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Improvements to the Interpretation and Understanding of SXR Tomography Measurements on MST PATRICK VANMETER, University of Wisconsin-Madison, Madison, WI, USA, PAOLO FRANZ, Consorzio RFX, Padova, Italy, LISA REUSCH, JOHN GOETZ, DANIEL DEN HARTOG, University of Wisconsin-Madison, Madison, WI, USA — The soft x-ray (SXR) tomography system on MST uses four cameras in a double foil configuration to determine the emissivity and temperature structures of the plasma. The emissivity is due to a combination of bremsstrahlung, recombination, and line radiation due to impurities in the plasma. At higher energies recombination steps and line radiation are no longer present and can therefore be removed using thick filters. However, this limits the range of measurements to high temperature, high performance plasmas. Recent analysis focuses on including these additional sources of radiation in order to extend the effective range of SXR measurements and to explore the agreement of SXR measurements with other diagnostics like the external magnetic sensing coils. The SXR emissivity structure should directly correspond to the structure of the magnetic field; however, there is a discrepancy between the phase of the emissivity reconstructions and magnetic field reconstructions when using a cylindrical approximation to interpret the magnetic signals. This discrepancy was measured for each SXR camera viewing angle and for two distinct plasma conditions, with results supporting the interpretation that it emerges from physical effects of the toroidal geometry. Improving the understanding of these toroidal effects and the effects of radiation from impurity ions will aid in the interpretation of all SXR measurements. Supported by the US DOE.

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