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Incorporating beam attenuation into an Integrated Data Analysis model to determine Z_{eff} ¹ M.D. NORBERG, L.M. REUSCH, D.J. DEN HARTOG, Univ. of Wisconsin-Madison — Determining the resistive dissipation of current in hot plasmas requires knowledge of the effective ionic charge, Z_{eff} . Typically Z_{eff} is determined from visible bremsstrahlung emission, but in limited plasmas with relatively high edge neutral density, the neutrals contribute as much to the visible spectrum as do the impurities. Using techniques from integrated data analysis (IDA), measurements of soft-x-ray emission from a region of the spectrum dominated by bremsstrahlung and impurity recombination were combined with individual impurity density profile measurements from charge exchange recombination spectroscopy, enabling determination of Z_{eff} in MST. Attenuation of the diagnostic neutral beam used to determine those impurity densities depends on Z_{eff} . In order to further enhance the analysis, measurements of beam attenuation are incorporated into the IDA framework. The cross sections for attenuation are determined using the Atomic Data Analysis and Structure (ADAS) code suite. This measurement takes advantage of recent detailed calibrations performed during refurbishment of our 50 kV diagnostic neutral beam.

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