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A 28 GHz ECH/EBW System for the Proto-MPEX plasma source[1] TIM BIGELOW, JOHN CAUGHMAN, IAN CAMPBELL, STEPHANIE DIEM, CARL DUKES, RICHARD GOULDING, STEPHEN KILLOUGH, JUERGEN RAPP, Oak Ridge National Laboratory — The Prototype Materials Plasma Exposure Experiment (Proto-MPEX) is a linear high-intensity RF plasma source [1] that requires plasma electron heating in overdense conditions to provide target parameters in the density and temperature range needed for plasma facing material studies. In Proto-MPEX, a dense helicon plasma is produced by 13.56 MHz RF power and is further heated by 28 GHz microwaves via Electron Bernstein Waves (EBW). A 28 GHz 200 kW cw gyrotron system from earlier experiments at ORNL provides the microwave power and has been successful to date at generating >150 kW in short pulses into a dummy load and >100 kW into the plasma via a 88.9 mm corrugated waveguide system and compact launcher near the plasma edge. For successful coupling via EBW into an overdense plasma, the launcher must be optimized and if possible have adjustable launch angle to maximize the efficiency. Modeling of the EBW coupling has been performed using the GENRAY-C code for the expected plasma profile in order to determine the best beam profile and polarization requirements. A compact HE11 mode waveguide launch with adjustable launch angle has been installed that is tightly coupled to the plasma.

[1] J.B.O. Caughman, et al, this conference

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