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The Development of Patterned Samples to Study Shock Anisotropy in Crystalline Solids DMITRO MARTYNOWYCH, LEORA COOPER, Massachusetts Inst of Tech-MIT, EMMA MCBRIDE, SLAC National Accelerator Lab, European XFEL, SUZANNE ALI, Lawrence Livermore National Laboratory, ARIANNA GLEASON, LANL, MARYLESA HOWARD, National Security Technologies, BEN OFORI-OKAI, Massachusetts Inst of Tech-MIT, SLAC National Accelerator Lab, KEITH NELSON, Massachusetts Inst of Tech-MIT — We present methods to generate and image converging shock waves in solid samples of consistent shape and crystallographic orientation. Using novel patterned samples, we extend our previously reported quasi-2D confined shock geometry to study crystalline and amorphous solids. Laser machining using ultrafast laser pulses creates uniform 50-μm radius disks out of a thin wafer affixed to a high-impedance substrate. A polymer layer is drop-cast to fill the machined-out voids surrounding the sample disks. Intense pump laser light irradiates a circular "ring" pattern around one of the disks, and absorption of the light by the polymer layer launches a shock wave that is transduced into the disk as it converges to a focus. Spatial and temporal details of the shock profile and the sample response are measured with single-shot multi-frame imaging. This technique can probe anisotropic responses to converging shock waves.

Dmitro Martynowych
Massachusetts Inst of Tech-MIT

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