

The Mu3e Experiment Searching for the Lepton Flavour Violating Decay $\mu^+ \rightarrow e^+e^+e^-$

Wednesday 29 July 2020 13:48 (3 minutes)

The Mu3e experiment is a novel experiment to search for the lepton flavour violating (LFV) decay $\mu^+ \rightarrow e^+e^+e^-$, with an ultimate sensitivity to a branching ratio of one in 2×10^{15} in phase I and one in 10^{16} muon decays for phase II, at 90 % CL. This would be an improvement in sensitivity by four orders of magnitude compared to previous searches by the SINDRUM experiment. Since this decay is suppressed to unobservable levels in the Standard Model of particle physics, any measurement of this decay would be a clear sign of new physics.

The experiment is currently under construction and will take place at the Paul Scherrer Institute in Switzerland. In order to reach this enormous number of muons, PSI is utilizing the worlds most intense muon beam, which produces $10^8 \mu/s$ at $\pi E5$ beamline (phase I) and a new high-intensity muon beamline HiMB is providing $10^9 \mu/s$ (phase II). To achieve the proposed sensitivity, the Mu3e experiment requires excellent vertex resolution, accurate timing, and momentum measurements. These are needed to reduce the main background processes, such as accidental coincidences of tracks from Michel decays with electron-positron pairs from Bhabha scattering or photon conversion.

The proposed poster will present an overview of the Mu3e experiment, and how this sensitivity is achieved based on high voltage monolithic active pixel sensors for high spatial resolution and scintillating fibres and tiles providing precise timing information at high particle rates.

I read the instructions

Secondary track (number)

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Session Classification: Detectors for Future Facilities (incl. HL-LHC), R&D, Novel Techniques - Posters

Track Classification: 13. Detectors for Future Facilities (incl. HL-LHC), R&D, Novel Techniques