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The Mu2e experiment

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The Mu2e experiment at Fermilab will search for the neutrinoless conversion of a muon into an electron in the field of an aluminum nucleus. A clear signature of this charged lepton flavor violating coherent two-body process is the monoenergetic conversion electron of 104.97 MeV produced in the final state. The experiment will have a single-event sensitivity of 2×10^{-17} , and either set a 90\% CL at $\sim 8 \times 10^{-17}$ or make a 5σ discovery at 2×10^{-16} .

The experimental apparatus consists of an intense pulsed proton beam interacting on a tungsten target, a set of superconducting magnets selecting negative muons, a segmented aluminum target stopping the muons and a set of detectors used to identify conversion electrons and to reject backgrounds from the beam, from decays of muons through the normal weak interactions, and from cosmic rays.

The experiment will begin operations in 2023 and will need about 3 years of data taking to achieve a factor of 10^4 improvement on the current best limit on the conversion rate.

After an introduction to Mu2e physics, the status of the different components of the experimental apparatus will be discussed.

Author:Dr DI FALCO, Stefano (INFN Pisa)Presenter:Dr DI FALCO, Stefano (INFN Pisa)Session Classification:Session