

Search for LFV with the Mu3e experiment

Tuesday 7 September 2021 16:30 (30 minutes)

The Mu3e experiment is designed to search for the lepton flavor violating decay $\mu \rightarrow e^+e^+e^-$.

The ultimate aim of the experiment is to reach a branching ratio sensitivity of 10^{-16} .

The experiment is located at the Paul Scherrer Institute (Switzerland) and an existing beam line providing 10^8 muons per second will allow to reach a sensitivity of a few 10^{-15} in the first phase of the experiment.

The muons with a momentum of about 28 MeV/c are stopped and decay at rest on a target.

The decay products (positrons and electrons) with energies below 53 MeV are measured by a tracking detector consisting of two double layers of 50 μm thin high-voltage monolithic active pixel sensors.

The high granularity of pixel detector with a pixel size of $80\mu\text{m} \times 80\mu\text{m}$ together with the small material budget allows for a precise track reconstruction.

Two timing detectors (scintillating tiles and fibres) provide precise timing information, allowing to further suppress combinatorial background.

The full Geant4-based detector simulation with the final geometry and reconstruction software indicate that a background-free measurement is possible.

The design and prototyping of the detector are finalized, the solenoid magnet is installed, and the integration and commissioning has started with this year.

The talk presents the detector and readout system design, as well as performance studies of the first phase of the experiment.

The plans for commissioning and first data taking will be discussed.

Working group

WG4

Primary author: KOZLINSKIY, Alexandr (Institut für Kernphysik, Johannes Gutenberg-Universität Mainz)

Presenter: KOZLINSKIY, Alexandr (Institut für Kernphysik, Johannes Gutenberg-Universität Mainz)

Session Classification: WG 4