Contribution ID: **62**   Type: **Poster**

Towards a muon scattering tomography system for both low-Z and high-Z materials

Saturday 20 April 2024 17:55 (5 minutes)

Muon scattering tomography (MST) is a non-destructive technique to image various materials by utilizing cosmic ray muons as probes. A typical MST system with a two-fold track detectors is particularly effective in detecting high-Z materials (e.g. nuclear materials), but difficult to recognize low-Z materials (e.g. explosive materials). In this poster, we present a concept of MST system to discriminate both low-Z and high-Z materials by extra measuring momentum of low-energy muons with a Cherenkov detector. Based on momentum-dependent track reconstruction and image reconstruction algorithm, we evaluate separation powers of different materials in the system. The results show that momentum measurement of low-energy muons and accurate track reconstruction can improve separation power of low-Z materials significantly.

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Session Classification: Poster (For two days)