

Abstract Submitted
for the SHOCK13 Meeting of
The American Physical Society

Comprehensive Comparison of VISAR and PDV Laser Interferometry in Plane Shock Wave Experiments K.A. ZIMMERMAN, Washington State University, A.J. IVERSON, E.P. DAYKIN, National Security Technologies, LLC, Y. TOYODA, Washington State University, G.D. STEVENS, R.S. HIXSON, National Security Technologies, LLC, Y.M. GUPTA, Washington State University — Plate impact experiments, using well-characterized materials, were conducted to achieve a direct and comprehensive comparison of two laser interferometry approaches used to measure shock wave profiles: Velocity Interferometer System for Any Reflector (VISAR) and Photon Doppler Velocimetry (PDV). A unique feature of this study was a one-to-one comparison of the two measurement approaches in each experiment. A broad range of stresses (4-60 GPa) were examined in this study. The choice of impactor and target materials permitted us to examine different types of material responses (elastic, elastic-plastic, and time-dependent elastic-plastic deformation) which, in turn, resulted in different types of wave profiles (single wave, two-wave structure, and two-wave structure with rapid stress relaxation following the first wave). Overall, the two approaches showed good agreement. However, small but discernible differences were observed in the following situations: wave profiles involving rapid stress relaxation behind the elastic wave; and window-corrected, peak states at high stress. The relative strengths and weaknesses of both methods are summarized. Work supported by DOE/NNSA.

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Date submitted: 26 Feb 2013

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