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Fielding of a time-resolved tomographic diagnostic

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ABSTRACT

A diagnostic instrument has been developed for the acquisition of high-speed time-resolved images at the Dual-Axis Radiographic Hydrodynamic Test (DARHT) Facility at Los Alamos National Laboratory. The instrument was developed in order to create time histories of the electron beam. Four discrete optical subsystems view Cerenkov light generated at an X-ray target inside of a vacuum envelope. Each system employs cylindrical optics to image light in one direction and collapse light in the orthogonal direction. Each of the four systems images and collapses in unique axes, thereby capturing unique information. Light along the imaging axis is relayed via optical fiber to streak cameras. A computer is used to reconstruct the original image from the four optically collapsed images. Due to DARHT's adverse environment, the instrument can be operated remotely to adjust optical parameters and contains a subsystem for remote calibration. The instrument was deployed and calibrated, and has been used to capture and reconstruct images. Matters of alignment, calibration, control, resolution, adverse conditions and maintenance will be discussed.

Keywords: fielding, tomography, adverse environment, instrumentation, high-speed imaging

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