

T2K oscillation analysis results: latest analysis improvements at the far detector

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T2K is a long baseline neutrino experiment which exploits a neutrino and antineutrino beam produced at the Japan Particle Accelerator Research Centre (JPARC) to provide world-leading measurements of the parameters governing neutrino oscillation. Neutrino oscillations are measured by tuning the neutrino rates and spectra at a near detector complex, located at JPARC, and extrapolate them to the water-Cherenkov far detector, Super-Kamiokande, located 295 Km away, where oscillations are observed as modifications of such rates and spectra.

The latest T2K results include multiple analysis improvements, in particular a new sample is added at the far detector, requiring the presence of a pion in muon-neutrino interactions. It is the first time that a pion sample is included in the study of neutrino disappearance at T2K and, for the first time, a sample with more than one Cherenkov ring is exploited in the T2K oscillation analysis, opening the road for further samples with charged- and neutral-pion tagging. The inclusion of such sample enables proper control of the oscillated spectrum on a larger neutrino-energy range and on subleading neutrino-interaction processes. Finally, T2K is engaged with the Super-Kamiokande collaboration to combine T2K neutrino beam data and Super-Kamiokande atmospheric data to perform a joint fit to the oscillation parameters. Such combination allows the degeneracies between the measurement of the CP-violating phase δ_{CP} and the measurement of the ordering of the neutrino mass eigenstates to be lifted. Precise evaluation of the enhanced sensitivity of this joint fit will be presented.

Attendance type

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