Abstract Submitted
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1D Coded Aperture X-ray Camera[1] SETH PREE, PAUL BELLAN, Caltech — Magnetized target fusion devices involve fast compression to high density and are compact. These properties make diagnosis difficult compared to conventional magnetic confinement devices such as tokamaks because of the tight space, the high power density, and the fast time scale. These issues put a premium on fast imaging diagnostics having a substantial standoff from the plasma. X-ray emission is an important indicator of plasma shape, evolution, and hot spots so an X-ray imaging camera is desirable. X-rays cannot be focused easily (if at all), so it is necessary to use an imaging system that avoids mirrors and refractive optics. A pinhole camera would be one possible solution, but a single aperture reduces sensitivity. To address these considerations, we are developing a 1D coded aperture imaging system with ∼30 ns resolution. This system, based on an earlier visible light proof-of-principle, will use a linear pixelated scintillator coupled via an optical fiber array to four 32-channel photomultiplier modules. The system will first be tested on the Caltech MHD jet to image a localized X-ray burst. It is then planned to diagnose MTF devices such as FuZE and MIFTI.

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