Abstract Submitted
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A 7.2 keV spherical crystal backlighter system for Sandia's Z Pulsed Power Facility[1] M. SCHOLLMEIER, P.F. KNAPP, D.J. AMPLEFORD, G.P. LOISEL, G. ROBERTSON, J.E. SHORES, I.C. SMITH, C.S. SPEAS, J.L. PORTER, R.D. MCBRIDE, Sandia Natl Labs — Many experiments on Sandia's Z facility, a 30 MA, 100 ns rise-time, pulsed-power driver, use a monochromatic Quartz crystal imaging backlighter system at 1.865 keV (Si He_α) or 6.151 keV (Mn He_α) x-ray energy to radiograph an imploding liner (cylindrical tube) or wire array. The x-ray source is generated by the Z-Beamlet Laser (ZBL), which provides up to 4.5 kJ at 527 nm during a 6 ns window. Radiographs of an imploding thick-walled Beryllium liner at a convergence ratio of about 20 [CR = $R_{in.}(0)/R_{in.}(t)$] were too opaque to identify the inner surface of the liner with high confidence, demonstrating the need for a higher-energy x-ray backlighter between 6 and 10 keV. We present the design, test and first application of a Ge (335) spherical crystal x-ray backlighter system using the 7.242 keV Co He_α resonance line. The system operates at an almost identical Bragg angle as the existing 1.865 and 6.151 keV backlighters, enhancing our capabilities such as two-color, two-frame radiography, without changing detector shielding hardware.
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