38th INTERNATIONAL CONFERENCE ON HIGH ENERGY PHYSICS
AUGUST 3 - 10, 2016
CHICAGO

Contribution ID: **339** Type: **Poster**

Normalization system for the Mu2e Experiment - The Stopping-Target Monitor

Saturday, August 6, 2016 6:00 PM (2 hours)

The Mu2e experiment, a search for Charged-Lepton Flavor Violation (CLFV), aims to measure the rate of neutrinoless muon-to-electron conversion in the coulomb field of an aluminum nucleus, $R_{\mu e} = \Gamma(\mu\mathrm{Al} \to e\mathrm{Al})/\Gamma_{\mathrm{capture}}(\mu\mathrm{Al})$.
If CLFV is not observed, we will improve the current limit by a factor 10,000.
In order to reach our goal, we must measure the denominator of $R_{\mu e}$ to about the 10% level.

In Mu2e, muons will be stopped in a series of thin aluminum foils known as the Muon Stopping Target. As muons are captured in excited energy levels of aluminum atoms they promptly cascade down to the $1s$ state emitting characteristic X-rays. Captured muons also produce excited nuclei which emit gamma-rays with known energies and intensities.
One sub-system of the Mu2e experiment, the Stopping-Target Monitor, will measure the X- and gamma-rays using a high-purity germanium detector.
To overcome the extremely high background rates and avoid severe radiation damage we place the detector far downstream of the Muon Stopping Target, employ a dipole magnet to sweep away charged particles, a series of collimators to ensure the detector only views the Muon Stopping Target, and shielding from background radiation. We present a detailed description of the sub-system design, simulation results, and the normalization measurement technique.

Primary author: Dr PALLADINO, Anthony (Boston University)

Co-author: Prof. MILLER, James (Boston University)

Presenter: Dr PALLADINO, Anthony (Boston University)

Session Classification: Poster Session

Track Classification: Detector: R&D and Performance