Abstract Submitted
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Two non linear dynamics plasma astrophysics experiments at LANL[1] T.P. INTRATOR, T.E. WEBER, Y. FENG, J.A. SEARS, H. SWAN, T. HUTCHINSON, J. BOGUSKI, K. GAO, L. CHAPDELAINE, J. DUNN, Los Alamos National Laboratory — Two laboratory experiments at Los Alamos National Laboratory (LANL) have been built to gain access to a wide range of fundamental plasma physics issues germane astro, space, and fusion plasmas. The over arching theme is magnetized plasma dynamics that include currents, MHD forces and instabilities, sheared flows and shocks, creation and annihilation of magnetic field. The Reconnection Scaling Experiment (RSX) creates current sheets and flux ropes that exhibit fully 3D dynamics, that can kink, bounce, merge and reconnect, shred, and reform in complicated ways. The most recent movies from a large detailed data set describe the 3D magnetic structure and helicity budget of a driven and dissipative system that spontaneously self saturates a kink instability. The Magnetized Shock Experiment (MSX) uses a Field reversed configuration (FRC) that is ejected at high speed and then stagnated onto a stopping mirror field, which drives a collisionless magnetized shock. A plasmoid accelerator will also access super critical shocks at much larger Alfven Mach numbers. Unique features include access to parallel, oblique and perpendicular shocks, in regions much larger than ion gyro radius and inertial length, large magnetic and fluid Reynolds numbers, and volume for turbulence.

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