Constraining Neutrino Physics Models Using Electron Scattering Data from Jefferson Lab

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Current and future neutrino facilities, including MicroBooNE, MINERvA, DUNE and T2K, rely on reconstructing the incident neutrino beam properties (energy and flux) from the measurement of reaction products from neutrino-nucleus interactions in their detectors. The extraction of physics quantities from these experiments, such as neutrino oscillation parameters, depends on good neutrino energy reconstruction which is highly sensitive to our knowledge of poorly-constrained neutrino-nucleus interactions.

The Electrons for Neutrinos project (e4nu) at the Thomas Jefferson National Accelerator Facility (JLab) exploits the similarity of electron- and neturino-nucleus interactions, and will use wide phase space exclusive electron scattering data from past and present experiments on nuclear targets with the CLAS and CLAS12 detector systems to obtain a comprehensive understanding of the interaction of leptons with matter. This data provides us with the tools needed to constrain models of the neutrino-nucleus interaction and will thus play a key role in the precise determination of the physics observables from neutrino-nucleus interactions measured at neutrino experimental facilities.

We will present e4nu results, focussing on the A(e,e'p pi) reaction on various targets to test event generator models, including beam energy reconstruction techniques, and *pion transparency*, i.e. pion-nucleus rescattering, which can provide an alternative means of tuning generator descriptions of final state interactions. Prospects for analysis of dedicated e4nu data from a recent CLAS12 experiment with 2, 4, and 6 GeV beams, on Deuterium, Carbon, and Argon targets, will also be discussed.