

KOTO experiment: searching for $K_{\{L\}} \rightarrow \pi^{\{0\}} \nu \bar{\nu}$

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We are going to report on the performance of the KOTO experiment at J-PARC during the 2013 physics run. The goal of KOTO is to discover and measure the rate of the rare decay KL into $\pi^0 \nu \bar{\nu}$. This flavor changing neutral current decay violates CP directly and proceeds through second-order weak interactions.

The Standard Model predicts the branching ratio to be $(2.8 \pm 0.4) \times 10^{-11}$.

The experiment is designed to reach sensitivity for discovery of this rare decay with 2×10^{14} protons on target (POT) per spill in 3 Snowmass years (3×10^7 s).

It is a follow-up to E391 at KEK with a completely redesigned beamline, a new CsI calorimeter with increased granularity and reduced shower leakage, and a new readout electronics, trigger and data acquisition system. KOTO first physics run, scheduled for May-June 2013, expects to accumulate about 10^{19} protons on target (POT) and reach the Grossman-Nir limit sensitivity of 1.46×10^{-19} at 90% CL. However, due to one radiation accident occurred on May 23th, the data taking is stopped, and the integrated POT is 8×10^{18} .

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