Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Estimates of heat flux to material surfaces in Proto-MPEX with IR imaging M. SHOWERS, University of Tennessee - Knoxville, T.M. BIEWER, T.S. BIGELOW, J.B.O. CAUGHMAN, Oak Ridge National Laboratory, D. DONOVAN, University of Tennessee - Knoxville, R.H. GOULDING, T.K. GRAY, J. RAPP, Oak Ridge National Laboratory, D.L. YOUCHISON, R.E. NYGREN, Sandia National Laboratories — The Prototype Material Plasma Exposure eXperiment (Proto-MPEX) at Oak Ridge National Laboratory (ORNL) is a linear plasma device with the primary purpose of developing the plasma source concept for the Material Plasma Exposure eXperiment (MPEX), which will address the plasma material interactions (PMI) science for future fusion reactors. New diagnostics for Proto-MPEX include an infrared (IR) camera, in-vessel thermocouples and ex-vessel fluoroptic probes. The IR camera and other diagnostics provide surface temperature measurements of Proto-MPEX's dump and target plates, located on either end of the machine, which are being exposed to plasma. The change in surface temperature is measured over the duration of the plasma shot to determine the heat flux hitting the plates. The IR camera additionally provides 2-D thermal load distribution images of these plates, highlighting Proto-MPEX plasma behaviors, such as hot spots. The plasma diameter on the dump plate is on the order of 15 cm. The combination of measured heat flux and the thermal load distribution gives information on the efficiency of Proto-MPEX as a plasma generating device. Machine operating parameters that will improve Proto-MPEX's performance may be identified, increasing its PMI research capabilities.

Melissa Showers
University of Tennessee - Knoxville

Date submitted: 24 Jul 2015 Electronic form version 1.4