

Heavy flavor molecules

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We proposed a unified framework to describe the interactions of the observed T_{cc} , P_c , and P_{cs} within a quark level interaction. We predict the possible $D_{(s)}^{(*)}D_{(s)}^{(*)}$ molecular states in the SU(3) limit with the masses of the P_c states as the inputs. We also investigate the baryon-meson and baryon-baryon systems. We suggest that for a specific heavy flavor meson-meson, baryon-meson, or baryon-baryon system, the interactions for the states with the same flavor and spin matrix elements can be related by a generalized flavor-spin symmetry.

Summary

The obtained results to the observed P_c , P_{cs} , and T_{cc} states indicate that the interactions of heavy flavor di-hadron systems may have a heavy quark spin and flavor symmetry. Specifically, the spin multiplets in the same system obey the heavy quark spin symmetry, for example, the $P_c(4312)$, $P_c(4440)$, and $P_c(4457)$. While different heavy flavor di-hadron systems obey the heavy quark flavor symmetry, for example, the observed P_c , P_{cs} , and T_{cc} states.

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