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# Status and prospects for the Mu2e experiment at Fermilab

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The Mu2e experiment at Fermilab will search for the coherent, neutrino-less conversion of negative muons into electrons in the coulomb field of Al nuclei. This is one of the clearest Charged Lepton Flavour Violating processes for exploring New Physics in the Intensity Frontier of Particle Physics. Observation of this process, by identifying the monoenergetic electron at  $\sim 105$  MeV, would be an unambiguous signal of physics beyond the Standard Model (BSM).

Mu2e aims to improve previous sensitivity on the conversion rate by four orders of magnitude, reaching a single event sensitivity of  $3 \times 10^{-17}$ . To achieve this goal, the experiment needs to provide the highest intensity pulsed muon beam in the world, with up to 1010 stopped muon/sec. This is achieved using the Fermilab proton beam and the design and realization of a unique 25 m long solenoidal system. Reducing beam losses in the slow extraction region indicates also the needs of bent crystals for shadowing.

The conversion electron will broad set of BSM models and to probe mass scales up to  $10^4$  TeV/ $c^2$ , not allows to explore a achievable to any current (or planned) high energy collider be identified by a high-resolution straw tracker, with better than 180 keV momentum precision and a fast CsI crystal calorimeter. Both detectors are inserted in the last solenoid section, just behind the Al Stopping Target. Large part of the solenoids is covered by a Cosmic Ray Veto to identify fake candidates produced by cosmic rays.

We expect to complete the experiment construction in 2025, start commissioning in the pit in 2026 and start data taking with beam at beginning of 2027. In this talk, we report the details of the experimental layout, the construction status of the magnetic system and detectors and present the reach of the first physics run.

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