Electron Bernstein Wave Studies in MST*

A. H. Seltzman, [1] J. K. Anderson, [1] C. B. Forest, [1] P. Nonn, [1] J. Kauffold, [1] S. J. Diem[2]
[1]*University of Wisconsin-Madison*
[2]*ORNL*

The overdense plasma in an RFP prevents electromagnetic waves from propagating past the edge, however use of the electron Bernstein wave (EBW) has the potential to heat and drive current in the plasma. MHD simulations have demonstrated that resistive tearing mode stability is very sensitive to gradients in the edge current density profile allowing EBW to potentially be a stabilizing influence. A new MW level experiment is being commissioned on MST to evaluate the potential use of the EBW for current profile control on the RFP. The development of new equipment includes a 5.5GHz klystron driven by a novel switchmode power supply. A quartz half wave resonant window has been constructed and coupling with a cylindrical molybdenum wave guide antenna has been studied. Due to the steep edge density gradient in the RFP, it is possible to efficiently couple to the EBW with O or X mode launch. The EBW is strongly damped at the electron cyclotron resonance where it couples to the electron gyromotion and alters the electron distribution. Either Fisch-Boozer or Ohkawa current drive mechanisms can be activated to drive off axis current in the plasma. Preliminary experiments have been performed to verify high power coupling and understand heating via observed x-ray emission when compared to Fokker-Plank modeling in CQL3D.

*Work supported by USDOE.