For submission to the APS/DPP press releases, David D. Meyerhofer, University of Rochester

Measurements of shock-induced compression in titanium

The study of shock-compressed metals is a topic of growing importance within the high energy density physics community. Measurements of the extended x-ray absorption fine structure (EXAFS) are commonly made at synchrotrons to determine the inter-atomic spacing and chemical bonding in static materials. This technique has recently been extended to shock-compressed metals at the University of Rochester's Laboratory for Laser Energetics. 59 of the 60 beams on the OMEGA laser system compress a spherical target to provide a smooth and bright x-ray source to backlight a Ti foil shocked by the remaining beam. Shock-wave induced compression and heating have been measured directly using an x-ray spectrometer to identify the EXAFS-induced modulations on the backlighter spectrum. This technique can be applied to a wide variety of high energy density physics experiments. In particular, it is possible that material structures under much higher pressures than is available in pressure cells used in synchrotron experiments can be studied, including the dynamics of solid-liquid phase transitions. These results will be presented in talk CO2.006 by Dr. B. Yaakobi. For further information contact Dr. R.L. McCrory (rmcc@lle.rochester.edu, 585-275-5286) or Dr. D.D. Meyerhofer (ddm@lle.rochester.edu, 585-275-0255).

EXAFS figure attached