Abstract Submitted
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Strain anisotropy and shear strength of shock compressed tantalum measured from in-situ Laue diffraction[1] CHRISTOPHER WEHRENBERG, MATT TERRY, BRIAN MADDOX, Lawrence Livermore National Laboratory, ANDREW COMLEY, Atomic Weapons Establishment, HYE-SOOK PARK, SHON PRISBREY, JAMES HAWRELIAK, Lawrence Livermore National Laboratory, JUSTIN WARK, ANDREW HIGGINBOTHAM, University of Oxford, BRUCE REMINGTON, Lawrence Livermore National Laboratory — Laser driven shock experiments, performed at the Omega facility, studied the dynamic yield strength and lattice dynamics of single crystal tantalum using in-situ Laue diffraction. Tantalum samples were shocked along the [100] direction to peak stresses up to 60 GPa and probed using the bremsstrahlung radiation from an imploding CH capsule x-ray source. Diffraction spots for both the undriven and driven regions of the sample were recorded simultaneously on time-integrated image plate detectors. The strain anisotropy was measured from the position shift of the driven diffraction spot and the total strain state was found using the volumetric strain from VISAR. Yield strength measurements were inferred from the data and compared with predictions from various models, including the LLNL multi-scale strength model for Ta.

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