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Experiments on Three-Dimensional Reconnection[1] WALTER GEKELMAN, ERIC LAWRENCE, ANDREW COLLETTE, STEPHEN VINCENA, UCLA, Dept Physics — Magnetic Field Line reconnection is still considered, by some, to be one of the most important topics in plasma physics and has been in this category for close to thirty years. One reason is most of the models for it are still two dimensional. We report on two very different experiments in which 3D reconnection plays a role. In the first experiment two magnetic flux ropes are generated from initially adjacent pulsed current channels in a background magnetoplasma. The currents twist about each other and merge and are observed to filament after merging. Volumetric space-time data show multiple reconnection sites with time-dependent locations. The quasi-separatrix layer (QSL) , a concept used in study of solar reconnection has been measured, and its three dimensional development will be shown. In the second experiment three-dimensional currents associated with colliding laser produced plasmas are observed. The currents in this situation are those of shear Alfvén waves. The wave fields are a small fraction of the background field; nevertheless, reconnection regions, multiple magnetic 'X' points (which are three dimensional) and induced electric fields are observed. The role of the guide field is investigated.

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Walter Gekelman
UCLA

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