SHOCK13-2013-000783

Abstract for an Invited Paper
for the SHOCK13 Meeting of
the American Physical Society

Explosively driven two-shockwave tools with application to ejecta formation at the Los Alamos National Laboratory Proton Radiography Facility

WILLIAM BUTTLER, Los Alamos National Laboratory

We present the development of an explosively driven physics tool to generate two mostly uniaxial shockwaves. The tool is being used to extend single shockwave ejecta models to a subsequent shockwave event separated by a time interval on the order of a few microseconds. We explore the possibility of varying the amplitude of both the first and second shockwaves, and we apply the tool in experimental geometries on Sn with a surface roughness of $R_a = 0.8\mu$m. We then evaluate the tool further at the Los Alamos National Laboratory Proton Radiography (pRad) Facility in an application to Sn with larger scale perturbations of wavelength 550μm, and various amplitudes that gave wave-number amplitude products of $\eta_0 2\pi/\lambda = \{3/4, 1/2, 1/4, 1/8\}$, where the perturbation amplitude is η_0, and the wave-number $k = 2\pi/\lambda$. The pRad data and velocimetry imply it should be possible to develop a second shock ejecta model based on unstable Richtmyer-Meshkov physics.

In collaboration with David Oro, Fesseha Mariam, Alexander Saunders, Malcolm Andrews, Frank Cherne, James Hammerberg. Robert Hixson, Christopher Morris, Russell Olson, Dean Preston, Joseph Stone, Dale Tupa, and Wendy Vogan-McNeil, Los Alamos National Laboratory,