instabilities are theoretically unstable to the higher temperature and density gradients achieved during PPCD discharges. On the MST, an eleven chord Far-Infrared (FIR) laser-based diagnostic system with ~ 8 cm spacing is used to measure electron density fluctuations by interferometry and far-forward collective scattering. The existing diagnostic measures line-integrated density fluctuations within the divergence of the probe beam covering a wavenumber range $k_- < 1.3$ cm^{-1}, corresponding to $k_- \rho_s < 1.3$ (ρ_s is the ion-sound Larmor radius). Experimentally, in PPCD plasmas, global tearing modes are reduced while high frequency coherent modes ($50 < f < 140$ kHz) emerge among broadband fluctuations. Correlations of these modes with sources of free energy, such as temperature and density gradients, will be investigated. Additionally, effects of increased plasma flow from a 1MW tangential NBI on high frequency density fluctuations will also be explored.

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