## Abstract Submitted for the SHOCK13 Meeting of The American Physical Society

In-situ XRD of iron at megabar pressures with short laer pulses ZUZANA KONOPKOVA, DESY Photon Science, Notkestr. 85, 22607 Hamburg, Germany, ALEXANDER GONCHAROV, Geophysical Laboratory, Carnegie Institution of Washington, 5251 Broad Branch Road NW Washington D.C., 20015, HANNS-PETER LIERMANN, DESY Photon Science, Notkestr. 85, 22607 Hamburg, Germany, WOLFGANG MORGENROTH, Inst. f. Geowissenschaften, Goethe Universität Frankfurt, D-60483 Frankfurt am Main, Germany, JAN TOR-BEN DELITZ, DESY Photon Science, Notkestr. 85, 22607 Hamburg, Germany, VI-TALI PRAKAPENKA, Consortium for Advanced Radiation Sources, the University of Chicago, Chicago, Illinois, USA — Recent improvements and growing technical capabilities of synchrotron sources enable us to investigate matter on shorter time scales, partially bypassing problems with sample contaminations and reaching increasingly higher temperatures at higher pressures. High quality x-ray diffraction data are nowadays feasible to obtain in several tens of milliseconds thanks to the high photon flux and efficient large area detectors. In-situ XRD experiments were conducted at the Extreme Conditions Beamline, P02.2, PETRAIII, Hamburg. The short laser pulses keep the heating time at minimum, which proves to be less destructive to the diamonds and the sample. We have followed the above strategy to study iron at megabar pressures. Measuring diffraction of iron at Earth's core conditions is technically difficult to achieve, which leads to contradictory results. We observe re-crystallization at highest temperatures and appearance of reflections with a large thermal shift. Further studies on melting and phase transitions will be conducted on iron and other metals in the near future.

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