

The latest T2K results on neutrino oscillations and neutrino-nucleus interactions

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T2K is a long-baseline neutrino oscillation experiment taking data since 2010. A neutrino beam is produced at the J-PARC accelerator in Japan and is sampled at a Near Detector complex 280 m from the neutrino production point and at the far detector, Super-Kamiokande. Beams predominantly composed of muon neutrinos or muon anti-neutrinos have been produced by changing the currents in the magnetic focusing horns. The additional neutrino-mode data collected with T2K in 2017 have doubled the statistics relative to previous analysis releases.

This presentation will show the most recent T2K oscillation results obtained from a combined analysis of the entire available data set in the muon neutrino and muon anti-neutrino disappearance channels, and in the electron neutrino and electron anti-neutrino appearance channels. Using these data, we measure four oscillation parameters: $\sin \theta_{23}$, $\sin \theta_{13}$, $|\Delta m_{32}^2|$ and δ_{CP} , as well as the mass ordering.

T2K also has new neutrino cross-section measurements. In addition to being interesting in their own right, measuring neutrino cross sections is vital as they correspond to a major systematic uncertainty for neutrino oscillation analyses. In particular, the new results focus on exploiting the water targets in the T2K off-axis near detector, ND280, updating our charged-current measurements with a wider phase space, and addressing in more detail the neutrino interaction vertex. This talk will give an overview of the T2K neutrino cross-section measurements, focusing on the latest results.

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