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Internal Measurements of Density and Magnetic Fluctuations in MST-RFP[1] L. LIN, W.X. DING, D.L. BROWER, UCLA, A.F. ALMAGRI, J.K. ANDERSON, B.E. CHAPMAN, J.J. KOLINER, D. LIU, M.D. NORNBERG, J.S. SARFF, J. WAKSMAN, UW-Madison — Internal density and magnetic fluctuations in two types of MST plasmas are measured with a high-speed laser-based interferometry and polarimetry diagnostic. First, we present the first-ever measurement of internal density and magnetic fluctuations associated with fast particle instabilities in a reversed field pinch. The measurements are performed in plasmas with a 1 MW tangential neutral beam, where a fast-particle-induced mode is observed. Profiles of the mode amplitude and phase are resolved by correlating internal measurements with edge magnetic fluctuations. The radial profile of density fluctuation peaks near the core, where fast ions reside. This structure is different from the global tearing mode, which peaks near the edge where the density gradient is large. Second, core density and magnetic fluctuations in high-performance plasmas assisted with pulsed poloidal current drive (PPCD) are measured. It is found that magnetic-fluctuation-induced transport has been significantly reduced, consistent with the improved confinement.

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