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Searching for cLFV with the Mu3e experiment

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The Mu3e experiment at the Paul-Scherrer-Institut searches for the charged lepton flavour violating decay $\mu^+ \rightarrow e^+ e^- e^+$. This decay mode is extremely suppressed in the Standard Model, such that any observation would be a clear signature for new physics being at play. The experiment will be conducted in two phases. In Phase I, a single event sensitivity of 2×10^{-15} is projected to be reached using the Compact Muon Beamline present at PSI. To reach the ultimate sensitivity of 10^{-16} in Phase II, an upgrade of the detector as well as a higher intensity muon beamline will be required.

The detector system has to provide excellent tracking efficiency as well as momentum, vertex and time resolutions to reach the experimental goals. An unprecedentedly thin silicon pixel tracking detector using HV-MAPS, ultra-light services and a gaseous Helium cooling system is being constructed. It is complemented by timing detectors consisting of scintillating fibres and tiles. The full detector is placed inside a solenoidal magnetic field of 1 T.

A first run integrating several subdetector prototypes was successfully conducted at PSI in 2021, with another run being planned for this year. While the design of the final detector components is being completed, the Mu3e experiment is entering the production stage. Commissioning of the final Phase I detector is planned to start in 2023. In this talk, the status of the Mu3e experiment will be presented.

In-person participation

Yes

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