Abstract Submitted
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Prospects for Using X-Ray Free-Electron-Lasers to Investigate Shock-Compressed Matter[1] BOB NAGLER, ANDREW HIGGINBOTHAM, GILES KIMMINAU, WILLIAM MURPHY, JUSTIN WARK, THOMAS WHITCHER, University of Oxford, UK, JAMES HAWRELIAK, DAN KALANTAR, RICHARD LEE, HECTOR LORENZANA, BRUCE REMINGTON, LLNL, JORGEN LARSSON, University of Lund, Sweden, NIGEL PARK, AWE, Aldermaston, UK, KLAUS SOKOLOWSKI-TINTEN, University of Duisburg-Essen, Germany — Within the next few years hard X-ray Free Electron Lasers will come on line. Such systems will have spectral brightnesses ten orders of magnitude greater than any extant synchrotron, with pulse lengths as short as a few femtoseconds. It is anticipated that alongside the X-ray source large-scale optical lasers will be sited, capable of shock-compressing matter to multi-megabar pressures. We discuss the opportunities that such systems may afford to further our knowledge of shocked and isochorically heated matter, in particular investigating the potential to perform small angle and/or diffuse scattering that may allow in situ measurements of dislocation densities in shocked crystals, and the creation of warm dense matter.

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