Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Improvements in SXR and Te Measurements on MST[1] J.A. GOETZ, M.B. MCGARRY, University of Wisconsin - Madison, P. FRANZ, Consorzio RFX - Padova, D.J. DEN HARTOG, J. JOHNSON, University of Wisconsin - Madison — A diagnostic that uses soft-x-ray (SXR) emission to provide both tomographically reconstructed x-ray emissivity and double-foil electron temperature from either brightness or emissivity has been in use on MST. Analysis of the data from this system has revealed several effects that were not accounted for in past diagnostics. For example, the purity (>99.8%) of the beryllium foils used to block visible light and to select the SXR energy range can produce significant changes in the data by altering the transmission function. In addition, the detailed geometry of the SXR detectors (silicon photodiodes) must be taken into account, including any difference in material composition such as the presence of oxides, front windows and frames, etc., to avoid misinterpretation of the data. All of these effects have been studied and will be presented in this work. Modifications of the diagnostic have been implemented in order to decrease the impact of these features on the measurements and have thus led to improved measurements and a validation of the results from the diagnostic. Time-resolved SXR emissivity and full radial profiles of electron temperature have been analyzed. In particular, high current improved confinement discharges often exhibit enhanced emission from island structures, both rotating and locked. Analysis has been concentrated on the correlation of SXR structures with temperature profiles in locked plasmas.

[1]Work supported by USDoE

John Goetz
University of Wisconsin - Madison

Date submitted: 10 Jul 2014 Electronic form version 1.4