Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Magnetic field generation from shear flow in flux ropes[1] T.P. INTRATOR, P24 Los Alamos Natl Laboratory, J. SEARS, K. GAO, J. KLARENBEEK, C. YOO, LANL — In the Reconnection Scaling Experiment (RSX) we have measured out of plane quadrupole magnetic field structure in situations where magnetic reconnection was minimal. This quadrupole out of plane magnetic signature has historically been presumed to be the smoking gun harbinger of reconnection. On the other hand, we showed that when flux ropes bounced instead of merging and reconnecting, this signature could evolve. This can follow from sheared fluid flows in the context of a generalized Ohms Law. We reconstruct a shear flow model from experimental data for flux ropes that have been experimentally well characterized in RSX as screw pinch equilibria, including plasma ion and electron flow, with self consistent profiles for magnetic field, pressure, and current density. The data can account for the quadrupole field structure.

[1]DOE Office of Fusion Energy Sciences under LANS contract DE-AC52-06NA25369, NASA Geospace NNHIOA044I, Basic

T.P. Intrator
P24 Los Alamos Natl Laboratory

Date submitted: 12 Jul 2012 Electronic form version 1.4