S001-29
A 会場 ：11/5　PM1 （13:45-15:30）
14:15〜14:30

高出力レーザーを用いた磁気リコネクション実験における電子アウトフローの大域・局所計測

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Global and local observations of electron outflow in magnetic reconnection using high power lasers

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Magnetic reconnections are ubiquitous in various space and astrophysical plasmas, which converts the magnetic field energy to the kinetic and thermal energies in plasmas. The microscopic electron dynamics plays an important role in the onset of magnetic reconnection, while the macroscopic magnetic field topology changes. We experimentally investigate magnetic reconnection in laser produced plasmas to study its multiscale nature. We irradiate a thin plastic target with high power laser beams to generate a plasma flow interacting with the externally applied magnetic field. Controlling the strength of the external magnetic field, we magnetize the electrons but not the ions so that only the electrons are directly coupled with the magnetic field. The global images with optical self-emission imaging show the plasmoid and cusp resulting from the reconnection. These structures propagate at the electron Alfven velocity [1]. The local velocity measurements with collective Thomson scattering show the electron Alfvenic outflow that is not accompanied with the ion outflow [2].

[1] Y. Kuramitsu, et al., Nat. Commun. 9, 5109 (2018).
[2] K. Sakai, et al., Sci. Rep. 12, 10921 (2022).