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(G*) Simulation study of the impact of intermediary materials on the T9 beam for the WCTE.

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The Hyper-Kamiokande (HK) is a next generation neutrino detector that will require new detector technologies and percent-level calibration to achieve its full physics potential. To achieve this goal, a 50-ton scale Water Cherenkov Test Experiment (WCTE) has been proposed and is scheduled to be installed at the T9 test beam experimental area in CERN, with the run starting in summer of 2024. To understand and characterize the T9 beam, several small detectors have been designed, including a Time-of-flight (TOF) detector, Aerogel Cherenkov Threshold (ACT) detectors, hole counters, and hodoscopes. These detectors will be placed between the beam-target stage and the WCTE water tank. However, the presence of these intermediary materials will modify the momentum and position distribution of the incoming T9 beam. To study these modifications, a dedicated Geant4 simulation has been performed, and the results will be discussed in this talk. Overall, this simulation aims to improve the accuracy and effectiveness of the WCTE detector by providing a better understanding of the T9 beam and its interactions with intermediary materials.

Keyword-1

Geant4

Keyword-2

Neutrino detector

Keyword-3

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