Abstract Submitted
for the GEC19 Meeting of
The American Physical Society

Three Dimensional Magnetic and Current Measurements in Pulsed ICP Operation PATRICK PRIBYL, JIA HAN, WALTER GEKELMAN, University of California, Los Angeles — Radio frequency plasma sources are widely used in low temperature industrial processing. Inductively coupled plasma (ICP) is an example, where plasma is generated by a stove-top coil mounted above the machine. Having reached a limit in process improvement available with steady state plasmas, the semiconductor industry has shown great interest in temporally modulated plasma operation. We performed 3D measurements of fundamental plasma parameters in a pulsed Argon plasma in a modified industrial etch tool. The ICP and bias RF can be independently pulsed at arbitrary repetition rates and duty cycles. This work reports magnetic probe measurements (B-dot) and the derived plasma current dynamics for pulsed operations. (A second poster at this meeting discusses Langmuir probe measurements). In general the current is concentrated near the top of the chamber, forming an induced image current from the antenna. As previously reported, the ohmic power is deposited close to the antenna, and not co-located with either the peak current or the density. We also report profile dynamics of pulsed operation at a repetition rate = 1 kHz, where the plasma does not have time to reach its nominal steady state.

Jia Han
University of California, Los Angeles

Date submitted: 04 Jun 2019 Electronic form version 1.4