

Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Particle and heat flux estimates in Proto-MPEX in Helicon Mode with IR imaging* M.A. SHOWERS, University of Tennessee-Knoxville; Oak Ridge National Laboratory, T.M. BIEWER, J.B.O CAUGHMAN, Oak Ridge National Laboratory, D.C. DONOVAN, University of Tennessee-Knoxville, R.H. GOULDING, J. RAPP, Oak Ridge National Laboratory — The Prototype Material Plasma Exposure eXperiment (Proto-MPEX) at Oak Ridge National Laboratory (ORNL) is a linear plasma device developing the plasma source concept for the Material Plasma Exposure eXperiment (MPEX), which will address plasma material interaction (PMI) science for future fusion reactors. To better understand how and where energy is being lost from the Proto-MPEX plasma during “helicon mode” operations, particle and heat fluxes are quantified at multiple locations along the machine length. Relevant diagnostics include infrared (IR) cameras, four double Langmuir probes (LPs), and in-vessel thermocouples (TCs). The IR cameras provide temperature measurements of Proto-MPEX’s plasma-facing dump and target plates, located on either end of the machine. The change in surface temperature is measured over the duration of the plasma shot to determine the heat flux hitting the plates. The IR cameras additionally provide 2-D thermal load distribution images of these plates, highlighting Proto-MPEX plasma behaviors, such as hot spots. The LPs and TCs provide additional plasma measurements required to determine particle and heat fluxes. Quantifying axial variations in fluxes will help identify machine operating parameters that will improve Proto-MPEX’s performance, increasing its PMI research capabilities. *This work was supported by the U.S. D.O.E. contract DE-AC05-00OR22725.

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Date submitted: 15 Jul 2016

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