

Abstract Submitted
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High-resolution phase contrast imaging of brittle failure during impact loading KYLE RAMOS, BRIAN JENSEN, LUO SHENGNIAN, DANIEL HOOKS, JOHN YEAGER, KRIS KWIATKOWSKI, TSUTOMU SHIMADA, Los Alamos National Laboratory, KAMEL FEZZAA, Advanced Photon Source — Heterogeneous processes involved in brittle failure necessitate in situ, spatially resolved observation. An impact capability has recently been developed in which synchrotron phase contrast imaging (PCI), at the 32-ID beamline of the Advanced Photon Source, can be used to resolve crack interfaces during dynamic deformation. The imaging is both fast and high-resolution as images with approximately 3 micrometer resolution are obtained from single x-ray pulses (<100 ps duration). Experiments have been performed to investigate questions regarding velocimetry interpretation, the effect of stress states, and whether cracking can occur under uniaxial compression. Uniaxial compression and tension in planar impact configurations and cylindrical impact penetration has been used to vary stress states and observe failure. PCI and velocimetry results from these experiments will be presented for a range of brittle materials spanning glasses and ceramics.

Kyle Ramos
Los Alamos National Laboratory

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