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Deuteron-Xi correlation function studied with three-body model

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Nowadays, the three-nucleon force is considered essential within the framework of nuclear forces. Additionally, three-hadron forces are thought to have a notable impact on hadronic systems beyond many-nucleon systems. The correlation function involving the deuteron and hadrons has emerged as a potential tool for exploring the three-hadron force. However, a comprehensive understanding of this deuteron-hadron correlation function is lacking. Particularly, it is necessary to clarify how the weak binding nature of the deuteron affects the correlation function.

To address this, we investigate the channel coupling between bound and continuum states, as well as continuum-continuum states, of the deuteron in scattering processes that are relevant to the d-Ξ^- correlation function. This channel coupling is described using the continuum-discretized coupled channels (CDCC) method. The CDCC method, a fully quantum-mechanical and nonperturbative reaction model, is founded on a three-body description of systems.

Our calculations indicate that the aforementioned channel coupling has a noticeable yet not overwhelmingly significant effect. Consequently, it is reasonable to simulate the deuteron-hadron correlation function without considering the deuteron-continuum states.

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