Abstract Submitted
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Time-resolved measurements of plasma properties in a pulsed argon inductively coupled plasma[1] A.E. WENDT, C.L. CULVER, S. WANG, J.B. BOFFARD, C.C. LIN, University of Wisconsin-Madison — Pulsed plasmas present new degrees of freedom (frequency and duty factor) to tailor plasma properties as compared to continuous plasmas. Using optical emission spectroscopy (OES), we have performed time-resolved measurements of the gas temperature, electron temperature, electron density, and number densities of argon $3p^5 4s$ metastable and resonance level populations [1]. These measurements were made in a 5 mTorr, 500 W average power inductively-coupled argon plasma with a fixed 30% duty factor for modulation periods of 10μs, 100μs, 1ms, and 6ms. Effective temporal resolution of the OES-derived values varied from 0.25μs for the shorter periods to 5μs for the longer periods. Results are compared with global model estimates [2] and time-resolved Langmuir probe measurements. For the shortest (10 μs) pulse period, the electron, metastable and resonance level densities vary little over the pulse period, but the electron temperature varies by a factor of two. The range of variations in all quantities grow with the length of the pulse period. Results obtained from different sets of emissions lines are used to study transient changes in the EEDF at the start of a pulse.

[1] JVSTA **31** (2013) 021303.
[2] Ashida et al. JVSTA **13** (1995) 2498.

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