

In-beam charged particle detector using 0.2-mm thick plastic scintillator for the J-PARC KOTO experiment

Friday 19 July 2024 20:40 (20 minutes)

The KOTO experiment at J-PARC is dedicated to searching for the rare decay $K_L \rightarrow \pi^0 \nu \bar{\nu}$. This decay violates CP symmetry and is sensitive to new physics beyond the Standard Model (SM) because its branching ratio is predicted to be 3×10^{-11} with a small theoretical uncertainty in SM. One of main backgrounds is caused by a small contamination of charged kaons in the neutral beam. We installed a new charged particle detector in the beam to reject the background events by detecting charged kaons directly. This detector consists of a 0.2-mm-thick plastic scintillator film and 12- μm -thick aluminized mylar. The scintillation photons escaping from the scintillator surface are reflected by the mylar and are detected with multiple photomultiplier tubes on the sides. In the data taken in 2023, we concluded light yield was 18.9 photoelectrons and inefficiency was less than 0.1%. In this presentation, I will report on the performance in detail.

Alternate track

I read the instructions above

Yes

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Session Classification: Poster Session 2

Track Classification: 12. Operation, Performance and Upgrade (incl. HL-LHC) of Present Detectors