Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Characterization of density and potential fluctuations with a Heavy Ion Beam Probe in MST improved confinement RFP plasmas[1]
X. CHEN, P.M. SCHOCH, D.R. DEMERS, Rensselaer Polytechnic Institute, P.J. FIMOGNARI, B.E. CHAPMAN, University of Wisconsin-Madison — In improved confinement (pulsed poloidal current driven) plasmas in MST, magnetic fluctuations are suppressed, and electrostatic fluctuations may be the dominant transport mechanism. We have acquired measurements in these plasmas of the fluctuating electron density ($\tilde{n}_e/n_e$) and potential ($\tilde{\phi}$) at multiple locations in the plasma interior with a heavy ion beam probe (HIBP). This allows us to evaluate the frequency spectra of the fluctuations up to 500kHz, assess wavenumbers, and estimate the electrostatic-fluctuation induced particle flux. Our analysis shows that the spectra of both $\tilde{n}_e/n_e$ and $\tilde{\phi}$ are broadband, and decrease with frequency, with most power below 100kHz. The features of the computed coherence and phase of $\tilde{n}_e/n_e$ at two spatial points are different than that of simultaneously acquired $\tilde{\phi}$. Fluctuation data acquired during improved confinement discharges, results of this analysis, and the role played by electrostatic fluctuations will be presented.

[1]Work supported by US-DOE.

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Date submitted: 17 Jul 2009 Electronic form version 1.4