

Molecular states of $\Omega_c, \Omega_b, \Xi_{cc}, \Xi_{cb}, \Xi_{bb}$ type

By exploring the interactions among mesons and baryons, in a coupled-channels approach, for the heavy-quark sector (charm and bottom), we investigate the dynamical generation of singly Ω_c/Ω_b and doubly Ξ_{cc} , Ξ_{cb} , and Ξ_{bb} heavy-quark baryon resonances. The interactions describing the meson-baryon transitions among the relevant channels are evaluated considering the vector meson exchange mechanism. For that, we extend the Local Hidden Gauge approach to the heavy-quark sector and show that the dominant terms come from the exchange of light vector mesons, with the heavy-quarks as spectators. Consequently, the heavy-quark spin symmetry is preserved for the dominant terms in $1/M_Q$ counting, and the Chiral Lagrangians describe the interaction. The amplitudes obtained are then unitarized through the Bethe-Salpeter equation, according to the Chiral Unitary approach, with its solutions interpreted as physical states, i. e. bound/resonances. For the singly-charmed system case, we obtain two states with $J^P = 1/2^-$ and $3/2^-$ with an excellent agreement with the experimental $\Omega_c(3050)$, $\Omega_c(3090)$ and $\Omega_c(3119)$ structures, recently reported by the LHCb collaboration [Phys. Rev. Lett. 118, 182001 (2017)]. Furthermore, for the bottom case, we found four states with a good matching with the four peaks seen in the high-energy part of the LHCb data [Phys. Rev. Lett 124, 082002 (2020)] report for the experimental Ω_b states. In addition, we also present predictions for the doubly-heavy quark baryons $\Xi_{cc}(bb)$ and Ξ_{bc} resonances.

Primary author: DIAS, Jorgivan

Presenter: DIAS, Jorgivan

Track Classification: Hadron-hadron interactions