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How can the photon-like heavy quarkonium $V \to Q\bar{Q}$ transition falsify our predictions ?

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The diffractive electroproduction of the S-wave heavy quarkonia (V) is an efficient tool for studies the structure of $V \to Q\bar{Q}$ transition. The most of existing studies in the literature are based on the unjustified assumption about a similar structure of both $\gamma^* \to Q\bar{Q}$ and $V \to Q\bar{Q}$ vertices, typically adopted in the light-front frame. The photon-like $V \to Q\bar{Q}$ vertex, besides an S-wave component, also contains an extra D-wave admixture in the $Q\bar{Q}$ rest frame. However, the relative weight of these contributions cannot be justified by any reasonable non-relativistic $Q\bar{Q}$ potential model. In this work, we investigate and discuss the relative role of the D-wave contribution by a comparison of our predictions based on the color dipole formalism with the available data. We found that the production of radially excited heavy quarkonia states is more efficient for studies of the $V \to Q\bar{Q}$-structure due to a stronger sensitivity of the D-wave contribution to the nodal structure of quarkonium wave functions.

Secondary track (number)

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