30th International Symposium on Lepton Photon Interactions at High Energies



Contribution ID: 51

Type: Poster

The T2K experiment measures the neutrino oscillation parameters by observing ν_{μ} ($\bar{\nu}_{\mu}$) disappearance and ν_e ($\bar{\nu}_e$) appearance from a $\nu_{\mu}(\bar{\nu}_{\mu})$ beam. The events are observed in the near detector ND280 and the far detector Super-Kamiokande (SK) situated at 280 m and 295 km respectively from the beam production target. In SK, the products of ν and $\bar{\nu}$ interactions produce Cherenkov rings. Charged current quasi-elastic (CCQE) interactions, the most dominant in the T2K energy region produce single ring CC events used for analyses. Resonant 1π production, the second dominant CC interaction in this energy region will have multi-ring topology and can be included to increase statistics. The addition of **CC** $\nu_{\mu} 1\pi^{+}$ ($\nu_{e} 1\pi^{+}$) samples are expected to improve the precision on $\sin^2 \theta_{23}$ and $|\Delta m^2{}_{32}|$ (leptonic CP phase δ_{CP}). Studies on the selection of CC 1π like events accumulated from forward horn current (FHC) operation are performed for ν_{μ} and ν_{e} samples. Estimation of different systematic uncertainties are important for oscillation sensitivity studies. One main contribution is detector systematic uncertainities related to the selection variables of samples including multi-ring samples. These are estimated via a fit to atmospheric neutrinos events collected in Super-K. We present the selection of multi-ring samples as well as the process of estimation of detector systematic uncertainties.

Monday 10 January 2022 16:19 (1 minute)

The T2K experiment measures the neutrino oscillation parameters by observing ν_{μ} ($\bar{\nu}_{\mu}$) disappearance and ν_{e} ($\bar{\nu}_{e}$) appearance from a ν_{μ} ($\bar{\nu}_{\mu}$) beam. The events are observed in the near detector ND280 and the far detector

Super–Kamiokande (SK) situated at 280 m and 295 km respectively from the beam production target. In SK, the products of ν and $\bar{\nu}$ interactions produce Cherenkov rings. Charged current quasi–elastic (CCQE) interactions, the most dominant in the T2K energy region produce single ring CC events used for analyses. Resonant 1π production, the second dominant CC interaction in this energy region will have multi–ring topology and can be included to increase statistics. The addition of CC $\nu_{\mu}1\pi^{+}$ ($\nu_{e}1\pi^{+}$) samples are expected to improve the precision on $\sin^{2}\theta_{23}$ and $|\Delta m^{2}_{32}|$ (leptonic CP phase δ_{CP}). Studies on the selection of CC 1π like events accumulated from forward horn current (FHC) operation are performed for ν_{μ} and ν_{e} samples. Estimation of different systematic uncertainties are important for oscillation sensitivity studies. One main contribution is detector systematic uncertainties related to the selection variables of samples including multi–ring samples. These are estimated via a fit to atmospheric neutrinos events collected in Super-K. We present the selection of multi–ring samples as well as the process of estimation of detector systematic uncertainties.

Authors: FERNANDES VILELA, Cristovao (CERN); REH, Michael (University of Colorado Boulder (US)); Dr LAKSHMI, S Mohan (National Centre for Nuclear Research, Warsaw); TOWSTEGO, Trevor (University of Toronto (CA))

Presenter: Dr LAKSHMI, S Mohan (National Centre for Nuclear Research, Warsaw)

Session Classification: Neutrino physics

Track Classification: Neutrinos