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Electron Bernstein Wave Studies in MST ANDREW SELTZMAN, JAY ANDERSON, CARY FOREST, PAUL NONN, MARK THOMAS, ERIC HENDRIES, University of Wisconsin Madison, STEPHANIE DIEM, Oak Ridge National Lab — The overdense condition in an RFP prevents electron cyclotron 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 the gradient in the edge current density profile, allowing EBW current drive to potentially stabilize mode growth. Single fluid MHD simulation at experimental Lundquist numbers predicts the effect of RF current drive on mode activity in the RFP to determine the suitability of EBW heating for sustained current drive and mode stabilization. Preliminary experiments that verify coupling and heating via observed x-ray emission are compared to simulation. Numerical modeling of an RF heating experiment with an experimentally realizable power level of 1MW has been conducted. Genray predictions of RF propagation path and Fokker-Plank modeling in CQL3D has determined optimum coupling, launch and target plasma conditions. Experimental verification of coupling from a cylindrical waveguide has been performed to determine optimal target discharge conditions, antenna position, and end cap geometry. Preliminary testing and simulation indicates that optimal target plasmas are low density (Ne=5E13/cm^3), 300kA discharges with the antenna positioned flush with the RFP edge and shielded with a boron nitride limiter. Work supported by USDOE.

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