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The Mu3e vertex detector - prototyping, cooling, and upcoming production

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The Mu3e experiment searches for the lepton flavor violating decay $\mu^+ \rightarrow e^+e^-e^+$ with an ultimate aimed sensitivity of 1 event in 10^{16} decays.

For this goal a very high momentum resolution is required.

This goal can only be achieved by reducing the material budget per tracking layer to $X/X_0 \approx 0.1\%$ and by using gaseous helium as coolant, a novelty for particle detectors.

The pixel detector is based on High-Voltage Monolithic Active Pixel Sensors (HV-MAPS) which are thinned to $50 \mu\text{m}$.

This poster presents the first successful operation of a thin pixel detector cooled with gaseous helium and thermal studies regarding the two inner tracking layers of Mu3e.

In addition, the upcoming detector production of the Mu3e vertex detector including chip and module quality control will be outlined.

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