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Determination of Z_{eff} in MST Plasmas through Integrated Data Analysis MATTHEW GALANTE, LISA REUSCH, DANIEL DEN HARTOG, University of Wisconsin-Madison, PAOLO FRANZ, Consorzio-RFX, JAY JOHNSON, MEGHAN MCGARRY, University of Wisconsin-Madison, HILLARY STEPHENS, Pierce College Fort Steilacoom — On most plasma science experiments, a maximum of knowledge must be gleaned from limited data. Integrated data analysis (IDA) enables combinations of measurements and uncertainties from multiple, distinct diagnostics in a statistical framework to determine the single most probable result for a physical parameter of interest. The method is highly modular, allowing for easy inclusion of many independent diagnostics. Using data from several diagnostics on the MST, a framework is being developed to determine the effective ionic charge (Z_{eff}). This parameter cannot be accurately determined by any single diagnostic on MST, but is of key importance to the growing MHD validation effort at MST. Initial results from MST indicate that Z_{eff}, as determined from soft x-ray tomography coupled with charge exchange recombination spectroscopy (CHERS) measurements for carbon and aluminum, is approximately 2 in the core of high current, high temperature, improved confinement discharges and has a hollow profile, peaking near mid-radius. The method for determination of Z_{eff} is also being applied to data from RFX-Mod. Work supported by U.S. Dept. of Energy and NSF.

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