X(3872) Relevant D\bar{D}^* Scattering in $N_f = 2$ Lattice QCD

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We study the S-wave D\bar{D}^ (*I=0*) scattering at four different pion masses m_pi ranging from 250 MeV to 417 MeV from $N_f=2$ lattice QCD. A bound state near the D\bar{D}^ threshold likely exists even after considering the possible left-hand cut effect due to the one pion exchange interaction. At m_pi approx 417 MeV where the effective range expansion is valid, the compositeness of the bound state is X\approx 1 and indicates a predominant D\bar{D}^* component. This state may correspond to X(3872). On the other hand, our results of the finite volume energies also hint at the existence of a 1^{++} resonance below 4.0 GeV.

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