

Design and Upgrade of a Compact Imaging System for the APS Linac Bunch Compressor*

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Abstract

We present the design, performance, and recent upgrade of a high-resolution, high charge sensitivity imaging camera system for the APS linac beam profile measurement. Electron beam distribution is converted to optical intensity distribution using standard YAG or optical transition radiation (OTR) converter screens. Two CCD cameras share the light through a beam splitter, each with its own imaging optics. One camera is normally set to a low magnification to give a full view of the converter screen, while the other to a high magnification for measuring very small beam. The focus and irises are driven by stepper motors and are remotely controlled. The fixed magnification and remotely controlled focus are chosen to obtain high reproducibility during beam-based setup of the optics. On bench test, the camera gave better than 10- μ m resolution and better than 1% reproducibility of the magnification. A four-position actuator was installed recently to provide the option of two flags, a wakefield shield, and an *in situ* calibration target. Other operation modes of the imaging system will also be discussed, including a compact version with a build-in electronic beam position monitor.

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