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Ramp Compression of Gold to 690 GPa[1] SIRUS HAN, Princeton University, JUNE WICKS, Johns Hopkins University, RAYMOND SMITH, Lawrence Livermore National Laboratory, DONGHOON KIM, Princeton University, JON EGGERT, Lawrence Livermore National Laboratory, THOMAS DUFFY, Princeton University — Gold is a face-centered-cubic (fcc) transition metal with wide applications as a pressure standard and experimental component in high-pressure science. At multimegabar pressures, theoretical studies have predicted transformations to hexagonal-close-packed (hcp), double hexagonal-close-packed, body-centered-cubic (bcc), or stacking disordered phases. Static experimental studies above 200 GPa have produced conflicting results on high-pressure polymorphism in gold. In this study, we used the Omega Laser Facility (U. of Rochester) to ramp-compress gold to 690 GPa. Our target packages consisted of a diamond ablator, gold foil and either a diamond or a LiF window. Samples were compressed over 5-10 ns timescales via laser-ablation. Pressure was determined from measured VISAR wave profiles. The *in-situ* lattice-level structure was probed using X-ray diffraction with a laser-plasma X-ray source. We observe the fcc phase at pressures up to 240 GPa, a mixed or intermediate phase from 240-390 GPa, and the bcc phase from 390-690 GPa. Our results will be compared with existing theoretical calculations and experimental data.

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