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Imaging High-Pressure Shock Waves by Magnified X-Ray Phase Contrast Imaging at the LCLS ANDREAS SCHROPP, BRICE ARNOLD, ERIC GALTIER, LEE HAE JA, BOB NAGLER, JEROME HASTINGS, SLAC National Accelerator Laboratory, YUAN PING, GILBERT COLLINS, Lawrence Livermore National Laboratory, ROBERT HOPPE, VIVIENNE MEIER, JENS PATOMMEL, FRANK SEIBOTH, CHRISTIAN SCHROER, Institute of Structural Physics, Technische Universität Dresden, SLAC COLLABORATION, LLNL COLLABORATION — The emergence of the new x-ray free-electron lasers (XFELs) comes along with completely new research opportunities in various scientific fields. The availability of short x-ray pulses of about 50fs time duration enables one to capture snapshots of the state of matter with ultrahigh temporal resolution. During the last year we developed an x-ray microscope based on beryllium compound refractive lenses (Be-CRLs), which provides focusing capabilities down to 100nm and even below. This new setup enables us to perform x-ray imaging experiments requiring additionally high spatial resolution. In a first experiment, carried out at the Matter in Extreme Conditions (MEC) endstation of the LCLS, the performance of the microscope was investigated by direct imaging of shock waves in different materials. The shock wave was induced by a 150ps infrared laser pulse. The evolution of this shock wave was then monitored with with an XFEL-pulse by magnified x-ray phase contrast imaging. In this contribution we report on the current status of the instrument and show first analysis results.

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