

Abstract Submitted
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New Physics search with Experiment E36 at J-PARC¹ DONGWI H
DONGWI, Hampton University, TREK COLLABORATION — We are potentially standing at the precipice in the quest for discovery of New Physics (NP) beyond the SM by performing a precision test of lepton universality. Experiment E36 conducted at J-PARC in Japan tests lepton universality in the $R_K = \Gamma(K_{e2})/\Gamma(K_{\mu2})$ ratio. In the SM, 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 break the universality of the lepton couplings and provide a clear indication of NP beyond the SM. The E36 detector apparatus allows sensitivity to search for sterile neutrinos below $300 \text{ MeV}/c^2$ and light $U(1)$ gauge bosons, which could be associated with dark matter or explain established muon-related anomalies such as the muon $g-2$ value, and perhaps the proton radius puzzle. E36 data taking was completed in 2015. A scintillating fiber target was used to stop a beam of up to 1.2 Million K^+ per spill. K^+ decay products were detected with a large-acceptance toroidal spectrometer capable of tracking charged particles with high resolution, combined with a CsI(Tl) photon calorimeter with large solid angle covering 75% of 4π and particle identification systems. The status of the data analysis will be presented.

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Dongwi Dongwi
Hampton University

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