2D Plasma Current Distribution in an Plasma Etch Tool with Dual-coil ICP Operation\textsuperscript{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 $\mu_0 \mathbf{J} = \nabla \times \mathbf{B}$. Local power deposition is inferred from $P = \mathbf{E} \cdot \mathbf{J}$ with $E$ computed from Faraday’s law, or from $P = \eta \mathbf{J} \cdot \mathbf{J}$, with $\eta$ 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.

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