Abstract Submitted
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Measurement of Z_{eff} and Radial Diffusion via X-ray Spectroscopy in MST D.J. CLAYTON, A.F. ALMAGRI, J.K. ANDERSON, D.R. BURKE, B.E. CHAPMAN, R. O'CONNELL, UW-Madison, R.W. HARVEY, CompX — Measured x-ray spectra and Fokker-Planck modeling are used to constrain the effective ionic charge Z_{eff} and the radial particle diffusion coefficient D_r in MST. A new single-photon counting Si detector measures 2-10 keV x rays while a multichord array of CdZnTe detectors measures the 10-150 keV range. Absolute calibration of the measured x-ray flux is required to find Z_{eff} and D_r. The Fokker-Planck code CQL3D models the electron distribution function and predicts the x-ray spectrum resulting from bremsstrahlung. The code is run iteratively to find the Z_{eff} and D_r for which the predicted x-ray flux best matches the measurement. Z_{eff} is then used to calculate quantities such as resistivity, ohmic power, and the energy confinement time. Results from standard RFP plasmas, with D_r dependent on electron velocity, and improved confinement, pulsed parallel current drive plasmas, with D_r independent of velocity, will be presented. Work supported by the USDOE.

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