Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Experimental Method for Laser-driven Flyer Plates for 1-D Shocks using the TRIDENT Laser[1] DENNIS PAISLEY, SHENGNIAN LUO, DAMIAN SWIFT, SCOTT GREENFIELD, ERIC LOOMIS, RANDALL JOHNSON, PEDRO PERALTA, Los Alamos National Laboratory, LDRD TEAM —
One-dimensional shocks can be generated using flyer plates accelerated to terminal velocities by a confined laser-ablated plasma. Over the past few years, we have developed this capability with our facility-size laser, TRIDENT, capable of > 500 Joules at multi-microsecond pulse lengths to accelerate 1-D flyer plates, 8-mm diameter by 0.1 – 2 mm thick. Plates have be accelerated to terminal velocities of 100 to >500 m/s, with full recovery of the flyer and target for post mortem metallography. By properly tailoring the laser temporal and spatial profile, the expanding confined plasma accelerates the plate away from the transparent sapphire substrate, and decouples the laser parameters from shock pressure profile resulting from the plate impact on a target. Since the flyer plate is in free flight on impact with the target, minimal collateral damage occurs to either. The experimental method to launch these plates to terminal velocity, ancillary diagnostics, models, and representative experimental data will be presented. LA-UR-07-1111

[1]Operated by Los Alamos National Security LLC for DOE/NNSA

Dennis Paisley
Los Alamos National Laboratory

Date submitted: 27 Feb 2007 Electronic form version 1.4