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The Mu2e experiment at Fermilab

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The Mu2e Experiment at Fermilab will search for coherent, neutrino-less conversion of negative muons into electrons in the field of an Aluminum nucleus. The dynamics of such charged lepton flavour violating (CLFV) process is well modelled by a two-body decay, resulting in a mono-energetic electron with an energy slightly below the muon rest mass.
If no events are observed in three years of running, Mu2e will set an upper limit on the ratio between the conversion and the capture rates \convrate of $\leq 6 \times 10^{-17}$ (@ 90% C.L.). This will improve the current limit of four order of magnitudes with respect to the previous best experiment.
Mu2e complements and extends the current search for $\mu \rightarrow e\gamma$ decay at MEG as well as the direct searches for new physics at the LHC. This CLFV process probes new physics at a scale inaccessible to direct searches at either present or planned high energy colliders. Observation of a signal will be a clear evidence for new physics beyond the Standard Model.
To search for the muon conversion process, a very intense pulsed beam of negative muons ($\sim 10^{10} \mu/$ sec) is stopped on an Aluminum target inside a very long solenoid where the detector is also located. The Mu2e detector is composed of a straw tube tracker and a CsI crystals electromagnetic calorimeter. An external veto for cosmic rays is surrounding the detector solenoid. In 2016, Mu2e has passed the final approval stage from DOE and has started its construction phase. Data collection is planned for the end of 2021.
An overview of the physics motivations for Mu2e, the current status of the experiment and the required performances and design details of the calorimeter are presented.

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