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Real-time measurements of shock and release in granular materials with synchrotron X-ray radiography MICHAEL E. RUTHERFORD, DAVID J. CHAPMAN, Institute of Shock Physics, Imperial College London, ALEXANDER RACK, European Synchrotron Radiation Facility, DANIEL E. EAKINS, Institute of Shock Physics, Imperial College London — Real-time mesoscale measurements of shock-induced densification in granular materials are required to further our understanding of how potential design parameters such as porosity and crystalline phase influence macroscale material performance. Synchrotron light sources provide periodic, high-flux, penetrating X-ray beams, making them an ideal tool with which to make dynamic, early-time (ns-μs), mesoscale measurements of compaction and release front evolution in shocked powders. This poster discusses the development and application of a high-spatiotemporal resolution (150 ps, 10s μm) phase-contrast X-ray radiography method for studying shock-compressed porous materials at the European Synchrotron Radiation Facility (France). Representative results recorded on single and multi-component granular samples are presented. Emphasis is placed upon the greatly enhanced scope of data available with the radiographic method in comparison with surface-based studies. Analysis of spatially-resolved wave speeds, wavefront thickness and density will be presented.

Michael E. Rutherford
Institute of Shock Physics, Imperial College London

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