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A Cosmic Ray Veto Detector for the Mu2e Experiment at Fermilab

The Mu2e experiment is designed to search for the charged-lepton-flavor-violating process, μ− to a e−, with unprecedented sensitivity. The single 105-MeV electron that results from this process can be mimicked by electrons produced by cosmic-ray muons traversing the detector. An active veto detector surrounding the apparatus is used to detect incoming cosmic-ray muons. To reduce the backgrounds to the required level it must have an efficiency of about 99.99% as well as excellent hermeticity. The detector consists of four layers of scintillator counters, each with two embedded wavelength-shifting fibers, whose light is detected by silicon photomultipliers. The design and expected performance of the cosmic ray veto detector will be described.

Primary author: Prof. DUKES, E. Craig (University of Virginia)

Presenter: Prof. DUKES, E. Craig (University of Virginia)

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