

Status of the Mu2e experiment

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The Mu2e experiment at Fermilab will search for the coherent, neutrinoless conversion of a negative muon into an electron in the field of an aluminum nucleus, an example of Charged Lepton Flavor Violation (CLFV). Observation of CLFV at Mu2e would be an unambiguous signal of physics beyond the Standard Model (BSM). Mu2e aims to improve upon the current best sensitivity on the conversion rate by four orders of magnitude, reaching a single event sensitivity of 3×10^{-17} , exploring a wide range of BSM models and probing mass scales up to 10^4 TeV. To achieve this goal, Mu2e will utilize a system of superconducting solenoids to create an intense pulsed muon beam, with about 10^{10} stopped μ^-/s . For Run I, the expected 5σ discovery sensitivity is $R_{\mu e} = 1.2 \times 10^{-15}$, with a total expected background of 0.11 ± 0.03 events. In the absence of a signal, the expected upper limit is $R_{\mu e} < 6.2 \times 10^{-16}$ at 90% CL. Mu2e is approaching a very important phase. Construction is almost complete. Commissioning will begin shortly and physics data-taking is scheduled to begin in 2027. This talk will explore the theoretical motivations, design, and current status of the Mu2e experiment.

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