

Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Utilization of Double Langmuir Probes on Proto-MPEX¹ NISCHAL KAFLE, Univ of Tennessee, Knoxville, JOHN B. CAUGHMAN, JUAN F. M. CANESES, RICHARD H. GOULDING, ELIJAH. H. MARTIN, Oak Ridge National Laboratory, DAVID. C. DONOVAN, Univ of Tennessee, Knoxville — Langmuir probes (LP) are a robust, simply constructed, and inexpensive diagnostic tool. They are routinely used to measure the electron temperature and density in plasmas. However, the uncompensated single-tip LP has demonstrated limitations in time fluctuating plasma potential. The measurement quality can be improved by implementing compensation or by using a double-tipped probe. Double Langmuir probes (DLPs) are referenced against each other instead of the device vessel and therefore are less susceptible to fluctuations in RF plasmas. DLPs are being used to measure plasma parameters at multiple locations in the Proto-MPEX experiment at Oak Ridge National Laboratory. Proto-MPEX is a linear plasma device that combines a helicon plasma source with additional microwave and radio frequency heating to deliver a high plasma heat flux at a target. An electron temperature of 3-6 eV and density of 3×10^{19} - $>5 \times 10^{19}$ m^{-3} has been measured near the target in Proto-MPEX for different magnetic field configurations, with peak magnetic fields >1 T. Plasma density and temperature tend to be higher closer to the plasma source and are strongly dependent on operating pressure. This presentation will give an overview of DLP and will provide results from multiple locations and for different operating conditions.

¹This work was supported by the U.S. D.O.E. contract DE-AC05-00OR22725.

Nischal Kafle
Univ of Tennessee, Knoxville

Date submitted: 15 Jul 2016

Electronic form version 1.4