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Strapping field profile to reproduce transition from slow rise to fast eruptions[1] BAO HA, PAUL BELLAN, California Institute of Technology — The hoop force causes arched, current-carrying plasma loops to expand unless additional forces are applied. This expansion was slowed and even inhibited by a magnetic field of proper polarity in previous solar coronal loop experiments [1] but there was no attempt to reproduce the slow expansion to fast eruption behavior often exhibited by solar loops. Kleim and Torok [2] predicted that a transition from a slow expansion to a fast eruption occurs if the magnetic field's rate of decay with increasing altitude meets an instability criterion. We have calculated the magnetic profiles which attain the instability criterion within the length scale of the Caltech experiment and are constructing an auxiliary coil designed to provide the required magnetic profile. We plan to image the plasma loop behavior under the influence of these coils.

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

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