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Low energy charmonium-hadron scattering in lattice QCD

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We investigate low energy J/psi-phi scattering and search for narrow resonances.The J/psi-phi channel is considered to be an interesting system, since three narrow resonances have been reported in recent experiments, namely, Y(4140) and Y(4274) by CDF collaboration, and X(4350) by Belle collaboration. These resonances seem to be relatively stable despite being above open charm thresholds, since their upper bounds of the widths are less then 10-30 MeV. In particular, Y(4140) is located close to the J/psi-phi threshold.
We study the J/psi-phi interaction at low energies by using extended Luscher formula with partially twisted boundary conditions, which allows us to calculate s-wave and p-wave phase shifts at any small value of the scattering momentum even in a single finite volume. We perform our simulations with the relativistic heavy quark action for charm quarks in 2+1 flavor dynamical lattice QCD using the PACS-CS gauge configurations with a lattice cut-off of 1/a = 2.2 GeV.

Keywords

Heavy Flavor, Jet Quenching, QGP

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