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The search for muon to positron conversion at Mu2e

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Neutrino oscillations have shown that lepton flavor is not a conserved quantity. Charged lepton flavor violation (CLFV) is suppressed by the small neutrino masses well below what is experimentally observable, while lepton number violation (LNV) is forbidden in the SM extended to include neutrino masses. New physics models predict higher rates of CLFV and allow for LNV. The CLFV $\mu^- \rightarrow e^-$ conversion and CLFV and LNV $\mu^- \rightarrow e^+$ conversion processes are sensitive to a wide range of new physics models.

$\mu^- \rightarrow e^+$ conversion is complementary to $0\nu\beta\beta$ decay and may be sensitive to flavor effects that $0\nu\beta\beta$ decay is insensitive to. A key background to the search for $\mu^- \rightarrow e^+$ conversion is radiative muon capture (RMC). Previous muon conversion experiments have had difficulty describing the RMC background when searching for $\mu^- \rightarrow e^+$ conversion. The Mu2e experiment at FNAL aims to improve the sensitivity to $\mu^- \rightarrow e^-$ conversion by a factor of 10,000. In order to make a similar improvement in the sensitivity to $\mu^- \rightarrow e^+$ conversion, the RMC background will need to be well understood. I will discuss RMC and previous $\mu^- \rightarrow e^+$ conversion searches, and then the upcoming $\mu^- \rightarrow e^+$ conversion search at the Mu2e experiment.

Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

Presenter: MACKENZIE, Michael (Northwestern University (US))

Session Classification: Minisymposium