Abstract Submitted
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Laboratory study of arched magnetic flux ropes formed within a solar-relevant potential field configuration[1] C.E. MYERS, M. YAMADA, H. JI, J. YOO, J. JARA-ALMONTE, E.E. LAWRENCE, Princeton Plasma Physics Laboratory — Solar eruptive events such as coronal mass ejections (CMEs) are thought to be driven by a sudden release of magnetic energy stored in the solar corona. In many cases, the pre-eruptive configuration is a non-potential magnetic structure that can be modeled as a line-tied magnetic flux rope. In spite of ever-improving observations, directly studying these coronal flux ropes remains a significant challenge. As an alternative, we have designed a laboratory experiment to produce low-β arched magnetic flux ropes similar to those found in the corona. These line-tied flux ropes are formed as a magnetized arc discharge between two electrodes and they evolve quasi-statically over hundreds of Alfvén times. Recently, we have constructed a new set of magnetic field coils to produce an active-region-like potential field configuration. Initial results from plasmas formed in this configuration are presented, including fast camera images and internal magnetic measurements. These discharges are expected to access a regime where a slowly evolving flux rope can suddenly undergo a dynamic eruption due to a loss-of-equilibrium[2] or the torus instability.[3]

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[2]Forbes & Isenberg, *ApJ* **373**, 294 (1991)
[3]Kliem & Török, *PRL* **96**, 255002 (2006)

Clayton Myers
Princeton Plasma Physics Laboratory

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