Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

2D Plasma Current Distribution in an Plasma Etch Tool with Dual-coil ICP Operation[1] PATRICK PRIBYL, WALTER GEKELMAN, JIA HAN, Univ of California - Los Angeles, ALEX PATERSON, Lam Research Corp — An industrial plasma etch tool installed at UCLA has been modified for accessibility and research purposes. Plasma is generated using two co-planar stove-top type coils with different radii, positioned above a top ceramic window. The inner antenna operates at 13 MHz and the outer at 2 MHz. A computerized probe drive enables three dimensional magnetic field measurements over the major portion of the interior volume. Local current density is then computed from $\mu_0 \vec{J} = \nabla \times \vec{B}$. Local power deposition is inferred from $P = \vec{E} \cdot \vec{J}$ with E computed from Faraday's law, or from $P = \eta \vec{J} \cdot \vec{J}$, with η being consistent with the current diffusion time and profile. Similar volumetric Langmuir probe measurements give n_e and T_e. In much of this work profiles are computed from 2D planar measurements assuming azimuthal symmetry, verified against the 3D measurements. Gekelman and Han present extensive results from 2 MHz single-coil operation in adjacent posters at this meeting. This work describes the addition of the second antenna and its resulting modification to the 2 MHz-only profiles. Current distributions from only the 13 MHz, and from combined operation are also presented.

[1]Work supported by NSF under a GOALI award and performed at the Basic Plasma Science Facility at UCLA (funded by NSF and DOE)

Patrick Pribyl
Univ of California - Los Angeles

Date submitted: 10 Jul 2018 Electronic form version 1.4