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Phase Transitions in Dynamically Compressed Bi MARTIN GORMAN, LLNL, RICHARD BRIGGS, ESRF, AMY COLEMAN, STEWART MCWILLIAMS, The University of Edinburgh, EMMA MCBRIDE, SLAC, DAVID MCGONEGLE, JUSTIN WARK, Oxford University, CINDY BOLME, LANL, ARIANNA GLEASON, Stanford University, GILBERT COLLINS, LLE, JON EGGERT, DAYNE FRATANDUONO, RAY SMITH, LLNL, ERIC GALTIER, HAE JA LEE, EDUARDO GRANDOS, BOB NAGLER, ZHOU XING, SLAC, MALCOLM MCMAHON, The University of Edinburgh, N/A N/A, N/a, UNIVERSITY OF EDINBURGH TEAM, LLNL TEAM, OXFORD UNIVERSITY TEAM, SLAC TEAM, LANL TEAM — The ability to characterise atomic structure at extreme conditions and on the timescale of laser-driven shock experiments is vital for our understanding of how materials behave under rapid pressure loading. A key finding in recent static high-pressure studies has been that many materials adopt complex crystal structures at high-pressure such as incommensurate host-guest structures. However, it is uncertain whether such complex structures are able to form on the timescales of laser shock experiments due to the highly reconstructive nature of the phase transformation mechanisms, leading to the possibility of non-equilibrium phases forming. We present X-ray diffraction measurements that characterise the structure of several solid phases of Bi including one new phase, which is not reported in the equilibrium phase diagram. Diffraction measurements on molten Bi will also be presented and the prospect of extracting quantitative density information from the liquid diffraction data will be discussed.

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