

Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

NSTX Reflectometer Measurements of RF Waves in the Scrape-off Layer in Front of the HHFW Antenna Array J.B. WILGEN, G.R. HANSON, P.M. RYAN, D.W. SWAIN, Oak Ridge National Laboratory, S. BERNABEL, N. GREENOUGH, J.C. HOSEA, J.R. WILSON, Princeton Plasma Physics Laboratory — The microwave reflectometer on NSTX, in addition to its primary function of measuring edge-density profiles, has been modified to monitor RF waves in the scrape-off layer in front of the 30 MHz High Harmonic Fast Wave (HHFW) antenna array. Access to the plasma is located on the horizontal midplane, between two current straps of the HHFW array. A broadband reflectometer covers the frequency range of 6-27 GHz, probing the density range from below $1 \times 10^{17} \text{ m}^{-3}$ up to $8 \times 10^{18} \text{ m}^{-3}$. RF wave-related signals are extracted from the reflectometer using a high-pass filter and preamplifier circuit, and then digitized at 100 MHz sampling rate. The reflectometer microwave signal exhibits 30 MHz sidebands, due to the modulation of the cutoff layer by the electrostatic component of the RF waves. In addition, parametric decay waves are detected at frequencies below the heating frequency, near 28 and 26 MHz. Dependence of the RF spectra on the antenna phasing and on the reflection location within the scrape-off layer will be presented and compared with similar spectra obtained from a floating Langmuir probe located in the HHFW antenna. Oak Ridge National Laboratory, managed by UT-Battelle, LLC, for the U.S. Dept. of Energy under contract DE-AC05-00OR22725

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Date submitted: 26 Jul 2005

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