



Poster session 1 - Monday 4 July

P1.041 Muon antineutrino disappearance and electron antineutrino appearance searches at T2K

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As we move to precision measurements of neutrino oscillation parameters θ_{13} , θ_{23} and Δm_{32}^2 we become sensitive to CP-violating and CPT-violating effects in neutrino oscillations. For the T2K long-baseline program, these measurements are dependent on a comparison of neutrino and antineutrino oscillations. As a result, T2K has been running with an antineutrino-enhanced beam since June 2014 and has a dataset with integrated beam power almost equally divided into neutrino mode and antineutrino mode.

In this poster we present an update of muon antineutrino disappearance and electron antineutrino appearance, first presented in summer 2015, with a significantly larger antineutrino dataset.

The results presented here were performed with an updated analysis method simultaneously fitting both neutrino mode and antineutrino mode samples to provide the best possible constraint on neutrino backgrounds in the antineutrino samples. There have also been improvements to the systematic error model and constraints from the near detector with the inclusion of interactions on a water target.

The muon antineutrino disappearance measurement provides an indication of the amount of CPT-violation in neutrino oscillations when compared to the neutrino results whereas the electron antineutrino appearance can probe CP-violation in a similar way.

The 2015 analyses provided a competitive constraint of the antineutrino mixing parameters θ_{23}^{Bar} and $\Delta m_{32}^2^{\text{Bar}}$, with best fit points 0.45 and $2.51 \times 10^{-3} \text{ eV}^2$ respectively, and the world's first search of electron antineutrino appearance in a muon antineutrino beam.

The studies here were performed using a T2K analysis package (known as "VALOR"), a framework that performs fits by minimising a negative log likelihood ratio with systematic error model parameters and some oscillation parameters marginalised out.



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