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Quantitative evaluation of the effect of multiphoton ionization in laser Thomson scattering diagnostics of low-temperature plasmas AKIHIRO KONO, Nagoya University, YUKITAKA MATSUDA, KEN OKADA, MITSUTOSHI ARAMAKI — Laser Thomson scattering technique allows one very high spatial-resolution measurements of electron density and temperature as required in diagnostics of microplasmas or measurement of regions very close to the wall. In such high-resolution measurements, laser energy density in the scattering volume must be very high for obtaining sufficient amount of scattering photons; therefore, electron production via multiphoton ionization by the laser beam may significantly affect Thomson scattering due to plasma electrons. In order to clarify the effect of multiphoton ionization in Thomson scattering diagnostics, we have been measuring absolute efficiency of multiphoton ionization caused by frequency-doubled Nd:YAG laser for various gases including rare gases, N_2, O_2, CF_4 and SF_6. It has been found that electrons produced via multiphoton ionization can reach a significant fraction of plasma electrons even at low pressures, depending on the gas species and laser focusing conditions. Details will be given in the presentation, including simulation results about how the escape of photoelectrons from the scattering volume affects the situation.

Akihiro Kono
Nagoya University

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