

## A comparison between the $P_c$ and $P_{cs}$ systems

We construct the effective potentials of the  $P_c$  and  $P_{cs}$  states based on the  $SU(3)_f$  symmetry and heavy quark symmetry. Then we perform the coupled-channel analysis of the lowest isospin  $P_c$  and  $P_{cs}$  systems. The coupled-channel effects play different roles in the  $P_c$  and  $P_{cs}$  systems. In the  $P_c$  systems, this effect gives minor corrections to the masses of the  $P_c$  states. In the  $P_{cs}$  system, the  $\Lambda_c \bar{D}_s - \Xi_c \bar{D}$  coupling will shift the mass of the  $P_{cs}(4338)$  close to the  $\Xi_c \bar{D}$  threshold. The  $\Lambda_c \bar{D}_s^{(*)} - \Xi_c \bar{D}^{(*)}$  coupling will also produce extra  $P_{cs}$  states. We discuss the correspondence between the  $P_c$  and  $P_{cs}$  states. Our results prefer that the  $SU(3)$  partners of the observed  $P_c(4312)$ ,  $P_c(4440)$ , and  $P_c(4457)$  in the  $P_{cs}$  system have not been found yet.

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