

Abstract Submitted
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Experimental onset threshold and magnetic pressure pileup for 3D reconnection¹ T.P. INTRATOR, X. SUN, L. DORF, Los Alamos National Laboratory, G. LAPENTA, Katholieke Universiteit Leuven, Belgium — Magnetic reconnection changes the topology of magnetic field lines to a lower energy state. This process can liberate stored magnetic field energy and accelerate particles during unsteady, explosive events. This is one of the most important processes in astrophysical, space and laboratory plasmas. The abrupt onset and cessation has been a long standing puzzle. We show the first three-dimensional (3D) laboratory example of onset and stagnation of magnetic reconnection between magnetized and parallel current channels (flux ropes) driven by magnetohydrodynamic (MHD) attraction and a 3D plasma current driven instability. Antiparallel magnetic field lines carried by these colliding flux ropes break and drive an electric field. The inflow soon exceeds a threshold for the formation of a reconnection current layer. Magnetic flux and pressure pile up just outside this layer, and eventually become large enough to support MHD back-reaction forces that stall the inflow and stagnate the reconnection process. * Supported by Los Alamos Laboratory Directed Research Development, Center for Magnetic Self Organization

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