

Abstract Submitted
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Toroidal flux tube reconnection experiments at SSX MICHAEL BROWN, Swarthmore College — We report experimental results from toroidal flux tube reconnection measurements at the Swarthmore Spheromak Experiment (SSX). Coaxial magnetized plasma guns are used to generate toroidal flux tubes (ie spheromaks) of either sense of magnetic helicity (right or left- handed twist). Arrays of up to 600 magnetic probes are used map the dynamics of the flux tube merging. Several results will be presented. First, high spatial resolution three-dimensional arrays show that locally, flux tubes with opposite helicity (RL or LR) merge rapidly while flux tubes with the same helicity (RR or LL) merge less rapidly. Second, distributed arrays with coarser resolution show that opposite helicity flux tube merging (after a fast reconnection event) ultimately generates a single, large scale structure with opposite twist at the ends. Same helicity merging generates a single, large scale twisted spheromak without reconnection. Finally, reconnection events are correlated with bursts of nearly Alfvénic flow which we measure spectroscopically.

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