



Contribution ID: 67

Type: **not specified**

Updated Results for the Search for $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$ Oscillations from T2K in the 3-flavour Framework

I report the results of a search for $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$ oscillations at the T2K experiment in a 3-flavour framework. An exposure of 1.49×10^{21} Protons On Target (POT) is used in ν mode and 1.63×10^{21} POT in $\bar{\nu}$ mode; an increase of 46% in the $\bar{\nu}$ exposure compared to results reported in June 2018.

Results are reported for a joint analysis where candidate events are selected from the e-like events observed in $\bar{\nu}$ running mode. In order to obtain the best possible constraint on $\bar{\nu}_e$ appearance, observations from four other far detector event samples (across both ν and $\bar{\nu}$ modes) are used in conjunction with near-detector data. These observations constrain the values of the oscillation and systematic parameters, including the mass-hierarchy.

Two hypotheses are tested: a) no appearance and b) $\bar{\nu}_e$ appearance according to the current best knowledge of the PMNS matrix. Both rate-only and rate+shape analyses are performed, producing p-values for each hypothesis. A description is given of the method used to constrain the parameters and the treatment of priors used to generate distributions of the rate-only and rate+shape test statistics.

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Session Classification: Welcome Reception and poster session