

Abstract Submitted  
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**ECH/EBW Plasma Coupling and Heating Experiments on the Proto-MPEX<sup>1</sup>** TIM BIGELOW, JOHN CAUGHMAN, JUAN CANESES, STEPHANIE DIEM, RICHARD GOULDING, NISCHAL KAFLE, JUERGEN RAPP, Oak Ridge National Laboratory — ECH and EBW have been under development on the Proto-Material Plasma Exposure eXperiment device (Proto-MPEX) to provide additional plasma electron heating. Proto-MPEX<sup>1</sup> has a linear magnetic field configuration and a helicon plasma source that forms a high-density medium-temperature central core plasma of typically 0.08m diameter<sup>2</sup>. A plasma density of up to  $6 \times 10^{19} \text{ m}^{-3}$  is generated which is  $>6$  times over-dense for 28 GHz microwave power available from the experiment's gyrotron system. Modeling using Genray-C code<sup>3</sup> has indicated that some heating of the plasma core should be possible at this frequency using the optimum O-X-EBW coupling scheme. Several improvements to the waveguide system have been made to increase the reliable operating power level and launch beam quality. To improve the plasma heating efficiency, work is underway to optimize the beam launch by adding a remotely adjustable launch angle, adding a polarization rotating miter bend, moving the launch point closer to the plasma edge and providing some beam focusing. Preliminary heating experiments have indicated some over-dense heating has been achieved. A launch power of  $\sim 75$  kW has been achieved out of a possible 150 kW. [1] Rapp, J [2] Caughman, J.B, [3] Diem, S. (see posters this session)

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