

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Multi-frame X-ray Phase Contrast Imaging of Impact Experiments at the Advanced Photon Source** BRIAN JENSEN, Los Alamos National Laboratory, ADAM IVERSON, CARL CARLSON, MATTHEW TEEL, NATIONAL SECURITY TECHNOLOGIES, BENJAMIN MORROW, DAVID FREDENBURG, Los Alamos National Laboratory — Recent advances in coupling synchrotron X-ray diagnostics to dynamic compression experiments are providing new information about the response of materials at extremes conditions. For example, propagation based X-ray Phase Contrast Imaging (PCI) which is sensitive to differences in density (or index of refraction) has been successfully used to study a wide range of phenomena including jet-formation in metals, crack nucleation and propagation, and detonator dynamics. These experimental results have relied, in part, on the development of a robust, optically multiplexed detector system that captures single X-ray bunch images with micrometer spatial resolution on the nanosecond time scale. In this work, the multi-frame PCI (MPCI) system is described along with experiment highlights that include the compression of an idealized system of spheres subjected to impact loading. Additional advances to the detector system will be presented that are designed to increase the efficiency of the detector system and to retrieve phase information from the X-ray images which is required for determining the density during dynamic loading. Experimental results, implications, and future work will be discussed.

Brian Jensen  
Los Alamos National Laboratory

Date submitted: 06 Nov 2015

Electronic form version 1.4