

Accelerator Physics and Technology Seminar

Normalization of the Mu2e Charged Lepton Flavor Violation Experiment

Jijun Chen, Purdue University

Date: Tuesday, July 9

When: 4:00 pm CDT

Where: Curia II (WH2SW) and Zoom

Abstract: To report reliable results, the Mu2e experiment normalizes the number of stopped muons to a 10% precision using two γ -ray transitions and one x-ray atomic transition. The primary γ -ray, directly related to the CLFV signal, is the 1808.7 keV emission from the muon capture process. Additional signals include the 346.8 keV x-ray from the $2p \rightarrow 1s$ atomic transition of muonic aluminum and the 844 keV γ -ray from the β -decay process. These measurements occur in an energy flux background of 3.2×10^8 TeV/sec. Two photon counting detectors, LaBr₃ and HPGe, ensure high accuracy and low systematic error. My main work includes simulating the STM shielding house to study background effects and applying corrections to accurately determine the number of stopped muons using the 1808.7 keV γ -ray. Corrections for geometric factors, detector efficiency, and signal loss are meticulously applied. Additionally, I have studied the detector's ability to handle beam fluctuations at the ELBE experiment, where real data has been collected and analyzed.