

Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Study of Current Profile Dynamics in MST with Fast Three-Wave Polarimetry-Interferometry¹ B.H. DENG, D.L. BROWER, W.X. DING, UCLA, J.K. ANDERSON, B.E. CHAPMAN, K.J. MCCOLLAM, D. CRAIG, S.C. PRAGER, J.S. SARFF, M.D. WYMAN, UW-Madison, MST TEAM — A recently developed three-wave FIR laser interferometer- polarimeter system for MST is now routinely operational. The fast time response (0.004 ms) for simultaneous density and current profile measurements allows one to follow profile evolution through (1) pellet injection, (2) oscillating field current drive, (3) the sawtooth cycle, and (4) enhanced confinement operation on MST. During pellet injection, the central current density first increases when the pellet ablates at the plasma edge and then collapses when the central electron density increases. When the pellet is fully ablated, sawtooth activity is suppressed. During oscillating field current drive, the driven edge poloidal magnetic field perturbation propagates to the plasma core on a characteristic reconnection time of about 0.2 ms. A functional fitting method has been developed to determine the toroidal magnetic field profile using the polarimetry measurements along with average and edge toroidal field measurements. The derived on-axis toroidal magnetic field agrees quantitatively with MSE measurements.

¹Work supported by US DoE.

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Date submitted: 21 Jul 2005

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