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GEANT4-BASED ANALYSIS OF FARADAY CUP PERFORMANCE FOR PIP-II LASER WIRE SCANNER SYSTEM

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The Proton Improvement Plan-II (PIP-II) accelerator upgrade at Fermilab marks a significant advancement in high-energy physics research. This initiative aims to enhance Fermilab's accelerator complex by replacing the existing linear accelerator with a warm front end (WFE) capable of accelerating H^- beams to 2.1 MeV. These beams are then further accelerated to 800 MeV using a superconducting linac (SCL). To accurately measure the transverse beam profile, traditional wire scanners will be utilized in the WFE section, while Laser wire scanners will be implemented along the SCL. The Faraday cup for the Laser wire scanner has been designed using the GEANT4 simulation toolkit. This paper presents a detailed analysis of its performance, focusing on electron absorption, secondary electron emission, and backscattering along the SCL.

Footnotes

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