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K \rightarrow pi nu nu at KOTO

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The KOTO experiment aims to discover the rare decay $K_L \rightarrow \pi^0 \nu \nu$ at the J-PARC 30 GeV proton synchrotron. This mode violates the CP symmetry directly and is highly suppressed in the Standard Model. Thus the mode is sensitive to new physics beyond the SM, in particular the physics related to CP violation.

KOTO is an upgrade of the E391a experiment at KEK, and includes a new CsI Calorimeter, DAQ system and high intensity beam. KOTO performed engineering and commissioning runs to study the detector performance until early 2013, and finally started the first physics run in May 2013. Although data taking time was terminated after 100 hours due to an accident, the experiment achieved nearly the same sensitivity as the KEK E391a experiment, which holds the current best limit on this decay.

In this contribution, the preliminary result of the first physics run will be reported.

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