Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Electron Bernstein Wave Coupling and Emission Measurements on NSTX[1] G. TAYLOR, S.J. DIEM, Princeton University, J.B. CAUGHMAN, ORNL, P.C. EFTHIMION, Princeton University, R.W. HARVEY, CompX, B.P. LEBLANC, C.K. PHILLIPS, Princeton University, J. PREINHAELTER, J. URBAN, Czech Inst. of Plasma Phys., J.B. WILGEN, ORNL — Electron Bernstein waves (EBWs) offer the potential for T_e(R,t) measurements and local current drive in overdense NSTX plasmas. However, these applications require resilient and efficient coupling between EBWs and electromagnetic waves outside the plasma. Two new remotely steered, obliquely viewing, quad-ridged horn antennas connected to absolutely calibrated dual-channel radiometers have simultaneously measured 8-18 GHz (fundamental) and 18-40 GHz (second and third harmonic) B-X-O emission. Emission data combined with EBW ray-tracing and Thomson scattering T_e(R,t) data allow the EBW coupling efficiency to be calculated. The EBW coupling efficiency and emission polarization have been mapped as a function of poloidal and toroidal angles for L- and H-mode plasmas and the results are compared to theoretical predictions. Coupling efficiencies of 50-100% have been measured in L-mode discharges while much lower values have been measured in H-mode discharges.

[1]Supported by US DoE contract DE-AC02-76CH03073 and a grant to encourage innovations in fusion diagnostic systems.

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Date submitted: 18 Jul 2006 Electronic form version 1.4