

Physics Opportunities in the Near DUNE Detector hall: PONDD



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Neutrino Interactions with Nuclei

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The interactions of neutrinos with nuclei are per se interesting because they contain information on the axial response of nuclear many-body systems. They are also of practical importance for running or planned long baseline experiments, such as T2K, NOvA and DUNE. All these experiments require a reconstruction of the incoming neutrino energy for the extraction of neutrino mixing parameters, mass hierarchies and CP-violating phases. This energy reconstruction is affected by both the primary, initial interaction of the incoming neutrino with the nucleus as well as by the final state interactions of hadrons produced in the initial step. The accuracy with which the essential physics parameters can be extracted then depends directly on the accuracy of the reconstruction methods and procedures (generators) used. In this talk I will discuss results obtained with a nuclear-theory based generator, GiBUU, which aims at a consistent description of initial and final state interactions; the latter are described by quantum-kinetic transport theory. Predictions for processes in the DUNE near detector will also be shown.

Presenter: Prof. MOSEL, Ulrich (Universitaet Giessen)

Session Classification: New Detector Techniques