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**Experimental study of non line-tied kink instability for different axial boundary conditions in RSX** XUAN SUN, LEONID DOLF, DAVID PRICE, CHASE LOCHMILLER, THOMAS INTRATOR, Los Alamos National Laboratory, Los Alamos, New Mexico, USA 87545 — The typical theoretical description of the kink, which is either toroidal or periodic, cannot describe non toroidal natural systems, e.g. astrophysical jets and erupted solar prominences. Using flux ropes in Reconnection Scaling eXperiment (RSX), a linear plasma device, it has recently been demonstrated that the kink instability is greatly affected by the axial boundary conditions. For example, when one end of the current rope is free to move, i.e., not line tied, the kink stability threshold is reduced to less that half of the Kruskal-Shafranov prediction [1]. We are investigating the kink behavior of finite length flux ropes with a focus on the axial boundary conditions. Different shapes and sizes of end plate will be used to test the dynamical evolution, relaxation response and saturated long lifetime end state of the kink motion. We will show magnetic and electrostatic fluctuation data at different places in the plasma column and boundary.

[1] I. Furno, et al, Phy. Rev. Lett. 97, 015002 (2006)

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