

Abstract Submitted
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PIN Diode and Amplifier Array for Imaging Transient X-ray Bursts from the Caltech MHD Jet Experiment¹ YI ZHOU, PAUL BELLAN, Caltech — Transient 6 keV x-ray bursts having a duration of about one microsecond are detected in association with the breaking off of an MHD-driven plasma jet in the Caltech MHD jet experiment [1]. The detection of x-rays is surprising because the plasma is both cold (2 eV) and highly collisional (mean free path about one micron in a plasma having a spatial scale of 10's of cm). The X-rays were observed using detectors that provide temporal but no spatial information. In order to locate the x-ray source, a PIN diode detector array is being developed for use in a coded-aperture imaging system. A prototype channel consisting of a PIN diode and an amplifier has been demonstrated to be sensitive to single 6 keV photons from a Fe-55 radioactive source. This prototype also detects the transient x-rays from the jet experiment and the detected signal is simultaneous with the signal from the previously-used photomultiplier-based detector. The signal-to-noise ratio of the prototype is comparable but may need to be improved in order to attain imaging capability. [1] R. S. Marshall, M. J. Flynn and P. M. Bellan, *Physics of Plasmas* 25 (2018) Art. No. 112101

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