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# On the molecular structure effects of the photoproduction in the \bar D \Lambda_c final state

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We investigate the photoproduction of the D ¯Λ_c final state via intermediate hidden-charm pentaquark states P_c (4312),P_c (4440), and P_c (4457), focusing on the role of their underlying molecular structure. Using an effective Lagrangian approach and incorporating hadronic form factors, we construct the full amplitude for the reaction γp⟶P_c⟶D ¯Λ_c mediated by triangle loop diagrams involving intermediate meson and baryon exchanges. The P_c (4312) state, treated as a J^P=1/2^-, D ¯Σ_c molecule whereas the P_c (4440), and P_c (4457) are the (D^* ) ¯Σ_c molecule with J^P=1/2^-,3/2^-, respectively that serves as a benchmark to analyze how the compositeness of the pentaquark influences the loop amplitude and the resulting cross sections. We calculate the full transition amplitude, including the loop integration with molecular vertex functions characterized by Gaussian regulators, and evaluate the invariant amplitude using both covariant and Euclidean techniques. The model emphasizes the importance of hadronic molecular interactions in shaping the observable distributions in meson photoproduction, particularly in terms of momentum dependence and angular structures. Our results provide theoretical predictions that can guide future experimental searches and analyses of hidden-charm molecular states through exclusive photoproduction channels.

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