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3D Measurements of Flux-Rope Structures in the Magnetic Reconnection Experiment J. JARA-ALMONTE, H. JI, M. YAMADA, J. YOO, C.E. MYERS, T.D. THARP, PPPL — In large systems, fast reconnection requires a means of effectively coupling the global MHD scale to the kinetic length scales. The prevailing theory for explaining this coupling is that the plasmoid instability causes a single X-point to break up into a hierarchical chain of X-points separated by flux-ropes. Previous 2D experiments on MRX have observed both impulsive reconnection events and current layer disruptions caused by the ejection of "flux-rope like" structures from the current layer.[1] These events are inferred to be the result of 3D local physics due to the fast ($\sim 2\mu$s) timescales, and thus full 3D measurements are possible. Using 10 magnetic probes with a combined 350 pickup coils, the magnetic field in a 9cm x 12cm x 16cm volume is simultaneously measured. Here, initial 3D measurements of the structure and dynamics of the "flux-rope like" structures in MRX will be presented.[2]

[1]Dorfman, S. Experimental study of 3-D impulsive reconnection events in a laboratory plasma (Doctoral Dissertation). Princeton University. 2012
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