

Abstract Submitted
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High Resolution X-Ray Measurement on MST¹ M.W. BROOKMAN, A.F. ALMAGRI, D.J. CLAYTON, J.D. LEE, J.S. SARFF, University of Wisconsin - Madison, Y. DIAWARA, Oak Ridge National Laboratory — A custom-built x-ray detector, with a 20 nanosecond shaping time, will provide a spectral measurement of photons in the 2 to 10 keV energy range. Output pulses from a shaping amplifier are directly digitized at 500 MHz to maximize spectral resolution. Each pulse can be fit to a Gaussian, and noise pulses are easily discriminated. This method is highly advantageous for plasmas with strong x-ray emission to avoid pulse pile-up. The new detector's 20 nanosecond pulse resolution is a ten-fold improvement in time resolution over x-ray detectors currently installed. It can be installed at several locations on the machine, to establish a toroidal survey of x-ray emission. With the help of a large set of pinhole collimators the diagnostic can be run under a wide variety of plasma conditions with the highest possible count rate. The photon energy and time of the pulse are recorded to generate the energy spectra for many time windows. X-ray spectra under various plasma conditions will be analyzed and compared with data from slower x-ray systems. Resulting data can then be used to estimate temperature and plasma effective charge.

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