

Searching for Charged Lepton Flavour Violation with the Mu3e Experiment

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Being an accidental symmetry in the Standard Model (SM), the conservation of lepton flavour is violated in many extensions of the SM. There is a global effort to search for lepton flavour violation (LFV) at high intensity muon sources to which the upcoming Mu3e experiment at the Paul Scherrer Institute (PSI) will contribute.

The Mu3e Collaboration aims to perform a background-free search for the LFV decay $\mu^+ \rightarrow e^+ e^- e^+$ with an unprecedented sensitivity in the order of 10^{-15} in the first phase of operation, and 10^{-16} in the final phase - an improvement over the preceding SINDRUM experiment by four orders of magnitude. The innovative experimental concept is based on a tracking detector built from novel ultra-thin silicon pixel sensors and scintillating fibres and tiles. The momentum resolution is further improved by a dedicated track reconstruction for low-momentum electrons. The full detector information is read out continuously. The data rate is reduced by realtime online event reconstruction and filtering on a GPU-based filter farm. The experiment is operated with a continuous muon beam in the order of $10^8 \mu^+/s$ in phase I at an existing beamline at PSI, and in excess of $10^9 \mu^+/s$ in phase II at the future High Intensity Muon Beam facility.

The experimental concept including recent developments in the construction of the phase I experiment as well as physics opportunities will be presented.

Attendance type

In-person presentation

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