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Improved measurement of $\mathbf{T_e}$ and $\mathbf{Z_{eff}}$ on NSTX-U using Integrated Data Analysis L. M. REUSCH, D. J. DEN HARTOG, University of Wisconsin - Madison, A. DIALLO, Princeton Plasma Physics Laboratory — We have begun to develop IDA to improve the precision and temporal resolution of electron temperature (T_e) profiles and increase the reliability of effective ionic charge (Z_{eff}) measurements on NSTX-Upgrade. Experimental measurements of a physical system are always limited in scope, scale, and resolution. In addition, uncertainties are always present, and while statistical uncertainties can often be estimated, systematic uncertainties are usually more difficult to quantify. Integrated Data Analysis (IDA) provides methods to overcome these measurement limitations and maximize the value of experimental measurements. The 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. Bayesian probability theory provides a natural framework for this type of analysis, and will be applied to this project. Initially, work will concentrate on combining data from the multi-energy soft x-ray (ME-SXR) diagnostic with charge exchange recombination spectroscopy measurements to improve Z_{eff}estimation. As appropriate and available, data from other diagnostics will be incorporated. The second goal of this project, to improve T_e measurement, will combine ME-SXR and Thomson scattering data. This work is supported by the U.S. DOE.

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