

T2K Neutrino Cross Section Measurements

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Precise knowledge of how neutrinos interact with matter is essential for measuring neutrino oscillations in long-baseline experiments. At T2K, the near detector complex measures neutrino interactions to constrain cross-section models for oscillation studies and to characterise the beam flux. The near detector complex provides a platform for performing neutrino-nucleon cross section measurements. The design of the ND280 near detector allows for a variety of cross section measurements on different targets to be performed. The additional WAGASCI near detector at a different off-axis angle features an increased Water/Carbon target ratio. Finally, the on-axis INGRID detector can be combined with ND280 and WAGASCI to measure the cross-section at different neutrino energies and to further constrain the nuclear models for different targets.

Recent cross section measurements from the near detector complex will be presented. The latest measurements of pion production in ND280, including measurements of transverse pion kinematics, and an improved analysis of coherent pion production making use of an anti-neutrino sample for the first time, will be shown. The first measurement of cross section without pions in the final state at the WAGASCI off-axis angle will be presented, as well as the first combined measurement of ND280 and INGRID allowing the first simultaneous measurement of cross-section at different neutrino off-axis angles, energies and different detectors on the same flux.

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