Abstract Submitted
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First observation of bcc gold and melting on the shock Hugoniot measured using x-ray diffraction[1] RICHARD BRIGGS, FEDERICA COPPARI, MARTIN GORMAN, RAY SMITH, Lawrence Livermore National Laboratory, SALLY TRACY, Geophysical Laboratory, Carnegie Institution of Washington, AMY COLEMAN, AMALIA FERNANDEZ-PANELLA, MARIUS MILLOT, JON EGGERT, DAYNE FRATANDUONO, Lawrence Livermore National Laboratory
— Au is one of the most recognizable and noblest of the elements in the periodic table. Its face-centered cubic crystal structure was observed in static experiments at room temperature up to almost two-fold compression, inviting a myriad of theoretical work on its structural stability. Here we report the first observation of bcc gold near 220 GPa on the shock Hugoniot, using dynamic compression and *in situ* x-ray diffraction. Experiments were carried out at the Dynamic Compression Sector of the Advanced Photon Source. A high-energy laser ($<$ 80 J at 351 nm, 5 or 10 ns flat top) sent an ablatively-driven shockwave through a polyimide ablator and the Au sample glued to a LiF window. Velocimetry measurements were made at the Au/LiF interface to determine pressure using impedance matching techniques. At pressures above 250 GPa, shock-induced melting is observed and is completed by 323 GPa, providing experimental constrains on the melting curve of gold on the Hugoniot.

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