

Abstract Submitted
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Two-Point Computational Modeling Of The National Spherical Torus Experiment Scrape-Off Layer¹ JOSEPH BARTON, North Carolina State University/ SULI/ PPPL, RAJESH MAINGI, Oak Ridge National Laboratory — A scrape-off layer (SOL) model for the National Spherical Torus Experiment (NSTX) is presented based on Stangeby's [1] two-point model and analytical balance equations. We present solutions in the sheath limited and conduction limited (i.e. high recycling) regimes with increasing complexity by eventually showing solutions with volumetric power loss due to Hydrogen and diverter recycling as well as momentum loss due to frictional collisions, viscous forces, and volume recombination. We observe a density limit at the plasma boundary – just outside the last closed flux surface – qualitatively consistent with other reports [2]. We then compare our predictions to heat flux data [3] from the NSTX, with the goal of predicting SOL parameters for future NSTX upgrades and other devices. [1] STANGEBY, P. C. in *The Plasma Boundary Of Magnetic Fusion Devices* (Institute of Physics, London, 2000). [2] BORRASS, K. et al. *Nucl. Fusion* 31 (1991) 1035. [3] MAINGI, R. et al. *J. Nucl. Mater.* 363-365 (2007) 196.

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