

A high efficiency cosmic ray muon detector for the Mu2e experiment

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The Mu2e experiment at Fermilab will conduct a world-leading search for Charged Lepton Flavour Violation (CLFV) in neutrino-less muon-to-electron conversion in the field of a nucleus. In doing so, it will provide a powerful probe into physics beyond the Standard Model, which can greatly enhance the rates of CLFV processes. To accomplish this measurement, which will constitute an $\mathcal{O}(10^4)$ improvement in sensitivity as compared to previous experiments, Mu2e must have excellent control over potential backgrounds: requiring less than one background event for $\mathcal{O}(10^{18})$ muons stopped over the lifetime of the experiment. One such background arises from cosmic muons, which are expected to induce approximately one background event per day. Mu2e will suppress these cosmic ray background events with an active shielding system: a large-area cosmic ray veto (CRV) detector enclosing the apparatus, with the ability to identify and veto cosmic ray muons with an average efficiency of 99.99%. This talk will describe the design of the CRV, its expected performance, and its present status in preparation for commissioning and data-taking.

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