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Improving electron temperature measurement on the MST RFP using integrated data analysis[1] D.J. DEN HARTOG, J.R. JOHNSON, K.J. MCCOLLAM, M.B. MCGARRY, L.M. REUSCH, H.D. STEPHENS[2], Dept of Physics, Univ of Wisconsin-Madison — Two completely independent electron temperature (T_e) diagnostics are in use on the MST RFP: Thomson scattering and double-filter soft x-ray (SXR). Both diagnostics are able to measure T_e at a rate up to 25 kHz and are in good qualitative agreement in the hot plasma core, where $T_e > 1$ keV. Thomson scattering measures a radial profile of T_e, whereas SXR measurements can be either 1D or 2D. 3D information can be extracted from both diagnostics by exploiting the rotation of helical plasma structures past the measurement points. We are beginning an effort to improve the scope, accuracy, and utility of T_e measurement on MST by combining information from both diagnostics and prior physics knowledge using the techniques of integrated data analysis (IDA) [R. Fischer and A. Dinklage, *Rev. Sci. Instrum.* **75**, 4237 (2004)]. Bayesian probability theory provides the most natural framework for this type of analysis, and will be the basis of the IDA toolkit to be developed. The overall goal of IDA is to combine data from heterogeneous and complementary diagnostics, considering all dependencies within and between diagnostics, in order to obtain the most reliable results in a transparent and standardized way. IDA exploits the redundancy of complementary diagnostics to resolve measurement inconsistencies, and will maximize the value of experimental measurements to the Validation process.

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