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Precise Measurement of $\Gamma(K^+ \rightarrow e^+\nu)/\Gamma(K^+ \rightarrow \mu^+\nu)$ and Search for New Physics by the TREK-E36 Experiment TONGTONG CAO, Hampton Univ — The J-PARC TREK-E36 experiment will provide a precise measurement of the ratio of decay widths $R_K = \Gamma(K^+ \rightarrow e^+\nu)/\Gamma(K^+ \rightarrow \mu^+\nu)$ to test lepton universality. R_K is very precisely predicted by the Standard Model (SM) with the uncertainty of 4×10^{-4} and a deviation from the prediction would very clearly indicate the existence of New Physics beyond the SM. Additionally, the experiment intends to search for visible decay modes of $A' \rightarrow e^+e^-$ in K^+ decays. The existence of an A' is well motivated by dark matter observations and $g_{\mu-2}$ anomaly, as well as the proton radius puzzle. In the E36 experiment, a K^+ beam was stopped by a scintillating fiber target, and charged decay products were momentum analyzed and tracked by a 12-sector superconducting toroidal magnet spectrometer and multi-wire proportional chambers combined with a photon calorimeter with a large solid angle (75% of 4π) and 3 different particle identification systems. In this talk, the status of the data analysis is presented. This work has been supported by the U.S. DOE Award DE-SC0013941.

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