Contribution ID: **260** Type: **Parallel contribution**

Molecular states of Ω□,Ω□,Ξ□□,Ξ□□,Ξ□□ 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 Ωc/Ωb and doubly Ξcc, Ξbc, and Ξbb 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/MQ 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 JP = 1/2− and 3/2− with an excellent agreement with the experimental Ωc(3050), Ωc(3090) and Ωc(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 Ωb states. In addition, we also present predictions for the doubly-heavy quark baryons Ξcc(bb) and Ξbc resonances.

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Track Classification: Hadron-hadron interactions