Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Langmuir Probe Modifications for Use in Pulsed Plasma[1]
ALEX PRESS, KEITH HERNANDEZ, MATTHEW GOECKNER, LAWRENCE OVERZET, The University of Texas at Dallas — The kinetics of the transition periods in pulsed rf discharges is complex. This is in part because large changes in plasma conditions can occur within a few microseconds. Langmuir probes which are able to sample more quickly than this may still be unable to make reliable measurements. Adapting Langmuir Probes for time resolved measurements with time resolution less than 10 rf cycles requires conscious choices in the data collection methods and probe hardware. As the probe current collection time decreases, improving time resolution, the collection period becomes similar to the RF period. Under these conditions, it is important to choose collection periods that are integer multiples of the rf period to reduce error stemming from measuring fractions of rf cycles. During pulse turn-on and turn-off phases, the rf period averaged plasma potential can change by many volts, inducing displacement current in the probe circuitry. To accurately measure the plasma parameters during these phases, this displacement current must be minimized. This is achieved by modifying the Langmuir probe hardware/circuitry. This talk will show how this can be accomplished and some of the limitations to using Langmuir probes to measure plasma parameters during transition phases of pulsed rf discharges.

[1]This work is supported by the National Science Foundation under Grant No. NSF IIP1338917. In addition, support from the industrial partners to the I/UCRC for Laser and Plasma Advanced Manufacturing, specifically Applied Materials and Lam Research.

Alex Press
The University of Texas at Dallas

Date submitted: 08 Jun 2018 Electronic form version 1.4