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Soft X-Ray Backlighting of Cryogenic Implosions Using a Narrowband Crystal Imaging System C. STOECKL, R. EPSTEIN, G. FIKSEL, D. GUY, V.N. GONCHAROV, R.K. JUNGQUIST, C. MILEHAM, P.M. NILSON, T.C. SANGSTER, M.J. SHOUP III, W. THEOBALD, Laboratory for Laser Energetics, U.of Rochester — X-ray backlighting of high-energy-density matter is widely used for imaging high-energy-density plasmas in hydrodynamic experiments. High-energy petawatt (HEPW) lasers such as OMEGA EP promise significantly improved backlighting capability by producing enhanced x-ray power and shorter emission times. A narrowband x-ray imager with an astigmatism-corrected, aspherically bent, quartz crystal for the Si He_α line at $\sim$1.86 keV has been used to record backlit images of cryogenic direct-drive implosions. A time-gated recording system was used to minimize the self-emission of the imploding target. With backlighter laser energies of $\sim$1.25 kJ at a 10-ps pulse duration, the radiographic images show a high signal-to-background ratio of $>$ 100:1 and a spatial resolution of better than 15 μm. The backlit images will be used to assess the symmetry of the implosions close to stagnation. This material is based upon work supported by the Department of Energy National Nuclear Security Administration DE-NA0001944 and the Office of Science under DE-FC02-04ER54789.

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