Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Ion Cyclotron Heating on Proto-MPEX[1] R. H. GOULDING, J. B. O. CAUGHMAN, J. RAPP, T. M. BIEWER, I. H. CAMPBELL, J. F. CANESES, Oak Ridge National Laboratory, N. KAFLE, H. B. RAY, M. A. SHOWERS, University of Tennessee, P. A. PIOTROWICZ, University of Illinois — Ion cyclotron heating will be used on Proto-MPEX (Prototype Material Plasma Exposure eXperiment) to increase heat flux to the target, to produce varying ion energies without substrate biasing, and to vary the extent of the magnetic pre-sheath for the case of a tilted target. A 25 cm long, 9 cm diameter dual half-turn helical ion cyclotron antenna has been installed in the device located at the magnetic field maximum. It couples power to ions via single pass damping of the slow wave at the fundamental resonance, and operates with $\omega \sim 0.8\ \omega_{ci}$ at the antenna location. It is designed to operate at power levels up to 30 kW, with a later 200 kW upgrade planned. Near term experiments include measuring RF loading at low power as a function of frequency and antenna gap. The plasma is generated by a helicon plasma source that has achieved $n_e > 5 \times 10^{19} m^{-3}$ operating with deuterium, as measured downstream from the ion cyclotron antenna location. Measurements will be compared with 1-D and 2-D models of RF coupling. The latest results will be presented.

[1]This manuscript has been authored by UT-Battelle, LLC, under Contract No. DE-AC05-00OR22725 with the U.S. Department of Energy.

Richard Goulding
Oak Ridge National Laboratory

Date submitted: 15 Jul 2016 Electronic form version 1.4