Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Fast-wave propagation in the edge of a cylindrical cold-plasma under NSTX-like conditions R.J. PERKINS, N. BERTELLI, PPPL, D.L. GREEN, ORNL, E.F. JAEGER, XCEL Engineering Inc., J.C. HOSEA, C.K. PHILLIPS, PPPL, P.M. RYAN, ORNL, G. TAYLOR, J.R. WILSON, PPPL, NSTX TEAM — NSTX uses a high-harmonic fast-wave (HHFW) antenna for plasma heating and current drive, but a significant amount of HHFW power can be lost directly to the divertor [1]. This loss has several interesting and unexplained properties: the flow of HHFW power from the antenna to the divertor regions is mostly aligned along the magnetic field and occurs along all field lines between the antenna and the separatrix [2]. The underlying cause is related to fast-wave propagation in the scrape-off layer due to the strong correlation between heating efficiency and the onset density for perpendicular fast-wave propagation. To understand the role of the onset density, a cylindrical cold-plasma model is being developed to determine the amount of wave-propagation in the SOL and how closely aligned the Poynting flux is to the magnetic field. This modeling will assist work with RF codes [3] to include the proper edge damping into such codes so that they can reproduce the losses observed in NSTX and predict their importance for ITER. This work is supported by USDOE Contract No. DE-AC02-09CH11466.

[1] Hosea J.C. et al 2008 Phys. Plasmas 15 056104
[2] Perkins R.J. et al 2012 Phys. Rev. Lett. 109 045001
[3] Green D.L. et al 2011 Phys. Rev. Lett. 107 145001

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Date submitted: 15 Jul 2013 Electronic form version 1.4