Abstract Submitted
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Establishing the x-ray diagnostic capabilities on the Magnetized Shock Experiment[1] J. BOGUSKI, T. E. WEBER, Los Alamos National Laboratory, I. A. BEAN, Virginia Polytechnique and State University, G. A. WURDEN, Los Alamos National Laboratory — Soft x-ray (0.1 – 10 keV) diagnostics are a workhorse for providing information on the temperatures and dynamics of plasmas. Additionally, hard x-rays (10 – 100 keV) can provide key insight into the kinetics of high-energy electron populations, such as those generated in collisionless shocks, high energy density physics applications, and outputs of intense laboratory x-ray sources. The Magnetized Shock Experiment (MSX) at LANL is a platform to study the physics of kinetic shocks and radiation generation processes using stagnating flow-dominated magnetized plasmoids. To develop an understanding of the expected x-ray outputs, we have built a multichannel x-ray detector using a series of pinhole aperture, transmission-foil-based "Ross" bandpass filters coupled to phosphor-coated windows to convert the x-rays to visible photons and PMTs for sensitive, time-resolved detection. A vacuum region separates the foils from the phosphor screen and PMT detector so as to make the output signal immune to incident plasma electrons. This system provides broadband coverage ranging from ˜0.1 keV to ˜100 keV with rough binning of photon output, and will serve as a basis for further refinement and development of more sophisticated x-ray diagnostics. Access to onsite soft and hard x-ray calibration tests stands enables accelerated development of detectors and rapid testing of new materials and designs.

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