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Muon momentum measurement in Muon Scattering Tomography

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The recent MODE whitepaper*, proposes an end-to-end differential pipeline for the optimization of detector designs directly with respect to the end goal of the experiment, rather than intermediate proxy targets. The TomOpt python package is the first concrete step in attempting to realize such a pipeline, and aims to allow the optimisation of detectors for the purpose of muon tomography with respect to both imaging performance and detector budget. Within this context, we propose to add an extra detection module in order to measure muon momentum. Given that momentum knowledge improves the quality of image reconstruction, a trade-off has to made between the cost of the momentum measurement module and the imaging performance required by the MST task. This poster explores how parameters of the detector can be related to the overall performance of the MST detection system.

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