Hall B Virtual Seminar

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New Physics Searches with the TREK-E36 Experiment at J-PARC and with the HPS Experiment at JLab

Abstract

The TREK-E36 experiment at J-PARC is designed to provide a precise measurement of the ratio of decay widths RK = Γ(K+ → e +ν)/Γ(K+ → µ +ν) to test lepton universality. RK 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 new massive U(1) gauge boson, the dark/heavy photon A 0 in K+ decays. A 0 is a well motivated and viable new force particle, which could mediate interactions with hidden-sector dark matter. The Heavy Photon Search (HPS) experiment at Hall-B of Jefferson Lab is desgined to search for A 0 in the mass range of 20 MeV/c 2 to 220 MeV/c 2 that kinetically mixes with the SM photon with couplings 2 > 10−10. In particular, HPS looks for the e +e − decay channel of heavy photons radiated by electron Bremsstrahlung, employing both resonance search and displaced vertexing techniques. In this seminar, the TREK-E36 and HPS experiments will be introduced, and their status will be reported. Calibration of multi-wire proportional chambers and tracking by Kalman filter for the TREK-E36 experiment will be discussed, and Monte Carlo simulation and triggers for the HPS experiment will be presented.

Friday, April 29, 2022

1:30 PM – 2:30 PM

https://jlab-org.zoomgov.com/j/1619701682?pwd=NFJuakxoQ0dDQk1RQkhCMVhPdWt5dz09&from=addon