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Laboratory demonstration of the onset threshold for 3D Sweet-Parker reconnection¹ XUAN SUN, TOM INTRATOR, GIOVANNI LAPENTA, IVO FURNO, Los Alamos National Laboratory — Magnetic reconnection is important in the magnetic self-organization of plasmas in many diverse fields of physics that include plasmas, magnetic fields, and current systems. It is one of these processes that can transport, generate, and restructure magnetic field, plasma flow, and thermal energy. Nearly all theoretical and experimental work on magnetic reconnection starts with boundary or initial conditions where the state of driven reconnection is the presumed starting point. But in nature and the laboratory the onset of reconnection must be forced naturally by some evolution of plasma mediated forces. How and why the onset of reconnection occurs is commonly recognized as a scientifically urgent question. Using two flux ropes, we show an experimental example of self consistent, kink instability driven, onset of 3D Sweet Parker reconnection. The local magnetic and kinetic pressure pile up and can react back on the drive pressure, and may even stall out the reconnection process

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Xuan Sun
xsun@lanl.gov
Los Alamos National Laboratory

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