

Abstract Submitted  
for the DPP14 Meeting of  
The American Physical Society

**The First Pulsed-Power Z-Pinch Liner-On-Target Hydrodynamics Experiment Diagnosed with Proton Radiography<sup>1</sup>** C.L. ROUSCULP, W.A. REASS, D.M. ORO, J.R. GRIEGO, P.J. TURCHI, R.E. REINOVSKY, A. SAUNDERS, F.G. MARIAM, C. MORRIS, Los Alamos National Laboratory — The first pulse-power driven, dynamic, liner-on-target experiment was successfully conducted at the Los Alamos proton radiography (pRad) facility. 100% data return was achieved on this experiment including a 21-image pRad movie. The experiment was driven with the PHELIX pulsed-power machine that utilizes a high-efficiency ( $k \sim 0.93$ ) transformer to couple a small capacitor bank ( $U \sim 300$  kJ) to a low inductance condensed-matter experimental load in a Z-pinch configuration. The current pulse ( $I_{peak} = 3.7$  MA,  $\delta t \sim 10$   $\mu$ s) was measured via a fiber optic Faraday rotation diagnostic. The experimental load consisted of a cylindrical Al liner (6 cm diam, 3 cm tall, 0.8 mm thick) and a cylindrical Al target (3 cm diam, 3 cm tall, 0.1 mm thick) that was coated with a thin (0.1 mm) uniform layer of tungsten powder (1 micron diam). It is observed that the shock-launched powder layer fully detaches from the target into a spatially correlated, radially converging ( $v_r \sim 800$  m/s) ring. The powder distribution is highly modulated in azimuth indicating particle interactions are significant. Results are compared to MHD simulations.

<sup>1</sup>Work supported by United States-DOE under contract DE-AC52-06NA25396.

C. L. Rousculp  
Los Alamos National Laboratory

Date submitted: 10 Jul 2014

Electronic form version 1.4