

CC1pi+ cross-section measurement on water using the T2K near detector

The near detector of the T2K experiment (ND280) is a magnetised multi-purpose detector located at 280m from the beam target. While the primary function of ND280 is to measure the neutrino spectrum and beam flavour composition, it may also be used to measure the cross-section of processes relevant to oscillation analyses of T2K.

In the Tracker region of ND280 there are 2 fine-grained detectors (FGDs). The downstream FGD consists of polystyrene scintillator bars alternately oriented in the x and y directions and interleaved with water layers. The polystyrene scintillator bars allow 3D tracking of the charged particles. The water layers serve as target for measurements of neutrino interactions on water.

The signal definition of this analysis is muon neutrino scattering with nucleon resonant excitation and production of a single charged pion (ν_μ CC1 π^+ , after final state interactions) in the water layers of this FGD. This analysis uses a Bayesian unfolding method with background subtraction and two sidebands to constrain the background coming from deep inelastic interactions and from interactions on carbon.

An estimate of the measurement capabilities will be shown using the NEUT simulation.

WG3: Accelerator Physics (Yes/No)

No

WG2: Neutrino Scattering Physics (Yes/No)

Yes

WG4: Muon Physics (Yes/No)

No

WG1: Neutrino Oscillation Physics (Yes/No)

No

Type of presentation

Poster

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