

Abstract Submitted  
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**High power plasma heating experiments on the Proto-MPEX facility**<sup>1</sup> T.S. BIGELOW, C.J. BEERS, T.M. BIEWER, J.F. CANESES, J.B.O. CAUGHMAN, S.J. DIEM, R.H. GOULDING, D.L. GREEN, N. KAFLE, J. RAPP, M.A. SHOWERS, Oak Ridge National Laboratory — Work is underway to maximize the power delivered to the plasma that is available from heating sources installed on the Prototype Materials Plasma Exposure eXperiment (Proto-MPEX) at ORNL. Proto-MPEX is a linear device that has a >100 kW, 13.56 MHz helicon plasma generator available and is intended for material sample exposure to plasmas. Additional plasma heating systems include a 10 kW 18 GHz electron cyclotron heating (ECH) system, a 25 kW ~8 MHz ion cyclotron heating ICH system, and a 200 kW 28 GHz electron Bernstein wave (EBW) and ECH system. Most of the heating systems have relatively good power transmission efficiency, however, the 28 GHz EBW system has a lower efficiency owing to stringent requirements on the microwave launch characteristics for EBW coupling combined with the lower output mode purity of the early-model gyrotron in use and its compact mode converter system. A goal for the Proto-MPEX is to have a combined heating power of 200 kW injected into the plasma. Infrared emission diagnostics of the target plate combined with Thomson Scattering, Langmuir probe, and energy analyzer measurements near the target are utilized to characterize the plasmas and coupling efficiency of the heating systems.

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