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Intrinsic Flow and Momentum Transport during Improved Confinement in MST D. CRAIG, E. TAN, B. SCHOTT, Wheaton College, Wheaton IL USA, J.K. ANDERSON, J. BOGUSKI, M.D. NORNBERG, Z.A. XING, University of Wisconsin - Madison, WI USA — Progress in absolute wavelength calibration of the Charge Exchange Recombination Spectroscopy (CHERS) system on MST has enabled new observations and analysis of intrinsic flow and momentum transport. Localized toroidal and poloidal flow measurements with systematic accuracy of +/- 3 km/s have been obtained during improved confinement Pulsed Parallel Current Drive (PPCD) plasmas at high plasma current (400-500 kA). The magnetic activity prior to and during the transition to improved confinement tends to increase the flow and sets the initial condition for the momentum profile evolution during improved confinement where intrinsic flow drive appears to weaken. Inboard flows change in time during PPCD, consistent with changes in the core-resonant m=1, n=6 tearing mode phase velocity. Outboard flows near the magnetic axis are time-independent, resulting in the development of a strongly sheared toroidal flow in the core and asymmetry in the poloidal flow profile. The deceleration of the n=6 mode during the period of improved confinement correlates well with the n=6 mode amplitude and is roughly consistent with the expected torque from eddy currents in the conducting shell. The level of D_α emission and secondary mode amplitudes (n=7-10) do not correlate with the mode deceleration suggesting that the momentum loss from charge exchange with neutrals and diffusion due to residual magnetic stochasticity are not significant in PPCD. This work has been supported by the U.S.D.O.E.

Darren Craig
Wheaton College

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