

Abstract Submitted  
for the NWS15 Meeting of  
The American Physical Society

**X-ray diffraction measurements to examine structural changes in shock compressed solids at the Dynamic Compression Sector** STEFAN TURNEAURE, NICHOLAS SINCLAIR, KURT ZIMMERMAN, YOGENDRA GUPTA, Washington State University — The Dynamic Compression Sector (DCS) is a new facility at the Advanced Photon Source (APS) designed for real-time examination of dynamically compressed condensed matter using hard x-rays as probes. The pulsed (153.4 ns period), short duration (about 100 ps), hard x-rays (8-35 keV) at the APS are ideal for examining the real-time response of condensed matter to dynamic loading. The DCS has several impact launchers allowing half-inch diameter flat-faced projectiles to be accelerated to velocities ranging from several hundred m/s to over 5 km/s. The projectile impacts a disk-shaped sample resulting in high dynamic stresses ranging from a few kilobars to over 1 megabar. A two-dimensional pixelated x-ray detector developed for use at the DCS can capture 4 successive x-ray diffraction frames with 153.4 ns interframe time during the impact event. Representative results of x-ray diffraction measurements on shock compressed solids undergoing stress-induced structural changes will be presented. The DCS, a national user facility, will be available to general users in CY2016 through the APS proposal process. Work supported by DOE/NNSA.

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Date submitted: 08 Apr 2015

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