

Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Gas Electron Multiplier Detectors for TREK at J-PARC¹ BISHOY

DONGWI, Hampton University — Lepton flavor universality is a basic assumption of the Standard Model (SM). The proposed experiment E36 at J-PARC in Japan measures decay widths of stopped K^+ using the TREK (Time Reversal Experiment with Kaons) detector system to conduct precision measurements of $R_K = \Gamma(K^+ \rightarrow e^+\nu)/\Gamma(K^+ \rightarrow \mu^+\nu)$ in search of lepton flavor universality violation. The SM prediction for the ratio of leptonic K^+ decays is highly precise with an uncertainty of $\Delta R_K/R_K = 4 \cdot 10^{-4}$. Any observed deviation from the SM prediction would yield clear indication of New Physics beyond the Standard Model. To test lepton flavor universality violation a total uncertainty for the decay ratio of $K_{e2}/K_{\mu2}$ is aimed to be 0.25% (0.20% stat+0.15% sys). The second portion of the experiment searches for heavy sterile neutrinos (N) in the $K^+ \rightarrow \mu^+N$ decay and allows for further stringent searches for light new particles as a byproduct. Gas Electron Multiplier (GEM) detectors will be constructed for this experiment in order to measure charged tracks of μ^+ and e^+ from charged K^+ decay. I will present Geant4 simulations of the TREK setup augmented with the GEM detectors.

¹This work has been supported by DOE Early Career Award DE-SC0003884.

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Date submitted: 01 Jul 2013

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