Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

Change in the Heating Mechanism During the Early Stages of Re-Ignition of Pulsed Capacitively Coupled Ar Plasmas.[1] LAWRENCE OVERZET, KEITH HERNANDEZ, MATTHEW GOECKNER, University of Texas at Dallas, ALEX PRESS, Los Alamos National Laboratories, PLASMA APPLICATIONS LAB TEAM — We have made Phase Resolved Optical Emission Spectroscopy measurements in pulsed Ar plasmas and combined them with measurements of the optical emission intensity (OEI) and electrical characteristics. The OEI exhibits a large overshoot early in the re-ignition at the 100 Hz pulsing rate which is not reflected in any of the electrical characteristics or present at a 10 kHz pulsing rate. This OEI overshoot occurs at a point in time when the RF power, Voltage, DC bias Voltage and electron density are all smaller than they become later in the glow. PROES measurements in combination with time resolved electrical characteristics indicate that the heating mechanism for electrons changes during the overshoot to a combination of stochastic and ohmic heating (from stochastic heating in the steady state). The combination enables a more efficient transfer of the electrical energy to heating electrons.

[1]This material is based upon work 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. The authors would also like to thank Siavash Pourkamali for generously lending the use of his oscilloscope.

Lawrence Overzet
University of Texas at Dallas

Date submitted: 16 Jun 2020 Electronic form version 1.4