

Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Overview of the Plasma Liner Experiment (PLX)¹ S.C. HSU, LANL, F.D. WITHERSPOON, HyperV Technologies, J.T. CASSIBRY, UAHuntsville, M.A. GILMORE, UNM, AND THE PLX TEAM — The Plasma Liner Experiment (PLX) is a multi-institutional collaboration that is exploring and demonstrating the formation of imploding spherical plasma liners to reach peak pressures exceeding 0.1 Mbar upon stagnation. The liners will be formed via the merging of 30 dense high Mach number plasma jets ($n \sim 10^{17} \text{ cm}^{-3}$, $M \sim 10\text{--}35$, $v \sim 50 \text{ km/s}$, $r_{jet} \sim 2.5 \text{ cm}$) in a spherically convergent geometry. We are aiming for two follow-on applications if this work is successful: (1) assembling repetitive, macroscopic (cm and μs scale) plasmas suitable for fundamental HEDLP scientific studies and (2) a standoff driver for magneto-inertial fusion. This is a staged project where scientific issues will be studied first at modest stored energies ($\sim 300 \text{ kJ}$) before attempting to reach HED- relevant pressures (requiring $\sim 1.5 \text{ MJ}$). This poster provides an overview of the project's status/plans and emphasizes the progress made in the past year: completion of phase one facility and diagnostic construction, progress in numerical simulations, and initial experiments on single jet propagation and two jet merging. Finally, we describe cosmically-relevant collisionless shock experiments based on the head-on collision of two lower density but higher velocity plasma jets.

¹Supported by DOE Fusion Energy Sciences and LANL LDRD.

Scott Hsu
LANL

Date submitted: 13 Jul 2011

Electronic form version 1.4