

Neutrino interaction modelling and uncertainties for T2K analyses

Wednesday 8 September 2021 16:00 (18 minutes)

In order to achieve the ambitious goal of characterising neutrino flavour oscillations with percent-level precision, it is critical for current and future long-baseline neutrino oscillation experiments to substantially reduce existing systematic uncertainties. The most impactful these uncertainties stem from the challenges of modelling few-GeV neutrino-nucleus interactions. In order to confront this challenge, the T2K experiment's Neutrino Interaction Working Group (NIWG) aims to implement up to date theoretical models in T2K's Monte-Carlo event generator (NEUT); to define a suitable parametrisation of the model's uncertainties as an input for neutrino oscillation analyses; and to constrain these parameters using global lepton and hadron scattering data.

In this talk we present the latest uncertainty model from T2K's NIWG as well as a comparison of the model to available data. Among other improvements, the latest model includes: a parametrisation offering substantial freedom to the input Spectral Function for charged-current quasi-elastic (CCQE) interactions; a momentum transfer dependent correction to the nuclear removal energy for CCQE interactions based on inclusive electron scattering data; and an updated treatment of nuclear medium effects in resonant pion production interactions.

Working group

WG2

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