Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Ross filter development for absolute measurement of Al line radiation on MST[1] N. LAUERSDORF, L. M. REUSCH, D. J. DEN HARTOG, J. A. GOETZ, University of Wisconsin-Madison, P. FRANZ, Consorzio RFX, P. VANMETER, University of Wisconsin-Madison — The MST has a two-color soft x-ray tomography (SXT) diagnostic that, using the double-filter technique, measures electron temperature (Te) from the slope of the soft x-ray (SXR) continuum. Because MST has an aluminum plasma-facing surface, bright Al line radiation occurs in the SXR spectrum. In past application of the double-filter technique, these lines have been filtered out using thick Be filters ($\sim$400μm and $\sim$800μm), restricting the measurement temperature range to $\geq$1 keV due to the signal strength having a positive correlation with Te. Another way to deal with the line radiation is to explicitly include it into the SXR spectrum analysis from which Te is derived. A Ross filter set has been designed to measure this line radiation, and will enable the absolute intensities of the aluminum lines to be quantified and incorporated into the analysis. The Ross filter will be used to measure Al+11 and Al+12 lines, occurring between 1.59 and 2.04 keV. By using multiple detectors with filters made of varying element concentrations, we create spectral bins in which the dominant transmission is the line radiation. Absolute measurement of Al line intensities will enable use of thinner filters in the SXT diagnostic and accurate measurement of Te $<$ 1 keV.

[1]This material is based upon work supported by the U.S. Department of Energy Office of Science, Office of Fusion Energy Sciences program under Award Numbers DE-FC02-05ER54814 and DE-SC0015474.

Lisa Reusch
University of Wisconsin-Madison

Date submitted: 14 Jul 2017 Electronic form version 1.4