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Momentum transport experiments using NBI in an RFP[1] M.D. NORNBERG, UW-Madison, J.S. SARFF, D.J. DEN HARTOG, S. KUMAR, J.K. ANDERSON, J. WAKSMAN, T. DOBBINS, UW-Madison and CMSO, D. CRAIG, Wheaton College, W.X. DING, L. LIN, D.L. BROWER, UCLA and CMSO —
The self-organization process that shapes the current density profile in an RFP discharge gives rise to large turbulent stresses that also shape the parallel flow profile. These stresses drive rapid transport during relaxation events flattening both the plasma current and parallel flow profiles. Experiments using tangential neutral beam injection to create a core-localized torque are presented for a range of equilibrium conditions in MST plasmas: from standard RFP discharges where tearing modes give rise to stochastic transport to discharges with inductive profile control (PPCD) which greatly suppress the tearing modes. Measurements of plasma spin-down after NBI turn-off are used to gauge momentum transport in plasmas with varying levels of tearing mode activity. Plasmas tending toward the quasi-single-helicity state have a dominant core mode that induces a braking torque on the plasma. This core mode is suppressed by NBI thereby reducing the braking torque on the plasma. Variation of the magnetic fluctuation level through inductive profile control shows a reduction in momentum transport consistent with stochastic transport theory.

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