Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Validation of deuterium neutral density measurements in NSTX-U using the Monte Carlo neutral transport code DEGAS 2[1] FILIPPO SCOTTI, Lawrence Livermore Natl Lab, D.P. STOTLER, R.E. BELL, M.D. BOYER, B.P. LEBLANC, PPPL, S.A. SABBAGH, Columbia U., V.A. SOUKHANOVSKII, LLNL — In NSTX-U, deuterium neutral density n_D profiles are inferred at the outboard midplane from deuterium Balmer-α (D-α) emission measured with a filtered camera (Edge Neutral Density Diagnostic, ENDD). n_D measurements obtained from D-α emissivity are validated using the Monte Carlo neutral transport code DEGAS 2. Contributions to emissivity due to electron impact excitation and molecular processes are estimated with DEGAS 2 towards assessing the direct use of ENDD for n_D estimates. Experimental measurements and DEGAS 2 simulations were compared over a database of L-mode discharges, showing good agreement in D-α emissivity profiles. D-α emissivity generally peaked at larger radii in simulations, while far-SOL emission was under predicted. A scan in far SOL plasma parameters in DEGAS 2 showed that a small increase in T_e, n_e improved the agreement with experimental profiles, pointing to the possible importance of intermittent transport. One-way coupling of DEGAS 2 with UEDGE fluid simulations is underway to study fueling and neutral penetration in NSTX-U discharges.

[1]Prepared for USDOE SC-FES under Contracts: DE-AC52-07NA27344 (LLNL), DE-AC02-09CH11466 (PPPL), DE-FG02-99ER54524 (Columbia U.).

Filippo Scotti
Lawrence Livermore Natl Lab

Date submitted: 03 Jul 2019 Electronic form version 1.4