Abstract Submitted
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Solar-relevant plasma loop expansion in strapping field[1] BAO HA, PAUL BELLAN, California Institute of Technology — Tokamak-like forces may explain fundamental behaviors of solar plasma arches. The hoop force causes arched, current-carrying plasma loops to expand. This expansion was slowed and even inhibited by a magnetic "strapping" field in previous solar loop experiments at Caltech [1] but no attempt was made to control the field's spatial profile. Kliem and Torok [2] predicted an explosive-like transition from slow expansion to fast eruption if the spatial decay rate of the strapping field exceeds a threshold. Smaller, independently-powered auxiliary coils placed inside the vacuum chamber produce strapping fields with above-threshold decay rate and strong enough to act on the plasma. The plasma is observed, however, to bypass regions of stronger strapping field and expand into regions of weaker field. Added external inductance slows plasma expansion allowing the strapping coils to hold down the plasma. Different interactions between arched plasma loops and strapping magnetic fields will be presented.

[1] J. F. Hansen and P. M. Bellan, Astrophys. J. Lett. **563**, L183 (2001)
[2] B. Kliem and T. Torok, Phys. Rev. Lett. **96**, 255002 (2006)

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