Abstract:

Mu2e will look for neutrino-less conversion of a muon to an electron by capturing a muon around an aluminum nucleus. Expected backgrounds occur shortly after proton arrival and can be eliminated utilizing a pulsed beam with precise timing. The ratio of out-of-time protons to in-time protons is referred to as the “extinction” of the beam, and must be kept below $10^{-5}$ in the Recycler and $10^{-10}$ at the Production Target. The Precision Time Profile Monitor (PTPM) will measure the time structure in the Recycler and upstream of the AC dipole. Here we conduct a beam test of Quartz Cherenkov Radiators for this PTPM to examine their response to 120GeV relativistic protons. The Quartz Radiators had about 99% detection efficiency with a time resolution of about 1ns. We estimate after pulsing to produce false signals at a rate less than $2 \times 10^{-18}$.

Introduction:

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**Figure 1:** Mu2e will search for Charged Lepton Flavor Violation (CLFV) in the form of a neutrino-less conversion of a muon to an electron $\mu \rightarrow e + X$.

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**Figure 2:** Mu2e will collide protons into a stationary production target that produces a muon to an electron by capturing a muon around an aluminum nucleus. The PTPM will measure the time structure in the Recycler and upstream of the AC dipole. Here we conduct a beam test of Quartz Cherenkov Radiators for this PTPM to examine their response to 120GeV relativistic protons. The Quartz Radiators had about 99% detection efficiency with a time resolution of about 1ns. We estimate after pulsing to produce false signals at a rate less than $2 \times 10^{-18}$.

** references:**