



Contribution ID: 65

Type: not specified

## The search for Charged Lepton Flavour Violation with the Mu2e experiment (20+10)

*Tuesday, March 28, 2023 5:45 PM (30 minutes)*

The Mu2e experiment, currently under construction at Fermilab (USA), will search for the charged-lepton flavor violating neutrino-less conversion of negative muons into electrons in the field of an aluminum nucleus. A conversion signal would require physics beyond the Standard Model, and the aim of Mu2e is to reach a sensitivity four orders of magnitude better than previous experiments.

To achieve such a goal, a reliable estimate of the relevant particle yields and a rigorous control of all backgrounds are mandatory, together with an accurate normalization of signal events.

An extensive campaign of Monte Carlo simulations has been therefore performed to investigate key yields, and beam and cosmic rays-related backgrounds.

The normalization of the signal events will be done with a detector system made of a HPGe detector and a Lanthanum Bromide detector, which will measure the rate of muons stopped on the aluminum target by looking at the emitted characteristic X- and  $\gamma$ -rays of energies up to 1809 keV. At the Helmholtz-Zentrum Dresden-Rossendorf the pulsed Bremsstrahlung photon beam at the ELBE facility has been used to study the performance of this detector system under timing and background conditions very similar to the ones expected at Mu2e.

The design and present status of the Mu2e experiment will be presented, together with the main results of the background and sensitivity studies, and a summary of the results of the ELBE campaign.

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**Session Classification:** Keynotes/Contributed Talks