

Abstract Submitted
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Dynamic Longitudinal Sound Velocity Measurements in Lead

MARK COLLINSON, AWE — Measurement of a materials longitudinal sound velocity at pressure can yield new information on its equation of state and strength. This includes sensitivity to phase changes, such as the face centred cubic - hexagonal close packed (FCC – HCP) transition seen at 14 GPa in existing diamond anvil cell studies on lead. Results are presented on a series of gas gun driven plate impact experiments at stresses between 5 and 17 GPa, focussed on the dynamic measurement of the longitudinal sound velocity. Thin tungsten flyer plates were used to generate a shock and release profile, with arrival times of both the shock and initial rarefaction waves measured using frequency shifted PDV at multiple sample thicknesses via a stepped target setup. A comparison of these experimental results to current multi-phase material models are presented, with a reduced gradient in the sound velocity with pressure observed compared to that predicted. Initial results on the dilute lead antimony alloy are also presented, facilitating comparison with the pure lead material.

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