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# Investigating magnetic reconnection in ICF conditions

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Magnetic reconnection (MR) is a process which occurs in many astrophysical plasmas, e.g. in solar flares, in coronal mass ejecta, or at the outer boundary of the Earth magnetosphere, as well as in man-made plasmas, e.g. fusion plasmas. However, as of now, the fundamental microphysics implied in this process is far from being well understood. Most of the investigations on this long-standing issue come from numerical studies and space observations. Laboratory modeling of plasmas, including those that can be generated by high-power lasers, offers now new perspectives to investigate MR and the processes governing it.
We will present recent two experiments, performed using the LULI2000 and LMJ (both located in France) high-power laser facilities. The first experiment, performed at LULI2000, was aimed at investigating the influence of the Hall magnetic field on the dynamic of magnetic reconnection driven by high-power lasers. Despite being distinct from the astrophysical plasmas where the beta parameter (the ratio of the plasma pressure over the magnetic one) is low (~10^-3 in the solar corona and~ 1 in solar winds), such HEDP reconnection experiments (where beta is of the order of several tens) are of interest to investigate fundamental issues in MR such as the influence of a guide field on the dynamic of the MR.
Then we will present a second and recent experiment on MR obtained using the LMJ/ PETAL facility at CEA-DAM (France). This facility offers specifically the possibility to investigate MR in low (~1) beta conditions due to the high energy that can be delivered on target, resulting in high-strength produced magnetic fields. It also offers the possibility to use several laser irradiation spots, hence allowing to evaluate the importance of the effect of MR in the ICF context where a large number of lasers hit the wall of a holhraum, with MR potentially impacting the interaction along the holhraum wall of the plasmas generated at these sites.

## Country or International Organization

France

## Affiliation

CNRS

**Primary authors:** Dr FUCHS, julien (CNRS); Dr SMETS, roch (CNRS, LPP); Dr BOLANOS, simon (CNRS, LULI); Dr RIQUIER, raphael (CEA); Dr GRISOLLET, alain (CEA)

**Presenter:** Dr FUCHS, julien (CNRS)

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