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Eruption of an arched magnetic flux rope in an ambient magnetoplasma[1] SHREEKRISHNA TRIPATHI, WALTER GEKELMAN, Department of Physics and Astronomy, UCLA — Arched magnetic flux ropes (AMFRs) are arch-shaped, current-carrying, magnetized plasma structures that ubiquitously exist in the solar atmosphere. A laboratory plasma experiment [*Tripathi and Gekelman, PRL 105, 075005 (2010)*] has been built to study the eruption of AMFRs in two essential steps: (i) production of an AMFR (n$\sim 10^{19}$ m^{-3}, T_e $\sim$14 eV, B$\sim$1 kG, L$\sim$0.5 m) with a persistent appearance lasting several Alfven transit times using a Lanthnum Hexaboride (LaB_6) plasma source, and (ii) generation of controlled plasma flows from the foot-points of the AMFR using two laser beams (1064 nm, 1 J/pulse). An additional LaB_6 source produces a large magnetoplasma in the background. The laser generated flows drive the eruption by injecting plasma and magnetic flux in the AMFR. The experiment is highly reproducible and runs continuously with a 0.5 Hz repetition rate, hence evolution of the AMFR is recorded using computer-controlled movable probes in 3D. High-speed imaging, Langmuir and 3-axis magnetic-loop probes are the main diagnostic tools. New results from this experiment on global kink-mode oscillations of the AMFR, excitation of fast waves, and ejection of a large magnetic flux rope from the apex of the AMFR will be presented.

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