

A Lattice QCD Study of the ρ Resonance

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We present a lattice QCD study of the ρ resonance with $N_f = 2 + 1$ clover fermions at a pion mass of approximately 320 MeV and lattice size 3.6 fm. We study two processes involving the ρ . The first process is scattering of two pions in P-wave with isospin 1 where by using the Luescher method we determine the strong scattering phase shift, from which we determine the ρ resonance mass and decay width $\Gamma(\rho \rightarrow \pi\pi)$. The second process is the radiative transition $\pi\gamma \rightarrow \pi\pi$ where we follow the Briceño-Hansen-Walker-Loud approach to determine the radiative transition amplitude in the invariant mass region near the ρ resonance and both space- and time-like momentum transfer. This allows us to determine the coupling between the ρ , the pion and the photon and the ρ radiative decay width.

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