Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Constraining Z_{eff} and Particle Diffusion using X-ray Spectroscopy on MST[1] J.D. LEE, A.F. ALMAGRI, J.K. ANDERSON, B.E. CHAPMAN, J.S. SARFF, University of Wisconsin-Madison, R.W. HARVEY, CompX — The X-ray spectroscopy diagnostic on MST consists of six SXR detectors and six HXR detectors capable of measuring photons in the energy range $3-25$ keV and $10-60$ keV, respectively. The detectors can be installed on any of 17 ports viewing a poloidal cross-section, with tangency radii from $r/a = 0.87$ inboard to $r/a = 0.84$ outboard. Measurements have been made in enhanced confinement plasmas with plasma current of ~ 400 kA, electron density of $\sim 0.6 \times 10^{19}$ m^{-3}, and electron temperature of ~ 1200 eV . Measured spectra are used to constrain radial profiles of Z_{eff} and D_{r} by comparison with spectra calculated from CQL3D, a Fokker-Planck solver [R.W. Harvey and M.G. McCoy, "The CQL3D Fokker-Planck Code," General Atomics (2011)]. The plasma equilibria required for CQL3D are produced by the reconstruction code MSTfit. Minimization is performed using a custom parallel simplex algorithm on a 248 core cluster.

[1]Work supported by US DoE.

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Date submitted: 12 Jul 2013 Electronic form version 1.4