Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Two-point modeling of SOL losses of HHFW power in NSTX[1] AYDEN KISH, Auburn Univ., RORY PERKINS, PPPL, JOON-WOOK AHN, ORNL, AHMED DIALLO, PPPL, TRAVIS GRAY, ORNL, JOEL HOSEA, MICHAEL JAWORSKI, GERRIT KRAMER, BENOIT LEBLANC, PPPL, STEVE SABBAGH, Columbia Univ. — High-harmonic fast-wave (HHFW) heating is a heating and current-drive scheme on the National Spherical Torus eXperiment (NSTX) complimentary to neutral beam injection. Previous experiments suggest that a significant fraction, up to 50%, of the HHFW power is promptly lost to the scrape-off layer (SOL). Research indicates that the lost power reaches the divertor via wave propagation and is converted to a heat flux at the divertor through RF rectification rather than heating the SOL plasma at the midplane [1]. This counter-intuitive hypothesis is investigated using a simplified two-point model [2], relating plasma parameters at the divertor to those at the midplane. Taking measurements at the divertor region of NSTX as input, this two-point model is used to predict midplane parameters, using the predicted heat flux as an indicator of power input to the SOL. These predictions are compared to measurements at the midplane to evaluate the extent to which they are consistent with experiment. [1] R. J. Perkins et al., Phys. Plasmas 22 042506 (2015) [2] P. C. Stangeby, The plasma boundary of magnetic fusion devices (Institute of Physics Publishing, Bristol, 2000).

[1]This work was made possible by funding from the Department of Energy for the Summer Undergraduate Laboratory Internship (SULI) program. This work is supported by the US DOE Contract No.DE-AC02-09CH11466.

Ayden Kish
Auburn Univ.

Date submitted: 14 Jul 2017 Electronic form version 1.4