

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

Thursday, 10 August 2023 13:30 (12 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 $20 \times 20 \text{ cm}^2$ 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 alpha background rate of the TPC is $(0.13 \pm 0.03) \times 10^{-6} \text{ Bq/cm}^2$, comparable to the leading commercial solutions.

Primary author: 韩, 柯 (上海交通大学)

Presenter: 文铭, 张 (上海交通大学)

Session Classification: 第一分会场 (RAS3)

Track Classification: 核探测器及其应用的研究成果