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Measurements of drift-wave-induced density and velocity fluctuations using high-speed passive impurity spectroscopy TAKASHI NISHIZAWA, UW Madison, D. CRAIG, Wheaton College, D.J. DEN HARTOG, M.D. NORNBERG, UW Madison — Passive impurity spectroscopy is used to study high frequency (˜100 kHz) electron density and ion velocity fluctuations in the edge of MST reversed field pinch plasmas. When tearing modes are suppressed, stochastic transport is greatly reduced and microturbulence is anticipated to become important. Gyrokinetic simulations predict unstable trapped electron modes (TEM) in the edge region of these improved-confinement MST plasmas. Interferometry measurements reveal electron density fluctuations with wavenumbers, propagation direction, and a density-gradient threshold in good agreement with predictions for TEMs. These density fluctuations are also observed as emission fluctuations using a recently upgraded Ion Dynamics Spectrometer (IDS II) through edge passive C+2 measurements. The particle transport associated with TEMs will be evaluated directly by correlating the IDS-measured ion velocity and density fluctuations. The measurement is localized to the C+2 emission shell in the edge of the plasma, which is determined by a coronal charge-state balance model using ADAS. We used a large-throughput spectrometer originally developed for fast CHERS measurements and PMTs for light detection to achieve high time resolution. This work is supported by the US DOE.

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