

Charged current interactions on carbon with a single positively charged pion in the final state at the T2K off-axis near detector with 4π solid angle acceptance

The long-baseline neutrino experiment Tokai-to-Kamiokande (T2K) is located in Japan and is measuring neutrino oscillation parameters. The muon neutrino charged current interactions in the near detector (ND280) are used to predict the event rate at the far detector, in particular constraining the neutrino flux and neutrino-nucleus interaction cross-sections, which are the dominant systematic uncertainties in the oscillation analysis. This poster presents a study of charged current interactions on carbon with a muon and a single positively charged pion in the final state ($CC1\pi^+$) at the T2K off-axis near detector with a 4π solid angle acceptance. This channel constitutes the main background for the muon neutrino disappearance measurement when the charged pion is not observed in the SuperKamiokande water Cherenkov detector, and a precise understanding of it is relevant for all current and planned neutrino oscillation experiments. Single positive pion production is primarily sensitive to resonant processes but also to non-resonant contributions as well as coherent pion production. Additionally, final-state interactions in the nuclear target have to be taken into account. A particularly interesting characterization of $CC1\pi$ interactions through the measurement of Adler Angles is presented. These observables carrying information about the polarization of the Delta resonance and the interference with the non-resonant single pion production.

Working group

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