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Instabilities in a Line-tied Screw Pinch with Non-monotonic Current Profiles[1] MATTHEW BROOKHART, YAN LI, AARON STEMO, CARY FOREST, University of Wisconsin - Madison — Models suggest that voriticity in active regions of the sun may drive non-monotonic current profiles in coronal loops. Instabilities in these loops may be responsible for some solar flare types. The Line-tied Reconnection Experiment, a linear screw pinch with line-tied axial boundaries, uses electrostatic current injectors (washer guns) at both ends of a cylinder to create equilibria with centrally reversed and hollow current profiles. Reversed-current plasmas with no net current are stable at high magnetic field but undergo sawtooth-like events as axial field is decreased. The onset conditions and internal structure of these events are compared to the literature on zero-net current instabilities in coronal loops. Hollow current profiles in the line-tied geometry are unstable to several instabilities at high safety factor (q>10), directly contradicting results on "current holes" in tokamaks. The growth and structure of these modes is highly dependent on equilibrium profiles.

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