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Studies of X-ray Spectroscopy in Improved Confinement Plasmas on MST[1] J.D. LEE, A.F. ALMAGRI, J.K. ANDERSON, B.E. CHAPMAN, J.S. SARFF, Physics Department, University of Wisconsin-Madison, R.W. HARVEY, CompX, COMPX COLLABORATION — 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 are installed on chords ranging from r/a = 0.87 inboard to r/a = 0.84 outboard. X-ray measurements have been made in MST improved confinement plasmas, PPCD, with plasma current of 400 kA, electron density of 0.6x10^{19} m^{-3}, and electron temperature of 1200 eV. A simple model for Zeff yields a central value around 4 for these plasma conditions. The measured X-ray spectra are also consistent with the temperature measured by Thomson Scattering. At the end of the improved confinement period we observe the X-ray emission at energy above 6 keV to decay faster than at the lower energies, suggestive of reemerging stochastic transport. A large reconnection event usually terminates PPCD. At this event, the x-ray flux increases at all energies for a few microseconds followed by a rapid decrease. Measured spectra will be used to constrain radial profiles for Zeff and radial diffusion, D_r, by comparison with the Bremsstrahlung spectra calculated from CQL3D, a Fokker-Planck solver.[1] Presently CQL3D cannot account for the recombination spectra, which are present in the measured x-ray emission.

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