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Pulsed-Power Driven Liner-On-Target Hydrodynamics Experiments Diagnosed with Proton Radiography using PHELIX[1] D.M. ORO, C.L. ROUSCULP, W.A. REASS, J.R. GRIEGO, P.J. TURCHI, R.E. REINOVSKY, A. SAUNDERS, F.G. MARIAM, C. MORRIS, Los Alamos National Laboratory — The Precision High Energy-density Liner Implosion eXperiment, PHELIX, is a pulsed-power driver capable of delivering multi-mega-ampere currents to cylindrical loads. The pulsed-power system utilizes a high-efficiency transformer to couple a small capacitor bank ($\sim$400 kJ) to a $\sim$5 cm diameter cylindrical Al liner. A peak current of $\sim$4 MA causes the liner to implode in 20 – 30 μs and attain speeds of >1 km/s. The PHELIX system is designed to be compatible with the Los Alamos proton radiography facility. Initial experiments with PHELIX explore shocked-ejected particle transport into gas in converging geometries. For these experiments a liner-on-target configuration is employed. To control the initial conditions, micron-sized tungsten particles are used in place of shock-formed ejecta. The inner surface of the cylindrical target is coated with a 0.1 mm uniform layer of W powder. The liner impacts the target generating a shock that launches the W particles off the target surface. The time history of the trajectory of the shocked-ejected particulate is captured in 21 proton radiographs recorded during the experiment. Comparison of 3 experiments, one into vacuum, one into Ar at 8.3 bars and one into Xe at 8.3 bars are discussed. Results are compared to simulations.

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