Abstract Submitted
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Investigating fluctuations that influence transport with heavy ion beam probe measurements in the MST RFP[1] P.J. FIMOGNARI, D.R. DEMERS, Xantho Technologies, LLC, Madison, WI — Drift-wave-like modes are an important instability impacting transport in confined toroidal plasmas. They are the major driver in the tokamak and also likely govern it in optimized stellarators and select RFP regimes. The HIBP can characterize this turbulence and related phenomena by measuring fluctuations of density and potential in the plasma interior. It helps quantify amplitudes, wavelengths, cross phases, and other characteristics necessary for validation of gyrokinetic codes. The unique ability of the HIBP to acquire these quantities from the plasma core, in multiple magnetic configurations, will advance understanding of transport. Properties of low and high confinement regimes in many magnetic configurations, including the RFP, differ. Transport in standard confinement RFP plasmas is governed by magnetic fluctuations arising from tearing instabilities; these fluctuations are reduced with current profile control and the residual transport is likely electrostatic. An HIBP on MST is measuring radial profiles of fluctuations (up to 500 kHz) in the plasma interior. Temperature and density gradients in these plasmas are strongest in the region r/a $\sim$ 0.5-0.8, accessible to the HIBP. These measurements, made with the first and only HIBP operating on an RFP, will shed light on dynamics influencing transport.

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