

Abstract Submitted
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A Data-Driven Approach for Determining Time of Initial Movement in Shock Experiments using Photonic Doppler Velocimetry¹

MARYLESA HOWARD, ABEL DIAZ, National Security Technologies LLC — Photonic Doppler velocimetry (PDV) is a high-speed, interferometric technique for measuring the beat frequency of a moving surface, from which the calculated velocity profile of the surface can be used to describe the physical changes the material undergoes after high-impact shock. Such a technique may also be used to characterize the performance of small detonators and determine the time at which initial movement was recorded. Hundreds of PDV probes may be deployed at a time on an experiment, and extracting the time at initial movement for each probe becomes an arduous task. In this work, we develop a semi-automated technique for extracting the time at initial movement from a normalized lineout of the power spectrogram near the offset frequency of each multiplexed-PDV probe. We characterize the response bias of this method and compare with the time obtained by hand calculation of the raw voltage data. Results are shown on shock experiments from gas gun setups and explosives-driven flyer plates.

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