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Building 3D data sets of flux tube dynamics[1] B. LOSETH, Los Alamos National Lab, Michigan State University, T.P. INTRATOR, J. SEARS, LANL — Magnetic Reconnection occurs when oppositely directed magnetic fields are advected towards each other as plasma flow. The magnetic fields diffuse through a small region where the frozen flux condition of ideal magnetohydrodynamics (MHD) breaks down and the field lines lose their identity and reconnect to other fields. The reconnection process is important in the confinement of fusion plasmas as well as long-standing solar-physics issues in solar flares, geomagnetic storms, and black hole accretion discs. The Reconnection Scaling Experiment (RSX) uses plasma guns to create one, two, or more parallel flux ropes in a cylindrical chamber with an axial magnetic guide field. The plasma channels twist helically and merge or bounce depending on the attractive force due to the parallel currents and the repulsive force associated with axial and azimuthal magnetic field line bending. The dynamics of merging and bouncing may lead to a new understanding of the statistical mechanics of magnetic fields and provide a means of visualizing three-dimensional MHD turbulence. An update of the RSX vessel including an adjustable magnetic probe array is currently under way and will allow for the building of 3D data sets of these dynamics.

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