Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

**Measurements of Flow Fluctuations and the MHD Dynamo in MST** D.A. ENNIS, J.K. ANDERSON, D. CRAIG, D.J. DEN HARTOG, G. FIKSEL, S. GANGADHARA, J. REUSCH, S.C. PRAGER, University of Wisconsin-Madison and the Center for Magnetic Self-Organization in Laboratory and Astrophysical Plasmas — In many astrophysical and laboratory plasmas the magnitude and spatial distribution of the magnetic field is affected by fluctuations. In the Madison Symmetric Torus we investigate the redistribution of magnetic field by coupled velocity and magnetic field fluctuations (the MHD dynamo, $<v \times b>$). 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 of poloidal velocity fluctuations with magnetic fluctuations associated with tearing modes resonant across the plasma radius. Strong correlations are observed for a range of m=1 magnetic modes, and the relative phase implies a contribution to the MHD dynamo away from the magnetic axis. The correlations are narrow in space and greatest near the tearing mode resonant surfaces. The total measured MHD dynamo on axis is zero to within error bars. Initial Ohm's law modeling including all available measurements implies a need for a dynamo significantly larger than the measured upper bound on the MHD dynamo. Work supported by U.S.D.O.E. and N.S.F.

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Date submitted: 25 Jul 2006 Electronic form version 1.4