



# CERN Colloquium

**SPEAKER:** Prof. KOBAYASHI Takashi ((IPNS/KEK)  
Japan, spokesman of T2K)

**TITLE:** **Indication of Electron Neutrino Appearance  
in the T2K experiment and its long-term  
implications**

**DATE:** Thu 14/07/2011 16:30

**PLACE:** Main Auditorium

## ABSTRACT

T2K (Tokai-to-Kamioka) is a long-baseline neutrino oscillation experiment primarily searching for oscillations of muon neutrinos into electron neutrinos. T2K will also make precise measurements of the atmospheric oscillation parameters via muon neutrino disappearance. The experiment uses 30 GeV protons from the new J-PARC Main Ring accelerator, located in Tokai, Japan, to generate a conventional neutrino beam to the Super-Kamiokande far detector. The hadron production measurements of the NA61 experiment at CERN were used to predict the neutrino fluxes at the near and far detectors. The T2K oscillation analysis compares the rates of observed and predicted muon and electron neutrino candidates in the far detector. We present first results based on data accumulated from January 2010 to March 2011. Six electron neutrino events pass the selection criteria for electron appearance at Super-Kamiokande, whereas the expected number of background events is  $1.5 \pm 0.3$ . The probability of a fluctuation of the background is 0.7% (2.5 sigma significance). Our conclusion is that we observe an indication of  $\nu(\mu)$  to  $\nu(e)$  appearance, opening the way to search for CP violation in the leptonic sector. We will also discuss implications of this result on the future of neutrino physics.

This colloquium is dedicated to Jack Steinberger

Organised by: Ignatios Antoniadis/PH-TH.....\*\*Tea and Coffee  
will be served at 16h00\*\*