Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Current-filamentation and Plasma Heating during Eruption of a Laboratory Arched Magnetized Plasma[1] KAMIL KRYNSKI, SHREEKRISHNA TRIPATHI, TROY CARTER, University of California Los Angeles —
Arched magnetized plasmas ubiquitously exist in the solar atmosphere and laboratory. We study dynamics and energetics of a laboratory arched magnetized plasma to gain a better understanding of processes governing their eruption. The arched plasma is produced using a hot-cathode lanthanum hexaboride (LaB_6) source and it evolves in an ambient magnetized plasma produced by another LaB_6 source [1, 2]. Typical plasma parameters are: $\beta \approx 10^{-3}$, Lundquist number $\approx 10^2$ - 10^5, B $\approx$ 1000 Gauss at footpoints, plasma radius/ion gyroradius $\approx$ 20, B $\approx$ 0-50 G in the ambient plasma, and 0.5 Hz repetition rate. We present recent results on measurements of plasma density, electron temperature, and three-dimensional magnetic-field. These results demonstrate formation of multiple current channels associated with magnetic reconnection, excitation of fast waves, and plasma heating. Role of ambient magnetic field in generating the three-dimensional structure of current-channels and energy release from the arched magnetized plasma will be presented.
References:
(1) Tripathi and Gekelman, Phys. Rev. Lett. 105, 075005 (2010)
(2) Tripathi and Gekelman, Solar Phys. 286, 479 (2013)

[1]Work supported by National Science Foundation, USA under award number 1619551.

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Date submitted: 03 Jul 2019 Electronic form version 1.4