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Flow Dynamics and Transport in the Edge of MST M.C. MILLER, A.F. ALMAGRI, J.K. ANDERSON, G. FIKSEL, A. KURITSYN, V.V. MIRNOV, J.A. REUSCH, J.S. SARFF, D.R. STONE, T.D. THARP, University of WI-Madison
— Insertable probes are used to investigate plasma flows and transport associated with tearing mode structures that occur in MST during quasi-periodic bursts of tearing mode instabilities (sawteeth). Novel ensemble techniques are used to reconstruct a signal's spatial variation in the rotating reference frame of the plasma from single point probe measurements. This allows for a detailed examination of the flow dynamics and spatial structure during a sawtooth crash. A Mach probe, a spectroscopic probe, and a triple tip Langmuir probe are used to measure components of the plasma flow as well as plasma density and electron and ion temperature. Edge resonant tearing modes phase lock together during a crash and form a complex island structure. Flows associated with this structure are measured and compared to predictions from a nonlinear cylindrical DEBS code and a toroidal NIMROD calculation. Fluctuation-induced particle transport, measured as $\langle \tilde{n}_{\mathrm{e}} \tilde{v}_{\mathrm{r}} \rangle$, increases dramatically during a crash. The flux is found to be non-axisymmetric and correlated with the tearing modes. The implications these measurements have on our understanding of reconnection, momentum transport, particle transport, and ion heating will be presented. Work is supported by the US DOE and the NSF.

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