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Impact Surface X-ray Diffraction Measurements in Shocked Solids STEFAN TURNEAURE, Y.M. GUPTA, Wash. State. Univ. — X-ray diffraction (XRD) measurements at the impact surface, rather than the rear surface, of a shocked crystal have two important advantages: time-dependent material response can be directly monitored without the complications arising from wave reflections, and the shocked crystal may be examined in a constant state over a continuous range of peak stresses. Methods for obtaining XRD data at the impact surface of crystals impacting an X-ray window will be presented. An optical beam parallel to and passing in front of the impact surface is blocked by the projectile several hundred ns before impact providing a trigger (about 10 ns jitter) for the X-ray source and detector. The quantitative accuracy of the impact surface XRD method was established using Si(100) shocked elastically to 5.4 GPa. Impact surface XRD measurements are expected to play an important role at the Dynamic Compression Sector at the Advanced Photon Source. Work supported by DOE/NNSA.

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