

Recent frequentist T2K oscillation analysis results and Hyper-Kamiokande sensitivity to accelerator neutrino oscillations

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This poster presents the most recent T2K oscillation analysis results using 3.78×10^{21} protons on target (POT) and highlights the expected sensitivity to the neutrino oscillation parameters for the forthcoming next generation experiment in Japan - Hyper-Kamiokande (Hyper-K).

By employing advanced methods for neutrino interaction modeling and neutrino flux prediction, T2K data are analyzed to refine measurements of neutrino oscillation parameters and explore CP violation in the lepton sector of the Standard Model. It is the first T2K oscillation analysis including data after Gd loading in Super-K corresponding to 0.17×10^{21} POT for neutrino mode. In addition, it includes an improved detector covariance matrix and a new decay electron selection cut for both MC and data selection at Super-Kamiokande. A 90% confidence interval for the δCP parameter ranging from -3.04 to -0.34 , and the p -value for inverted ordering hypothesis of 0.0603 are some of the obtained results.

Looking forward to the Hyper-K era, comprehensive sensitivity studies were conducted using inputs from previous T2K analyses and a new frequentist fitter. These studies demonstrate Hyper-K's potential to further constrain oscillation parameters, offering valuable insights for precise measurement and CP violation discovery. For instance, sensitivity studies for δCP indicate that, with a true δCP of $-\pi/2$, CP violation can be determined with a 5-sigma confidence level after 2 years of Hyper-K operation, achieving approximately 22% precision for the δCP parameter.

Poster prize

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T2K and Hyper-K

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