

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Edge Measurements of Plasma Momentum Dynamics in MST¹

M.C. MILLER, A.F. ALMAGRI, D. CRAIG, D.A. ENNIS, G. FIKSEL, S. GAN-GADHARA, A. KURITSYN, S.C. PRAGER, T.D. THARP, University of Wisconsin - Madison and the CMSO — In the MST reversed field pinch, the dynamics of plasma momentum during reconnection are governed by two fluctuation induced nonlinear terms: the Reynolds stress, $\rho(\tilde{\mathbf{v}} \cdot \nabla)\tilde{\mathbf{v}}$, and the Maxwell stress, $\tilde{\mathbf{j}} \times \tilde{\mathbf{B}}$. Previous measurements in both the edge and core plasma show the Maxwell stress to be about 10 times larger than either the inertial or the viscous term in the momentum balance equation. Recently, measurements of the Reynolds stress have been performed in the edge plasma of MST using probes. A spectroscopic probe looking at He II line emission is used to measure radial velocity fluctuations, and a Mach probe is used to measure the toroidal and poloidal velocities. The Reynolds stress, as reconstructed from these measurements, is shown to balance the Maxwell stress in the edge and both are an order of magnitude larger than the inertia, thus indicating that these two stresses dominate edge plasma dynamics during reconnection.

¹This work is supported by the NSF and the US DOE

Matthew Miller
University of Wisconsin - Madison and the CMSO

Date submitted: 18 Jul 2007

Electronic form version 1.4