

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Behavior of a laboratory plasma column near the current-driven instability limit¹ J. SEARS, T.P. INTRATOR, G. WURDEN, T.E. WEBER, W. DAUGHTON, J. KLARENBECK, K. GAO, Los Alamos National Laboratory — A plasma column is generated in a longitudinal magnetic field in the Reconnection Scaling Experiment such that current can be drawn along the column axis. At low current density, the column remains straight. At current density slightly above the external kink limit, the column deforms with azimuthal wavevector $m = 1$. The amplitude of the deformation saturates and the column gyrates at a steady rate for many periods. The instability sometimes gives way to a higher-order mode. At higher current density still, the column disrupts. To investigate the saturated non-ideal behavior we measure the vector magnetic field and the plasma temperature and density in a cubic volume measuring 0.1 m on a side with resolution on the order of the electron skin depth. Our 3D probe positioning system uses stereo camera vision to precisely situate the probe tips. Study of the saturated kink mode in laboratory plasma may offer clues to the long lifetime of astrophysical jets.

¹Supported by DOE Office of Fusion Energy Sciences under LANS contract DE-AC52-06NA25369, NASA Geospace NNH10A044I, Basic

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Date submitted: 20 Jul 2012

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