

## Local measurements of laser-driven electron-scale magnetic reconnection

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Magnetic reconnections are ubiquitous in various space and astrophysical phenomena, where the electron dynamics plays essential roles in the triggering mechanism. Recent spacecraft observations in the earth's magnetosphere have revealed the electron dynamics in magnetic reconnections [1, 2]. However, it is highly challenging to obtain global information from the local space observations. Laboratory experiments enable us to measure global and local information simultaneously. We have performed the experiments of the electron-scale magnetic reconnection, by controlling the external magnetic field strength in order to directly couple only electrons with magnetic field in laser produced plasmas [3]. The results of optical diagnostics show the cusp and plasmoid propagating at the electron Alfvén velocity, those are characteristics to a magnetic reconnection [3]. In addition to this, we observed the local electron motion different from the ion motion with collective Thomson scattering. We also measured the magnetic field inversion and whistler waves with magnetic induction probe. We show direct evidence of the electron-scale magnetic reconnection in laser produced plasmas.

### References

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