



Contribution ID: 334

Type: **Talk**

HV-MAPS for Mu3e and beyond

Wednesday 19 February 2025 09:00 (20 minutes)

Many years of research and development of High Voltage Monolithic Active Pixel Sensors (HVMAPS) have culminated in the final design for the Mu3e pixel sensor, MuPix11. Following the requirements of the Mu3e experiment MuPix11 has been developed to provide excellent vertex, time and momentum resolution in a high rate environment and allowing to construct ultra-thin detector layers with 1\,textperthousand material budget.

While the MuPix sensor architecture was settled in 2018, the HV-MAPS technology kept evolving towards higher levels of functionality integration and improved time resolution, approaching the 1\, ns regime.

In this work, the MuPix11 chip will be presented including results from testbeam and laboratory characterisation, as the status and results of the construction of the Mu3e pixel detector. Further, the current state of the generic HV-MAPS development and an outlook towards future developments will be given.

Primary experiment

Mu3e

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Session Classification: Semiconductor MAPS 1

Track Classification: Semiconductor Detectors