Contribution ID: **107** Type: **Oral talk (15 min + 5 min questions)**

The computational tool for evaluation of Nπ electroproduction cross sections

Thursday, 14 July 2022 16:20 (20 minutes)

The measurements of exclusive $\pi^+ n$ and $\pi^o p$ electroproduction with the CLAS detector in Hall B at Jlab provided the dominant part of the world data on observables of these channels [1,2] stored in the CLAS Physics Data Base [3]. The data on exclusive Nπ and $\pi^+\pi^- p$ electroproduction are the major source of the information on nucleon resonance (N*) electroexcitation amplitudes. They offer insight into the Nπ structure and strong QCD dynamics which underlie the nucleon resonance generation from quarks and gluons [1,2,4]. The approach for evaluation of the four-fold $N\pi$ differential cross sections from unpolarized, transverse-transverse, longitudinal-transverse exclusive structure functions will be presented in the talk. The special procedures were developed for extraction of the mentioned above structure functions from experimental data. These structure functions were interpolated within entire $N\pi$ electroproduction phase space covered in the measurements with CLAS offering evaluation of $N\pi$ electroproduction cross section entirely from the experimental data without any bias from reaction models. Comparison with the available data on Np electroproduction demonstrated credibility of approaches developed for cross section evaluation. For the first time, reliable estimates of $N\pi$ electroproduction observables have become available within a broad kinematics area of the invariant masses of the final hadron system of W < 1.7 GeV and the photon virtuality range Q^2 < 5.0 GeV^2. The estimated $N\pi$ cross sections and exclusive structure functions are of particular importance for the studies of the N* structure. Future extension of these estimates toward higher W covering DIS region are important for exploration of the ground nucleon structure in 3-dimesions from the results on the chiral-odd generalized parton distributions constrained by the data of deeply virtual $N\pi$ electroproduction. The extracted structure functions and the computer code for on-line evaluation of Np electroproduction cross sections are available on the website [5] for the access worldwide.

1. I.G. Aznauryan and V.D. Burkert, Electroexcitation of Nucleon Resonances, Prog. Part. Nucl. Phys. 67, 1 (2012).
2. D.S. Carman, K. Joo, and V.I. Mokeev, Few Body Syst. 61 29 (2020).
3. CLAS Physics Database, http://clasweb.jlab.org/physicsdb
4. V.D. Burkert et al., The Nucleon Resonance Structure from the $\pi^+\pi^- p$ electroproduction Reaction off Protons, Moscow Univ. Phys. Bull. 74, 243 (2019).
5. https://clas.sinp.msu.ru/~almaz

The speaker is a student or young scientist

Yes

Section

1. Intermediate and high energies, heavy ion collisions

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