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Design of the LCLS-II HE Burn-Through Monitor Readout Electronics

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The Linac Coherent Light Source II (LCLS-II) is currently undergoing a High Energy (HE) upgrade. This upgrade adds 23 additional cryomodules to the LCLS-II Linac, increasing its energy from 4GeV to 8GeV; which subsequently increases the hard X-ray source photon energy from 5keV up to 12keV. In the photon experimental beamlines, X-ray beam stoppers, located at the entrance to the experimental hutches, can be inserted to absorb the beam indefinitely, up to its full energy. In the event that the beam should somehow breach the stopper, a burn-through monitor (BTM), placed directly in back of the stopper is designed to detect and respond to this occurrence. The BTM detector consists of a YAG:Ce scintillator coupled with a photodiode, which detects the burst of fluorescent photons produced by the breach. The electronics system reads out the photodiode and signals a fault to the LCLS-II Beam Containment System (BCS), interrupting accelerator and FEL beam production. The BTM readout electronics must be simple, reliable and self-checking. This paper describes the design of this electronics system, including the operation and performance of its predecessor, which was developed for LCLS-II.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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