

Abstract Submitted
for the SHOCK17 Meeting of
The American Physical Society

Multi-frame X-ray Phase Contrast Imaging (MPCI) for Dynamic Experiments ADAM IVERSON, CARL CARLSON, National Security Technologies, NATHANIEL SANCHEZ, BRIAN JENSEN, Los Alamos National Laboratory — Recent advances in coupling synchrotron X-ray diagnostics to dynamic experiments are providing new information about the response of materials at extremes. For example, propagation based X-ray Phase Contrast Imaging (PCI) which is sensitive to differences in density has been successfully used to study a wide range of phenomena, e.g. jet-formation, compression of additive manufactured (AM) materials, and detonator dynamics. In this talk, we describe the current multi-frame X-ray phase contrast imaging (MPCI) system which allows up to eight frames per experiment, remote optimization, and an improved optical design that increases optical efficiency and accommodates dual-magnification during a dynamic event. Data will be presented that used the dual-magnification feature to obtain multiple images of an exploding foil initiator. In addition, results from static testing will be presented that used a multiple scintillator configuration required to extend the density retrieval to multi-constituent, or heterogeneous systems. The continued development of this diagnostic is fundamentally important to capabilities at the APS including IMPULSE and the Dynamic Compression Sector (DCS), and will benefit future facilities such as MaRIE at Los Alamos National Laboratory.

Brian Jensen
Los Alamos National Laboratory

Date submitted: 24 Feb 2017

Electronic form version 1.4