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## Construction of the ultra-thin Mu3e tracker detector

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A low-mass detector is fundamental to experiments where multiple scattering limits the spatial and momentum resolution of the tracking system. This requirement applies to low-momentum experiments, such as the muon to 3-electron decay search, i.e., the Mu3e experiment, under commissioning at PSI. To fulfil the material budget specifications ( $0.1\% X_0$  per layer), Mu3e exploits High-Voltage Monolithic Active Pixel Sensors (HV-MAPS). These chips integrate sensor and readout electronics and can be thinned to  $50 \mu\text{m}$  thickness (or  $0.054\% X_0$ ). The remaining material budget is used on the mechanical support structure, of which the high-density interconnect flex circuit forms an integral part. The minimal thickness of each layer introduces considerable challenges related to the mechanical stability and construction of the detector components.

We will present the design of the Mu3e tracker and the mechanical tooling used during its construction. The challenges set by the Mu3e requirements for a low material budget detector will be discussed, and first detector prototypes will be shown.

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