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# Experimental Momentum-binning for Muon Scattering Tomography

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Muon scattering tomography is a novel cosmic muon imaging technique that exploits the multiple Coulomb-scattering of the cosmic muons.
Imaging and identification of enclosed high-Z materials become possible,
usable in large volume scanners. The proof of concept is supported via several simulation frameworks and experimental demonstartions.

As the scattering angle strongly depends on the momentum of the muon,
using that information can enhance the imaging, and allow one to expand the identification capabilities towards lower-Z materials.

We have constructed a muon-scattering experiment using good spatial resolution 80cm-size MWPCs, as multiple layer setup for precise tracking.
The basics of operation has been proved as mapping the scattering-strength in 2D/3D maps of targets with various size (from 1cm up) and materials (ranging from plastic to lead). The setup is equipped with additional scattering layers below the post-target tracking part, thus scattering on these known layers could indicate the momentum of the incoming muon. This novel method opens for momentum tagging and thus momentum-binned imaging; which has increased the discrimination-power between materials even in lower-Z region.

The presentation will show details the experimental setup, display the imaging capabilites for various targets, and demonstrate its momentum-binned imaging.

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