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Non-perturbative pion dynamics for the $X(3872)$

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Collaboration

Abstract content

We discuss the role of the non-perturbative pion dynamics on the near-threshold resonance X(3872) charmonium state, which is assumed to be an S-wave $D\bar D^{bound system}[1,2]. The calculations are performed within the fr channels Faddeev-type three-body equations for the $D\bar{D}\pi$ system in the $J^{PC}=1^{++}$ channel. The πD interaction is parameterised via a D^{*} pole, and a three-body contact interaction is included to render the equations well defined. T perturbatively and compare it with different approximate treatments. Moreover, we explore the quark-mass dependence of the pole position of the X(3872) state. We find that the trajectory of the X(3872)$ depends strongly on the assumed quark-mass dependence of the short-range interactions which can be determined in lattice QCD calculations, see e.g. [3] for the first results.

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