ID contributo: **38** Tipo: **non specificato**

Background studies and normalization of signal events in the Mu2e experiment

martedì 16 maggio 2023 18:10 (15 minuti)

The Mu2e experiment is currently being constructed at Fermilab to search for the neutrino-less conversion of negative muons into electrons in the field of an aluminum nucleus. The experiment aims at a sensitivity of four orders of magnitude higher than previous related experiments, which implies highly demanding accuracy requirements both in the design and during the operation. To achieve such a goal, two important tasks should be accomplished. First, it is essential to estimate precisely the particle yields and all the backgrounds that could mimic the monoenergetic conversion electron signal. Second, it is necessary to normalize the signal events accurately. The normalization of the signal events is planned to be done using a detector system made of an 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 γ-rays of energies up to 1809 keV. Therefore, it is essential to evaluate the detector system's performance before the start of the actual experiment. In this study, the first task was addressed by an extensive campaign of Monte Carlo simulations to investigate the relevant parameters and their impact on the experiment's sensitivity. The second task was handled by taking advantage of the Helmholtz-Zentrum Dresden-Rossendorf pulsed Bremsstrahlung photon beam at the ELBE facility. The detector system was tested at the ELBE facility under timing and background conditions similar to the ones expected at the Mu2e experiment. The study presents and discusses the simulation results and the detector system testing campaign.

Autore principale: RACHAMIN, Reuven (Helmholtz-Zentrum Dresden-Rossendorf (HZDR))

Relatore: RACHAMIN, Reuven (Helmholtz-Zentrum Dresden-Rossendorf (HZDR))

Classifica Sessioni: Young Researchers Talks