

The Mu2e Experiment at Fermilab

Dr. Kyle Knoepfel (ND PhD 2011)
Postdoc, FermiLab

Thursday, November 21 ♦ 4:00 P.M.
Room 415 Nieuwland Science Hall

At tree level, charged-lepton flavor violation (CLFV) processes are forbidden by the standard model (SM). Such processes are allowed, in principle, by SM loop diagrams, yet the small values of the neutrino mass differences (relative to the W -boson mass) constrain such processes to rates of smaller than 10^{-50} . Observation of a CLFV process would thus be an unambiguous signature of physics beyond the SM, which has yet to be discovered. One search method is to look for the coherent conversion of a muon into an electron upon interaction with an atomic nucleus. Such a search is the focus of the Mu2e experiment, designed to come online late this decade at Fermilab.

I will discuss the proposed Mu2e experiment at Fermilab, which will improve bounds on the CLFV mass scale by a factor of 10 with respect to the previous experiment SINDRUM II. I will cover some basic CLFV concepts, motivate the Mu2e experiment, discuss its design, collaboration, and primary backgrounds as well as its expected sensitivity to CLFV new physics signatures. I will also briefly mention studies that have been performed for next-generation Mu2e experiments, which would benefit from a Project-X accelerator concept at Fermilab.