

Semi-exclusive cross sections for charged-current quasi-elastic and neutral-current elastic neutrino scattering off ^{40}Ar and a sterile neutrino oscillation study

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Flux-integrated semiexclusive differential cross sections for charged-current quasielastic and neutral-current elastic neutrino scattering on argon are analyzed. The cross sections are calculated using the relativistic distorted-wave impulse approximation and compared with recent MicroBooNE data. It was found that the measured cross sections can be described well within the experimental uncertainties with value of the nucleon axial mass $1 < M_A < 1.2$ GeV. The flux-integrated differential cross sections as functions of reconstructed neutrino energy are evaluated for the far detector of the SBN experiment in Fermilab. The effects of the short base-line neutrino oscillations are taken into account in a 3+1 framework. We found that cross sections depend on oscillation parameters and the ratio of the measured and predicted cross sections can be used in a sterile neutrino oscillation study.

Information on the subject:

- 1) A.V. Butkevich, Phys.Rev. C105, 025501 (2022); arXiv: 2107.01827
- 2) A.V. Butkevich, Phys.Rev. D107, 073001 (2023); arXiv: 2212.09300

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