Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Transverse Diffraction at the LCLS: Shock-Compressed Silicon E. E. MCBRIDE, SLAC, A. KRYGIER, M.. HARMAND, IMPMC, Z.. KONOPKOVA, H.-P. LIERMANN, A. SCHROPP, S. TOLEIKIS, DESY, A. PELKA, M. ROEDEL, HZDR, C. SPINDLOE, CLF, R. F. SMITH, LLNL, E. GALTIER, H. J. LEE, B. NAGLER, SLAC, TH. TSCHENTSCHER, European XFEL, J. S. WARK, University of Oxford, A. HIGGINBOTHAM, University of York — Despite being the subject of numerous shock compression studies, the behavior of silicon under dynamic loading is vigorously debated [1-4]. The few studies that combine shock compression and X-ray diffraction have exclusively focused on "normal" X-ray geometry whereby X-rays are collected along the shock propagation direction, consequently sampling numerous strain states at once, greatly complicating both phase identification and studies of phase transition kinetics. Here, we present a novel setup performing in situ X-ray diffraction studies perpendicular to the shock propagation direction at the Matter at Extreme Conditions end station at LCLS. Combining the extremely bright microfocussed X-ray beam with a nanosecond drive laser, we unambiguously determine the character of each wave for the first time. [1] Graham et al., JPCS, 27, 9 (1966) [2] Turneaure & Gupta, APL, 90, 051905 (2007) [3] Colburn et al., JAP, 43, 5007 (1972) [4] Gust & Royce, JAP, 42, 1897 (1971)

E. E. McBride
SLAC

Date submitted: 20 Jul 2016 Electronic form version 1.4