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Coalescence of magnetic flux ropes in a 3D reconnection experiment XUAN SUN, THOMAS INTRATOR, LEONID DORF, GIOVANNI LAPENTA, Los Alamos National Laboratory — The dynamics of magnetic flux ropes are of fundamental importance to the Earth's magnetosphere, solar eruptions, and many other astrophysical phenomena. Understanding the flux rope merging process mainly relies on the spacecraft observation, theory, and numerical simulations while little has been done experimentally. We present experimental results of 3D merging of two flux ropes in the Reconnection Scaling eXperiment (RSX) at Los Alamos National Laboratory. The two flux ropes, or the two current channels embedded in the external magnetic field, are produced by two identical plasma guns. By varying the external magnetic field strength and plasma currents, we study the merging process for strong and moderate guide field. The primary results show the flux ropes undergo a sloshing process in the strong guide field and form a reverse current sheet if one decreases the guide field strength to $\sim$5 times the anti-parallel field strength. The results confirm that the merging rate is slower at higher guide field.

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