Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Tearing Mode Flow Measurements in MST D. A. ENNIS, S. GANGADHARA, D.J. DEN HARTOG, G. FIKSEL, F. EBRAHIMI, V.V. MIRNOV, S.C. PRAGER, University of Wisconsin-Madison and the Center for Magnetic Self-Organization in Laboratory and Astrophysical Plasmas, D. CRAIG, Wheaton College — Fluctuating flows driven by resistive tearing modes are observed in a number of laboratory and astrophysical plasmas, including the MST reversed field pinch. Carbon emission from neutral beam-induced charge exchange recombination is collected by a custom-built, high throughput spectrometer yielding measurements of carbon impurity ion velocity localized to +/- 1 cm with high bandwidth (100 kHz). We have measured the correlation between poloidal velocity fluctuations and magnetic fluctuations associated with tearing modes resonant across the plasma radius providing correlated flow fluctuations resolved to better than 500 m/s. Strong correlations are observed for a range of $m = 1$ magnetic modes, and the measurements are consistent with tearing mode flows parallel to the mean magnetic field. Correlations are largest near the tearing mode resonant surfaces, and are narrow in space, in contrast to the broad structure of magnetic fluctuations. However, flow fluctuations associated with the dominant mode broaden during quasi-single-helicity plasmas. Theoretical calculations and computational modeling of linear and nonlinear tearing mode flows have been performed, and comparisons with the experimental results will be presented. Work supported by USDoE and NSF.

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Date submitted: 20 Jul 2007 Electronic form version 1.4