

# GENIE global fits of neutrino scattering data

*Thursday, 8 June 2017 18:00 (2 hours)*

GENIE is the main physics generator used in DUNE. As a world leading neutrino event generator, the collaboration is in the process of optimizing the prediction for neutrino interactions in the GeV energy region which has been shown to be difficult to understand, especially in heavy nuclei. To solve this issue, the GENIE collaboration has developed its own system to perform global fits of neutrino (and anti-neutrino) scattering data. The fitting framework is very generic and can accommodate any combination of observables and datasets, while properly handling possible correlations. The machinery is based on the Professor software suite which is actively used for general purpose MC tuning at the LHC.

The fitting system also benefits from new models and comprehensive configurations recently implemented into GENIE. We have developed new comprehensive global models based on empirical and theory-driven configurations, and we may now estimate cross section and FSI parameters for each of them. The outcome of this effort will be several new GENIE tunes that will also include data-driven constraints on systematic parameters. Neutrino interaction uncertainties will be one of the dominant systematics for DUNE and this work aims to improve the understanding on one of the major ingredients for the CP violation search at DUNE.

## Summary

The poster will present the first of these tunes to be completed, namely the global fit of CC  $0\pi$  data.

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