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2.12 A Wolter Imager on the Z Machine to Diagnose Warm X-ray Sources

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We have developed a Wolter x-ray imager on the Z Machine to study the emission of warm x-ray sources with x-ray energies above 15 keV. As x-ray energy increases, imaging these sources with both high resolution and signal-to-noise becomes increasingly difficult using existing pinhole camera techniques. A Wolter optic has been adapted from observational astronomy and medical imaging for Z and uses curved x-ray mirrors to form a 2D image of a source with 5x5x5mm FOV and measured 180-μm resolution on-axis. The mirrors consist of a multilayer that is tuned to allow x-rays within a narrow energy band to be collected by the optic. This multilayer, along with the larger collection solid angle makes the Wolter optic much more efficient at imaging x-rays compared to a traditional pinhole camera. Here we present the experimental design and implementation of the Wolter x-ray imager on Z, which is initially optimized to view Mo K-alpha x-rays (17.5 keV). In addition, we present a brief overview of its measured imaging performance and considerations for image deblurring.

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