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Study of $\pi \to \pi\pi$ transition generalized parton distributions and the non-diagonal DVCS

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The generalized parton distributions (GPDs) provide abundant information on the hadron structure such as spin structure and spatial distribution in terms of quark and gluon degrees of freedom and can be accessed through the hard exclusive reactions such as the deeply virtual Compton scattering (DVCS) and deeply virtual meson production. In particular, in the presence of the resonance state of the target nucleon, one can investigate the transition GPDs which may give us information on the dynamics of such transitions. In this work, we study the DVCS process of $\gamma^*\pi \to \gamma\pi\pi$ involving the $\pi \to \pi\pi$ transition GPDs as a spinless example of developing the framework of the transition GPDs. Here we introduce the parameterizations of $\pi \to \pi\pi$ transition GPDs up to the leading twist accuracy and investigate their symmetric properties. We used the soft-pion theorem to show that they are normalized in terms of the usual pion GPDs under the condition that one of the two final state pions is taken to be soft. Also, the hadronic tensor in the DVCS amplitude is calculated in the isospin invariant form so that one can see which GPDs contribute to the physical process such as the Sullivan-type of $eN \to e\gamma\pi\pi N'$ reaction.

Presentation type

Oral presentation

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