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Three dimensional magnetic field structure of magnetic reconnection using plasma flux ropes THIAGO OLSON, Vanderbilt University, TOM INTRATOR, LANL, RACHEL OBERTO, Washington University, XUAN SUN, LANL — In nature, magnetic reconnection releases energy stored in stressed magnetic fields, and thus accelerates particles. This type of magnetic relaxation topologically rearranges magnetic field structure. In nature these processes are intrinsically 3D, whereas most models, theories and experiments are 2D, staying within the classic Sweet-Parker picture. The Reconnection Scaling eXperiment (RSX) at Los Alamos National Laboratory includes magnetic fields and current systems in the plasma that support these natural 3D fields. 2D studies have shed much light on the physics, but 3D aspects are largely unconsidered and unknown. Explanation of this behavior demands the need of a 3D picture or map. We present the B-dot probe design needed to map out the B-field structure in the plasma, and the results of the 3D merging of plasma flux ropes. RSX has already yielded data showing the onset, flux pileup, and stagnation of magnetic reconnection between two interacting plasma flux ropes. B-dot probe, and 3D positioner design and construction will be discussed in depth. This work was supported by the Los Alamos Laboratory Directed R&D program, and the Physics Frontier Center for Magnetic Self Organization in Laboratory and Astrophysical? Plasmas, jointly funded by NSF and DOE.

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