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Doubly charmed tetraquark T_{cc}^+ ($cc\bar{u}\bar{d}$) from lattice QCD

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The determination of the DD^* scattering amplitude from lattice QCD is complicated by long-range interactions. In particular, the scattering amplitude exhibits a left-hand branch cut in the kinematical region where several states from lattice simulations appear, requiring careful treatment. We tackle this problem by adopting plane-wave and effective-field-theoretic methods, which also address partial wave mixing. In addition, we incorporate a diquark-antidiquark interpolator in the operator basis (along with the relevant scattering operators) in order to achieve a better resolution of the energy spectrum. Results show that inclusion of it has a moderate impact at physical charm quark mass.

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