Contribution ID: **111** Type: **Poster**

Probing the physics of the elusive neutrino using electron scattering data with two nucleons at the final state

Friday, 21 June 2024 17:30 (2 hours)

The ability of future accelerator-based neutrino experiments to set unprecedented constraints on all oscillation parameters, requires a solid understanding of neutrino cross sections. This is true especially for the most often selected signal of final state lepton and a single proton, and its background which could consist of processes with more than one final state proton. However, neutrinos are weakly interacting, and therefore measurements are statistically limited, making their model constraining very challenging. Nonetheless, neutrinos and the well-known electrons have a few similarities, such as the vector part of their interaction with the nucleus and many identical nuclear effects. In [4], we use electron-nucleus interaction measurements at various beam energies and target nuclei from the CLAS12 spectrometer at Jefferson Lab, Virginia, to test and constrain models of neutrino-nucleus interactions for their future use in oscillation experiments. Presented here for the first time a comparison between data and simulation used for neutrino experiments of the ratio between events with two protons and events with one proton and one neutron at the final state. These comparisons shed light on interesting nuclear effects.

Poster prize

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Session Classification: Poster session and reception 2

Track Classification: Neutrino interactions