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**Circuit induced pulsed RF transients: impact on plasma parameters and source design considerations**[1] JOEL BRANDON, KRIS FORD, North Carolina State University, SANG-KI NAM, JANG-GYOO YANG, SANGHEON LEE, Samsung Electronics, STEVE SHANNON, North Carolina State University
— The transient characteristics of pulse-modulated inductively coupled plasmas in argon are experimentally investigated. Time resolved measurements are made by Langmuir probe and microwave hairpin probe for a cylindrical ICP configuration driven at 13.56MHz with nominal peak power densities between 0.01 W/cm$^3$ – 0.1 W/cm$^3$and nominal 1 kHz pulse frequency. Optimized conjugate match tuning to plasma impedance at a defined time after pulse initiation provides control of the initial $n_e$ and $T_e$ transient comparable to generator-driven pulse shaping methods at the expense of non-optimal time averaged reflected power. Source design considerations can also contribute to time dependent control of power delivery, particularly when tuning strategies such as delivered power leveling and agile frequency control are considered. Time resolved measurement of plasma parameters and power dissipation in the system are presented, demonstrating control of $n_e$ and $T_e$ rise times through matching network and source topology design, controlling rise time by as much as a factor of four and enabling within-pulse power delivery control.

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