

A gaseous time projection chamber with Micromegas readout for low-radioactive material screening

Wednesday, 8 May 2024 14:40 (20 minutes)

Low-radioactive material screening is becoming essential for rare event search experiments, such as neutrinoless double beta decay and dark matter searches in underground laboratories. A gaseous time projection chamber (TPC) can be used for such purposes with large active areas and high efficiency. A gaseous TPC with a Micromegas readout plane of approximately $40 \times 60 \text{ cm}^2$ is successfully constructed for surface alpha contamination measurements. We have characterized the energy resolution, gain stability, and tracking capability with calibration sources. With the unique track-related background suppression cuts of the gaseous TPC, we have established that the intrinsic alpha background rate of the TPC is $(0.27 \pm 0.02) \times 10^{-6} \text{ Bq/cm}^2$. The surface-treated acrylic samples are currently being tested in the TPC.

Collaboration (if any)

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Session Classification: 09 - 探测器物理与技术

Track Classification: 09 - 探测器物理与技术