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EXAFS study of solid iron up to 560 GPa[1] YUAN PING, FEDERICA COPPARI, DAMIEN HICKS, LLNL, BARUKH YAAKOBI, LLE, DAYNE FRATANDUONO, SEBASTIEN HAMEL, JON EGGERT, RYAN RYGG, RAY SMITH, DAMIAN SWIFT, DAVE BRAUN, LLNL, TOM BOEHLY, LLE, GILBERT COLLINS, LLNL — Dynamic compression by multiple shocks is used to compress iron up to 560 GPa (5.6 Mbar), the highest solid-state pressure yet attained for iron in the laboratory. EXAFS (extended x-ray absorption fine structure) spectroscopy offers simultaneous density, temperature and local-structure measurements for compressed iron, providing highest-pressure data up to date for constraining solid state theory and evolution models for many newly discovered extra-solar terrestrial planets. The data show that the close-packed structure of iron is stable up to 560 GPa, the temperature at peak compression is significantly higher than expected from pure compressive work, and the strength of iron many times greater than expected from lower pressure data.

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Yuan Ping
LLNL

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