

Design and Fabrication of a Large-Area, High-Sensitivity Cosmic Ray Veto Detector for the Mu2e Experiment

The Muon-to-Electron-Conversion (Mu2e) Experiment is a high-precision experiment at Fermilab which will search for coherent, neutrino-less muon-to-electron conversion in the presence of an atomic nucleus. Observation of such a process, which is effectively forbidden in the standard model, would unambiguous evidence of charged lepton flavor violation (CLFV), which has not yet been observed. Mu2e expects to improve the sensitivity by four orders of magnitude over the present limits. This conversion process is uniquely sensitive to a wide range of beyond-the-standard-model physics models and indirectly probes mass scales up to the energy scale of 10^4 TeV. Extensive simulations indicate that the background for the experiment will be at a sub-event level. In order to reduce the backgrounds to this level, a large-area, high-sensitivity cosmic ray veto (CRV) detector is required to veto cosmic ray muons, which can create fake, conversion-like events. The design of the CRV, expected performance of the detector, and the fabrication status will be present.