Charged Current Inclusive Neutrino Cross Sections: Superscaling Extension to the Pion Production and Realistic Spectral Function for Quasielastic Region

M.V. Ivanov[1,2], **A.N. Antonov**[1], **M.B. Barbaro**[3], **J.A. Caballero**[4], **G.D. Megias**[4], **R. González-Jiménez**[4], **E. Moya de Guerra**[2], **J.M. Udías**[2]

[1]Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences, Sofia 1784, Bulgaria

[2]Grupo de Física Nuclear, Departamento de Física Atómica, Molecular y Nuclear, Universidad Complutense de Madrid, CEI Moncloa, 28040 Madrid, Spain

[3]Dipartimento di Fisica, Università di Torino and INFN, Sezione di Torino, Via P. Giuria 1, 10125 Torino, Italy

[4]Departamento de Física Atómica, Molecular y Nuclear, Universidad de Sevilla, 41080 Sevilla, Spain

Superscaling approximation (SuSA) predictions to neutrino-induced charged-current pion production in the Δ-resonance region are explored under MiniBooNE experimental conditions [1]. The results obtained within SuSA for the flux-averaged double-differential cross sections of the pion production for the $\nu_\mu + \mathrm{CH}_2$ reaction as a function of the muon kinetic energy and of the scattering angle, the cross sections averaged over the angle, the total cross section for the pion production are compared with the corresponding MiniBooNE experimental data. The SuSA charged-current π^+ predictions are in good agreement with data on neutrino flux average cross-sections. The SuSA extension to the pion production region and the realistic spectral function $S(p, \mathcal{E})$ [2] for quasielastic scattering are used for predictions of charged current inclusive neutrino-nucleus cross sections. The results are compared with the inclusive neutrino-nucleus data from the T2K experiment.

References

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