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Upgrade of the phase space multiscreen of FERMI Linac

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The measurement of the longitudinal phase space at the end of FERMI linac is one of the most important characterization of the electron beam properties prior to delivery to the FEL lines. It is performed using an RF-deflecting cavity in conjunction with a dipole to spread the beam in time and energy. The beam transverse distribution is then measure with a multiscreen. The original multiscreen installed in 2009 had a large FOV with a 45deg YAG orientation and 1.5MPx camera. An upgrade has been devised to improve resolution, frame rate and robustness to COTR contamination. The upgrade design is based on a COTR suppressing geometry, a dispersion minimizing incidence angle, a double mirror vacuum optical layout and a Scheimpflug camera geometry. The optical distortion has been characterized by using a precision checkerboard target and automatic Matlab nodes detection. This leads to a transformation matrix that is applied at the image server level to the raw image to remove the trapezoidal distortion. The detector is 8 Mpx 10 Gbit/s CMOS camera fiber coupled to the image sever and capable of full frame 50Hz acquisition.

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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