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Title:	Tuning the genie pion production model with MINERvA data
Authors:	Fiza, N. (/jspui/browse?type=author&value=Fiza%2C+N.)
Keywords:	Few-GeV neutrino energies MINER Nuclear
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Abstract:	Faced with unresolved tensions between neutrino interaction measurements at few-GeV neutrino energies, current experiments are forced to accept large systematic uncertainties to cover discrepancies between their data and model predictions. The widely used pion production model in genie is compared to four MINER v A charged current pion production measurements using nuisance. Tunings, i.e., adjustments of model parameters, to help match genie to MINER v A and older bubble chamber data are presented. We find that scattering off nuclear targets as measured in MINER v A is not in good agreement with expectations based upon scattering off nucleon (hydrogen or deuterium) targets in existing bubble chamber data. An additional ad hoc correction for the low - Q ² region, where collective nuclear effects are expected to be large, is presented. While these tunings and corrections improve the agreement of genie with the data, the modeling is imperfect. The development of these tunings within the nuisance framework allows for straightforward extensions to other neutrino event generators and models, and allows omitting and including new datasets as they become available.
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