

Abstract Submitted
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Development of a Spherical Crystal X-Ray-Imaging Diagnostic for OMEGA and OMEGA EP G. FIKSEL, R. JUNGQUIST, C. MILEHAM, P.M. NILSON, W. THEOBALD, C. STOECKL, Laboratory for Laser Energetics, U. of Rochester — Bent Bragg crystal x-ray imagers have become routine diagnostics in various laser, magnetically confined, and astrophysical plasmas. The Laboratory for Laser Energetics is developing a monochromatic x-ray imager for backlit and self-emission plasma imaging at Cu K_α line radiation at 1.541 Å (8.048 keV). The image will be formed by a spherically bent quartz crystal with a 2131 lattice cut. The crystal $2d$ lattice spacing of 3.082 Å corresponds to an 88.7° angle (1.3° from normal). The crystal has a 25-mm diameter and the radius of curvature radius is $R_c = 500$ mm. The resulting spectral bandpass is $\Delta\lambda/\lambda = 10^{-3}$. Optical ray tracing shows that a spatial resolution of about 6 to 8 μm is possible, limited by astigmatism and coma. The imager prototype will be tested on the MTW Laser Facility. The x-ray radiation will be formed by interaction of short (<1 -ps), high-power ($>10^{19}$ W/cm²) laser pulses with thin Cu foils. Details of design, testing, and the schedule for implementation on OMEGA EP will be reported. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

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