Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Observations of Plasmoids in Pulse-Power Driven Magnetic Reconnection Experiments JACK D HARE, LEE SUTTLE, SERGEY LEBEDEV, GUY BURDIAK, JEREMY CHITTENDEN, THOMAS CLAYSON, CATALINA GARCIA, NICOLAS NIASSE, TIMOTHY ROBINSON, ROLAND SMITH, NICOLAS STUART, FRANCISCO SUZUKI-VIDAL, GEORGE SWADLING, Imperial College London, ANDREA CIARDI, Univ Paris 06, NUNO LOUREIRO, Massachusetts Institute of Technology, JIMING MA, Northwest Institute of Nuclear Technology, China, JIAN WU, Xian Jiaotong University, QINGGUO YANG, China Academy of Engineering Physics — We present a detailed study of magnetic reconnection in a quasi-two-dimensional pulsed-power driven laboratory experiment. Oppositely directed magnetic fields, advected by supersonic and sub-Alfvénic carbon plasma flows, are brought together and mutually annihilate inside a thin current layer. Temporally and spatially resolved non-perturbative diagnostics allow us to determine the structure and dynamics of this layer, the nature of the inflows and outflows and details of the energy conversion by the reconnection process. We find evidence for anomalous resistivity inside the layer, and for the presence of two fluid effects in the form of density depletion regions. We observe plasmoids, consistent with the predictions of semi-collisional plasmoid instability theory, which may cause enhanced viscous heating of the ions.

Jack Hare
No Company Provided

Date submitted: 04 Jul 2016 Electronic form version 1.4