

Abstract Submitted
for the GEC11 Meeting of
The American Physical Society

Time Resolved Simulation and Measurement of Violet Emission Spectra Early in an Ar Pulsed rf Inductively Coupled Plasma During Metastable Build-Up STEVEN ADAMS, Air Force Research Laboratory, CHARLES DEJOSEPH, JR., VLADIMIR DEMIDOV, UES Inc., JARED MILES, University of Wisconsin Madison, JORDAN SAWYER, University of Tennessee Knoxville — The temporal evolution of metastable Ar within a pulsed rf inductively coupled plasma (ICP) source has been measured by tunable diode laser absorption spectroscopy (TDLAS) and combined with time-resolved Langmuir probe measurements of the EEDF and optical cross sections to simulate the evolution of the violet emission spectrum from a 5 mTorr Ar discharge. Measurements were conducted in a diffuse plasma region, 12 cm away from the rf window. Here the metastable density was found to build relatively slowly, from near zero at the beginning of the rf pulse to a maximum density over several hundred microseconds. Experimental optical emission spectra in the 410-430 nm range were found to be in good agreement with the simulations over all times. Certain emission line ratios with unique dependences on direct and step-wise excitation were shown to be good indicators of the metastable evolution. This work was supported by the Air Force Office of Scientific Research.

Steven Adams
Air Force Research Laboratory

Date submitted: 18 Jul 2011

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