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Laser Thomson Scattering Diagnostics of Pulsed Filamentary Discharge Plasmas NIMA BOLOUKI, Kyushu University, KENTARO TOMITA TEAM, YUKIHIKO YAMAGATA TEAM, KIICHIRO UCHINO TEAM — Laser Thomson scattering (LTS) has been applied to measure spatiotemporal evolution of electron density and electron temperature in a pulsed filamentary discharge. The light source of LTS is the second harmonics Nd:YAG laser with a energy of 8 mJ. Also a triple grating spectrometer (TGS) having high rejection rate for stray light is used to measure LTS spectra. In our experimental conditions, non-thermal and non-equilibrium micro-plasmas are generated at round atmospheric pressure. Moreover, the electrode set in this experiment is consisted of a needle electrode and a hemispherical electrode with an inter-electrode gap of 0.5 mm. The total electric charge that flows through the discharge channel vary from 20 nC to 850 nC by changing capacitance in electrical circuit. We could show that the total charge variation leads to increase in electron density from $10^{22}\mathrm{m}^{-3}$ to 10^{23} m^{-3}. However, the electron temperature remains almost constant at the main discharge. In order to investigate the streamer phase, we changed the gap up to 16mm, and then performed the LTS method to measure the electron density and electron temperature.

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