Abstract Submitted
for the GEC07 Meeting of
The American Physical Society

Effect of multiphoton ionization in laser Thomson scattering measurements A. KONO, K. FUKUYAMA, M. ARAMAKI, Nagoya University — In laser Thomson scattering measurements of electron density and temperature, one should be careful about production of electrons in the scattering volume via laser irradiation. It is generally assumed that Ar plasma is free from such laser perturbations. However, in our measurements for inductively coupled Ar plasma using a frequency-doubled YAG laser (532 nm), Thomson scattering spectra obtained from measurements with different laser energy densities at the focal point differ significantly, when the discharge power is low and hence the ratio of the metastable Ar atom density to the electron density is relatively large. This suggests that multiphoton ionization of metastable Ar atoms may affect the measurement significantly. To clarify the phenomenon, an experiment for determining the ionization yield at the laser focal point in the Ar gas containing a known concentration of metastable Ar atoms is being carried out. The laser beam is focused at the center of a small dc-biased parallel-plate probe and the laser-induced probe current is measured. Preliminary measurements indicate successful detection of the current due to multiphoton ionization of metastable Ar atoms, the efficiency of which is to be quantified.
(Work supported by Grant-in-aid 18540491 from MEXT Japan.)

Akihiro Kono
Nagoya University

Date submitted: 15 Jun 2007 Electronic form version 1.4