Draft Abstract for 47th Annual Meeting of the APS
Division of Plasma Physics
Denver, Colorado, October 24-28, 2005

Electron Bernstein Wave Physics in NSTX* G. TAYLOR, S. DIEM, P.C. EFTHIMION, R.A. ELLIS, E. FREDD, J. HOSEA, J.R. WILSON, *Princeton U.*, T.S. BIGELOW, M.D. CARTER, J.B. CAUGHMAN, F. JAEGER, D.A. RASMUSSEN, J.B. WILGEN, *ORNL*, R.W. HARVEY, *CompX*, A.P. SMIRNOV, N.M. ERSHOV, *Moscow State U.*, J. URBAN, J. PREINHAELTER, *Czech Inst. of Plasma Physics,* A. BERS, J. DECKER, A.K. RAM, *MIT*. Numerical modeling [1] and emission diagnostics [2] are used to study electron Bernstein wave (EBW) coupling, propagation and damping physics in NSTX. This research supports both the design of a 1 MW, 28 GHz EBW current drive (EBWCD) system and the development of an EBW $T_e(R)$ diagnostic. Off-axis EBWCD may be critical to sustaining solenoid-free high β plasmas in NSTX. Modeling and emission measurements support efficient EBW coupling via obliquely launched O-mode polarized electromagnetic waves. Off-axis 28 GHz EBWCD appears viable on NSTX, however intrinsic Doppler broadening of EBWs in the plasma, combined with significant cyclotron harmonic overlap, may preclude core access for 28 GHz EBWs.

[1] R.W. Harvey and G. Taylor, *Phys. Plasmas* **12**, 051509 (2005)
[2] G. Taylor, *et al.*, *Phys. Plasmas* **12**, 052511 (2005)

*Supported by U.S. DOE Contracts DE-AC02-76CH03073, and DE-FG03-02ER54684