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Monte Carlo studies of BeamLoss detectors for PoFEL

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The main purpose of Beam Loss Monitor (BLM) system is the early detection of incorrect beam propagation inside the beamline and, therefore, the protection of machine, its vacuum and electronic components. The beam parameters within the PoFEL facility induces the need of such a system. Each of the proposed beam loss detector, which are distributed along the PoFEL device, is built of miniature photomultiplier tube integrated with HV supplier and voltage divider, coupled with small plastic scintillator. The paper describes numerical investigation of Beam Loss Monitor position and efficiency along the designed PoFEL linear accelerator and undulator sections. In order to determine response of BLM detector for various positions within the facility, we have used the Geant4 Monte Carlo framework. Definition of the geometry used during calculations was based on the CAD design of PoFEL and detectors, and utilize gdml support built into the Geant4. During the analysis, the energy deposition within the detector, as well as optical photon production, was taken into account. Additionally, the preliminary numerical studies of the cherenkov fiber optic BLM is also showed.

Footnotes

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