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Steady-State Merger of Flux Ropes and the Role of Counter-Current Ropes on Stability[1] BROOKHART MATTHEW, CARLOS PAZ-SOLDAN, ANDREW ECKHART, CARY FOREST, University of Wisconsin - Madison — The Line-tied Reconnection Experiment, a linear screw pinch with line-tied axial boundaries, creates plasma via a hexagonally-packed array of nineteen electrostatic current injectors (washer guns). These guns inject individually controlled current and density filaments, called flux ropes. When firing the central seven guns, the individual flux ropes merge without time dependence. This merger, consistent with particle diffusion and magnetic shear, does not necessarily invoke magnetic reconnection. Hollow current profiles are explored and shown to be unstable at high safety factor (>10). The injection of opposing current at the center of the device stabilizes the hollow current plasmas and may provide more rigorous line tying. Plasmas with no net current are explored. Finally, recent improvements to the device, along with plans for simultaneous detailed measurements of flux rope merger and stability, are presented.

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