

## Design and construction of the ultra-lightweight Mu3e vertex detector

The Mu3e collaboration is setting up an experiment to study the decay of a muon into three electrons  $\mu^+ \rightarrow e^+ e^- e^-$ . Any observation of this decay with the Mu3e experiment would point to physical processes so far not described in the standard model, mediated by the exchange of very heavy particles.

Mu3e uses ultra-thin High Voltage –Monolithic Active Pixel Sensors (HV-MAPS) for vertexing and tracking plus scintillating detectors for timing.

Different tools were designed for prototype production as close as possible to series production. Different parts of the vertex detector have been modified during the tooling process to improve manufacturability and functionality.

The prototype half shell which is used for thermal stress tests, consists of four equivalent tape heater ladders and PEI-end rings on both sides. A ladder includes one HDI-flex and a stiffener on both ends. During the mounting process the ladders get connected to each other with a single fold on the long side. It will be shown how we kept up the requirement of a very low material budget combined with a high stability and CTE control. This poster presentation will focus on the prototype production of the inner pixel layers. Prototypes will be on display.

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