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Hard x-rays as a diagnostic tool for warm dense matter¹ ERIK BRAMBRINK, H.G. WEI, B. BARBREL, P. AUDEBERT, A. BENUZZI, C. GREGORY, M. RABEC LE GLOAHEC, M. KOENIG, LULI, Ecole polytechnique, Palaiseau, France, T. ENDO, T. KIMURA, R. KODAMA, N. OZAKI, Graduate school of engineering, Osaka university, Suita, Osaka, Japan, T. BOEHLI, LLE, Rochester, USA, H.-S. PARK, LLNL, Livermore, USA — Laser driven sources producing short bursts of energetic x-rays (10-100 keV) are an important tool to investigate warm dense matter. Radiography, x-ray scattering and x-ray diffraction are the principal tools to measure ionic density, plasma parameters and crystal structure. We studied short-pulse laser-generated hard x-ray (18-60 keV) sources, suitable for radiographs of large samples of dense matter. The spatial and dynamic resolution for different target types and laser parameters have been investigated. A high quality radiographs with good spatial resolution in two dimensions was demonstrated by irradiating free standing thin W wires. We investigated also the influence of the geometry for the quality of the radiograph, which is crucial for the design of experiments probing laser-compressed matter. Finally, we present the application of the x-ray source for the density measurement of shocked iron.

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