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**Observation of Solid–Solid Phase Transitions in Ramp-Compressed Aluminum** D.N. POLSIN, T.R. BOEHLY, J.A. DELETTREZ, M.C. GREGOR, C.A. MCCOY, B. HENDERSON, Laboratory for Laser Energetics, U. of Rochester, D.E. FRATANDUONO, R. SMITH, R. KRAUS, J.H. EGGERT, R. COLLINS, F. COPPARI, P.M. CELLIERS, LLNL — We present results of experiments using x-ray diffraction to study the crystalline structure of solid aluminum compressed up to 500 GPa. Aluminum is of interest because it is frequently used as a standard material in high-pressure compression experiments. At ambient pressure and temperature, Al is a face-centered cubic close-packed crystal and has been observed to transform to hexagonal close-packed (hcp) when compressed to $\sim 200\,\mathrm{GPa}$ in a diamond anvil cell. It is predicted to transform from hcp to body-centered cubic when compressed to $\sim 315\,\mathrm{GPa}$. Laser-driven ramp waves will be used to compress Al to various constant-pressure states. The goal is to investigate the Al phase diagram along its isentrope, i.e., at temperatures $\sim 1000\,\mathrm{K}$ and pressures ranging from 200 to 500 GPa. X-ray diffraction will be used to measure the crystalline structure of the compressed Al and observe the transformations that occur at various pressures. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

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