Abstract Submitted
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Deuterium alpha line measurements and neutral density modeling for the Madison Symmetric Torus[1] S. EILERMAN, J.K. ANDERSON, S. KUMAR, D. LIU, M. NORNBERG, J. WAKSMAN, University of Wisconsin-Madison, G. FIKSEL, University of Rochester — Accurate measurements of deuterium alpha line emissions play an important role in determining many plasma parameters, including neutral particle density, electron source rate, particle confinement time, diffusion rate, and thermal conductivity. Knowledge of the core neutral particle density is required to calculate fast ion confinement time and interpret charge exchange recombination spectroscopy data. In the Madison Symmetric Torus (MST), a filtered photodiode array collects D_α photons along several viewing chords at a fixed toroidal location. A new analysis of this chord-integrated data is being developed using the NENE Monte Carlo particle tracing code to model neutral particle diffusion inside the plasma. This method is compared to previous modeling via Abel inversion with a two-dimensional asymmetric correction. Data resolution and fit quality are also being improved by substantially increasing the number of detector viewing chords. These improvements will allow for more accurate calculation of particle transport quantities in MST.

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