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The first observation of the bcc phase in aluminum compressed to 559 GPa DANAE POLSIN, Univ of Rochester, DAYNE FRATANDUONO, Lawrence Livermore National Laboratory, RYAN RYGG, Univ of Rochester, AMY JENEI, RAY SMITH, JON EGGERT, Lawrence Livermore National Laboratory, MICHELLE GREGOR, BRIAN HENDERSON, JACQUES DELETTREZ, Univ of Rochester, RICHARD KRAUS, PETER CELLIERS, FEDERICA COPPARI, DAMIAN SWIFT, Lawrence Livermore National Laboratory, CHAD MCCOY, CHRISTOPHER SEAGLE, JEAN-PAUL DAVIS, Sandia National Laboratory, STEPHEN BURNS, THOMAS BOEHLY, GILBERT COLLINS, Univ of Rochester
— Ramp compression is used to near isentropically compress aluminum samples to pressures up to 559 GPa and at temperatures below the melt. Nanosecond *in-situ* x-ray diffraction is performed at the University of Rochester's Laboratory for Laser Energetics and the National Ignition Facility to directly measure the crystal structure at pressures where fcc–hcp and hcp–bcc phase transformations of Al exist. Velocimetry provided the pressure in the Al. The fcc–hcp and hpc–bcc transformations are confirmed experimentally at 243 GPa and 327 GPa, respectively. This is the first experimental evidence of the high-pressure bcc phase of Al. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944, the University of Rochester, and the New York State Energy Research and Development Authority.

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