NEUT/NuWro cross-section modelling at low three-momentum transfer

P3.030  

P Stowell  

University of Sheffield, UK  

on behalf of T2K collaboration

The neutrino Charged-Current inclusive (CC-inc.) interaction cross-section has been found to differ significantly when comparing measurements on hydrogen and carbon targets. This is a result of several additional nuclear effects, such as multi-nucleon interactions, emerging when neutrinos scatter off heavier targets, and the suppression of the quasi-elastic cross-section at low 4-momentum transfer.

The MINERvA collaboration has recently reported separate measurements of both the Energy ($q_0$) and 3-momentum ($q_3$) transferred to the nucleus in CC-inc. events. This was achieved by looking at both the muon, and hadronic final state particles. Expressed as a double differential in the energy observed in the MINERvA detector ($E_{av}$) and $q_3$, this measurement provides additional insight into the different regions of the phase-space where the cross-section may be modified by nuclear effects.

In this poster I present comparisons between the NEUT and NuWro event generators and this MINERvA dataset. We find that the constant binding energy in the Global Fermi Gas model produces a large deficit in the lowest $E_{av} - q_3$ bins due to a suppression of the charged-current quasi-elastic model at low energy transfer to the nucleus. The Local Fermi Gas model in NuWro is found to have better agreement with the data in this region, but a significant deficit is still observed in the higher nuclear recoil bins.