

Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Determination of electron densities by means of laser absorption spectroscopy in ICPs YUSUF CELIK, DIRK LUGGENHOELSCHER, UWE CZARNETZKI, Ruhr-University Bochum, MITSUTOSHI ARAMAKI, Nagoya University — A novel method to determine electron densities in pulsed low pressure ICP discharges via absorption spectroscopy on argon metastables is presented. The laser system used in the experiment is an external cavity diode laser (ECDL) in Littrow configuration tuned at a vacuum wavelength of 696.73 nm. The temporal evolution of the line-integrated absorption from metastable argon atoms in the Ar2s5 state in the afterglow is recorded. An analytical expression for the decay of metastables is presented which allows the determination of electron densities. For the analysis, the spatial density profile inside the chamber and the line-integration of the detected signal is taken into account. The results obtained with this technique are compared to Langmuir probe measurements. Both techniques show good agreement. Furthermore, metastable densities and gas temperatures are determined by scanning the laser wavelength over the Doppler-shaped absorption profile.

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Date submitted: 11 Jun 2010

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