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Modelling neutrino-nucleus interactions for the T2K experiment (from Modeling nu-N session)

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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 challenging of such systematic uncertainties is related with the modelling few-GeV neutrino-nucleus interactions.

To improve our understanding, the T2K collaboration is engaged in a continuous effort to implement up-to-date theoretical models in T2K's Monte Carlo event generator (NEUT) and to define a suitable parametrisation of the model's uncertainties as an input for neutrino oscillation analyses. The new uncertainty model, developed for the latest T2K oscillation measurement, will be presented, as well as a comparison of the model to available global lepton- and hadron-scattering 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.

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