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Measuring material structure of samples dynamically compressed to high pressure JAMES HAWRELIAK[1], DAN KALANTAR, HECTOR LORENZANA, STEVEN POLLAINE, BRUCE REMINGTON, RAY SMITH, Lawrence Livermore National Laboratory, ANDREW HIGGINBOTHAM, WILLIAM MURPHY, JUSTIN WARK, University of Oxford — Dynamic quasi-isentropic compression will be used on the National Ignition Facility to generate pressures approaching 3000 GPa. This will enter a materials regime impossible to reach in the solid state by static and shock compression techniques. There is sparse data on materials at these pressures to validate the models and quantum molecular dynamics simulations that are now possible. Our goal is to develop diagnostic techniques that can be used dynamically to measure key properties of these materials at these extreme conditions. We will discuss the development of dynamic x-ray diffraction from quasi-isentropically compressed samples on laser-based platforms as a means of determining the crystallographic structure. This work performed for the US DOE by UC LLNL under contract W-7405-ENG-48. The project (06-ERD-017 and 06-SI-004) was funded by the Laboratory Directed Research and Development Program at LLNL.

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