

Abstract Submitted
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Simultaneous Photonic Doppler Velocimetry and Ultra-high Speed Imaging Techniques to Characterize Pressure Output of Detonators MICHAEL MURPHY, STEVEN CLARKE, LANL — Detonator output directed into both ambient air and polymethylmethacrylate (PMMA) samples is simultaneously investigated using ultra-high speed, time-resolved schlieren/shadowgraph imaging and photonic Doppler velocimetry (PDV) measurements. In air, one-dimensional measurements of explosive cup position are made from the time-resolved image sequences and are compared to time-integrated velocity curves obtained from the PDV data. The results demonstrate good agreement that validates using the two methods concurrently. In PMMA, both average and instantaneous shock velocities are calculated from 1-D measurements of shock position. Velocity-Hugoniot data for PMMA is utilized to map the shock velocity calculations to corresponding values of mass velocity and shock pressure. Simultaneous PDV data describing the motion of the explosive cup/PMMA interface is used to determine the mass velocity and pressure at the interface, and to compare to the mass and shock pressures calculated from the imaging data.

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