Contribution ID: **153**   Type: **Contributed**

Exploring resonance structure with transition GPDs with CLAS12 at JLAB

Tuesday, 6 June 2023 14:30 (20 minutes)

Generalized Parton distributions (GPDs) correlate the transverse position and the longitudinal momentum fraction of the partons in the nucleon. Over the last two and a half decades, there have been extensive studies of these distributions functions based on different exclusive lepton scattering reactions. The most established reactions are deeply virtual Compton scattering (DVCS), where a real photon is produced, and deeply virtual meson production (DVMP). While these studies have already provided a significant insight into the 3D structure of the ground state nucleon, little is known about the 3D structure of resonances so far. Such information is encoded in so called transition GPDs, which can be accessed for example in DVCS and DVMP reactions with a N→N *transition. Because the factorisation of this process amplitude requires constraints on the Mandelstam variable t and the photon virtuality Q2 (-t/Q² « 1) and several final state particles have to be detected for a clean identification, CLAS12 in combination with the upgraded CEBAF accelerator at JLAB provides an excellent opportunity to study such processes. The talk will present first beam spin asymmetry measurements for the hard exclusive π-Δ++ production and compare them to results from the hard exclusive π+ and π0 production [1]. In addition, an outlook on upcoming studies of the N→N DVCS process and further N→N* DVMP observables will be provided.*

[1] S. Diehl et al. (CLAS Collaboration), submitted to Phys. Rev. Lett. (2023) https://doi.org/10.48550/arXiv.2303.11762

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Session Classification: QCD and hadron structure

Track Classification: QCD and hadron structure