

Neutrino neutral-current elastic scattering on ^{12}C

A.V. Butkevich (Moscow, INR), D. Perevalov (FNAL)

(Submitted on 6 Jun 2011)

The neutral current elastic scattering of neutrinos on Carbon and ^{12}C targets is computed using the relativistic distorted-wave impulse approximation with relativistic optical potential. Results for exclusive and inclusive neutrino reactions on ^{12}C target are presented. We show that the nuclear effects on the shape of four-momentum transferred squared distribution $d\sigma/dQ^2_{QE}$ in neutrino neutral-current and charged-current quasi-elastic scattering are similar. We also calculate flux-averaged neutral current elastic differential cross section $d\sigma/dQ^2_{QE}$ for neutrino scattering from ^{12}C , as well as, the neutral-current to charged-current cross section ratio as functions of Q^2_{QE} . The value of axial mass M_A is extracted from a fit of $d\sigma/dQ^2_{QE}$ cross section measured in MiniBooNE experiment. The extracted value of $M_A = 1.28 \pm 0.05$ GeV is consistent within errors with the MiniBooNE result. Additionally, for proton kinetic energies above the Cherenkov threshold, the strange quark contribution to the neutral current axial vector form factor at $Q^2_{QE} = 0$, Δs , was extracted from a fit of MiniBooNE data for $\nu_p \rightarrow \nu_p$ to $\nu_N \rightarrow \nu_N$ cross section ratio. This value is found to be $\Delta s = 0.11 \pm 0.36$.

Comments: 23 pages, 8 figures

Subjects: **High Energy Physics - Phenomenology (hep-ph)**; Nuclear Theory (nucl-th)

Journal reference: Phys.Rev.C84:015501,2011

DOI: [10.1103/PhysRevC.84.015501](https://doi.org/10.1103/PhysRevC.84.015501)

Cite as: [arXiv:1106.0976](https://arxiv.org/abs/1106.0976) [hep-ph]

(or [arXiv:1106.0976v1](https://arxiv.org/abs/1106.0976v1) [hep-ph] for this version)

Submission history

From: Anatoly Butkevich [[view email](#)]

[v1] Mon, 6 Jun 2011 07:42:23 GMT (145kb)

Which authors of this paper are endorsers?

Download:

- [PDF](#)
- [PostScript](#)
- [Other formats](#)

Current browse context:

hep-ph

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1106](#)

Change to browse by:

[nucl-th](#)

References & Citations:

- [INSPIRE HEP](#)
([refers to](#) | [cited by](#))
- [NASA ADS](#)

Bookmark ([what is this?](#))

