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Construction and Tests of Phosphor View Screen Station for Monitoring Transverse Profile of Electron Beam at PCELL

Development of an accelerator-based light source for generating coherent terahertz (THz) and mid-infrared (MIR) free-electron laser (FEL) is ongoing at the PBP-CMU Electron Linac Laboratory (PCELL). For producing high quality radiation, suitable electron beam property is necessary. In particle accelerator technology, transverse beam distribution and profile can be measured by using several techniques. The beam monitoring using view screen station is one of popular and effective methods. At PCELL, we use stations consisting of phosphor screen equipped with CCD camera to monitor, measure and record the beam image along the accelerator system and beamlines. The phosphor screen was chosen due to its high spatial resolution. The phosphor film is uniformly coated on a thin aluminum plate. Its green emission when electrons hitting the screen is mated well with the respond of the CCD camera. The screen can be moved in and out from the vacuum chamber using the air pressurized linear actuator. This paper presents about design, construction and tests of the screen stations. The resolution of measurements for beam transverse profile and emittance will also be discussed.

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