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Angularly resolved x-ray scattering measurements of shock and ramp compressed polycrysaalline diamond M.J. MACDONALD, SLAC National Accelerator Lab, University of Michigan, L.B. FLETCHER, E.J. GAMBOA, M. GAUTHIER, H.J. LEE, E. GALTIER, SLAC National Accelerator Lab, A. RAVASIO, SLAC National Accelerator Lab, LULI, A. GLEASON, SLAC National Accelerator Lab, Stanford University, S. HAMEL, Lawrence Livermore National Lab, J. VORBERGER, Max Planck Institute, D.O. GERICKE, University of Warwick, Z. CHEN, University of Alberta, D. KRAUS, B. BARBREL, University of California Berkeley, S. FUNK, J.B. HASTINGS, S.H. GLENZER, SLAC National Accelerator Lab, HED SCIENCE COLLABORATION COLLABORATION — Direct measurements of the crystal structure of materials under shock and ramp compression can be obtained using 2D angularly resolved x-ray scattering at the MEC end station of the LCLS facility. Diamond has been proposed as an ablator material for inertial confinement fusion targets, requiring a better understanding how the crystal structure responds to dynamic compression. In this experiment we used the two 527 nm optical lasers to compress 25 and 50 μm diamond foils. Each beam provided 6 J in 3 ns focused to an intensity of 4×10^{14} W/cm^2 with different pulse shapes to provide shock and ramp compression. Compression and lattice deformation measurements were made directly from angularly resolved x-ray scattering and compared to DFT simulations.

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