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T2K latest results on muon neutrino and antineutrino disappearance

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T2K (Tokai to Kamioka) is a Japan-based long-baseline neutrino oscillation experiment designed to measure (anti-)neutrino flavor oscillations. After the measurement of a non-zero value of the mixing angle θ_{13} , T2K has started a campaign to measure the phase δ_{CP} , an unknown element of the Pontecorvo-Maki-Nakagata-Sakata matrix, that can provide a test of the violation or conservation of the CP symmetry in the neutrino sector. To achieve this goal, T2K is taking data with a neutrino and antineutrino enhanced beam investigating asymmetries in the electron neutrino and antineutrino appearance probabilities. Such ability to run with different beam mode, also allows the experiment to separately extract for neutrinos and antineutrinos the oscillation parameters δm_{32}^2 and θ_{23} analyzing the muon (anti)neutrino disappearance channels. No significant differences between the survival probabilities of muon neutrino and anti-neutrino are expected in T2K according to the standard 3 flavor oscillation model, so a difference could be interpreted as possible CPT violation and/or non-standard interactions. In this presentation the latest T2K results on these searches, obtained analyzing the data taken in both beam modes, are described. An analysis using an effective two-flavor neutrino oscillation model, where $\sin^2 \theta$ is allowed to take non-physical values larger than 1, is discussed as well. This analysis has as goal to check the consistency of our data with the three-flavor model neutrino oscillation framework.

Collaboration name

T2K Experiment

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