Einladung

zum Vortrag

von

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über

Quasi-bound states of a *DNN* system

Abstract

For the last ten years, nuclear systems with anti-kaons have been a hot topic in strange nuclear physics, and $\bar{K}NN$ has been well discussed because it is a prototype system of kaonic nuclei. Now we tackle the charm sector, expecting that the analogy between strangeness and charm sectors brings useful information to the strangeness physics and that there are unique properties in the charm sector.

We have investigated a system of *D* meson and two nucleons, *DNN*(T=1/2), analogous to $\bar{K}NN$ (T=1/2), with a variational approach [1] using an effective *DN* single-channel potential derived from the coupled-channel model extended to the charm sector [2], in which the $\Lambda_c(2595)$ is dynamically generated as a quasi-bound state of the *DN* system [3]. We have tested three kinds of NN potentials which have different strengths of repulsive core.

As a result, we have found a bound state in $J_\pi=0^-$ channel for all the *NN* potentials, while no state is found below the $\Lambda_c(2595)$-*N* threshold in $J_\pi=1^-$ channel even for the potential that has the softest repulsive core. Due to the strong attraction of *I=0 DN* potential which generates the resonant state $\Lambda_c(2595)$, the *DNN*($J_\pi=0^-$) state has a large binding energy of about 220 MeV. As a consequence of the very narrow width of $\Lambda_c(2595)$ decay width of the bound *DNN* is less than 40 MeV, which is rather small compared to the binding energy. We will report also on the structure of *DNN* and the comparison with the $\bar{K}NN$ system:

1. *I=0 DN* pair in the *DNN* is nearly identical to $\Lambda_c(2595)$, similarly to the case of $\bar{K}NN$ system in which an *I=0* $\bar{K}N$ is almost the same as $\Lambda(1405)$.
2. The deep binding of *DNN* is mainly attributed to suppression of kinetic energy due to the heavy mass of *D* meson.

Furthermore, we would like to mention on *DNN*($J_\pi=0^-$) with isospin T=3/2, which corresponds to interesting states, D^0nn or D^+pp.

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[2] T. Mizutani and A. Ramos, Phys. Rev. C74, 065201 (2006).
[3] M. Bayar, C. -W. Xiao, T. Hyodo, A. Dote and M. Oka, E. Oset, Phys. Rev. C86, 044004 (2012).

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