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Shear-induced Lowering of Phase Transitions in Dynamically Compressed Silicon E. E. MCBRIDE, SLAC, A. KRYGIER, IMPMC, A. EHNES, DESY, E. GALTIER, SLAC, M. HARMAN, IMPMC, Z. KONOPKOVA, DESY, H.-J. LEE, SLAC, H.-P. LIERMANN, DESY, B. NAGLER, SLAC, A. PELKA, M. ROEDEL, HZDR, A. SCHROPP, DESY, R. F. SMITH, LLNL, C. SPINDLOE, RAL, D. SWIFT, LLNL, F. TAVELLA, SLAC, S. TOLEIKIS, DESY, T. TSCHENTSCHER, European XFEL, J. 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.\pard[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

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