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Study of light, charmonium-like, and fully-charm tetraquark spectroscopy

Tuesday 13 July 2021 19:46 (2 minutes)

We study tetraquark states of all $qq\bar{q}\bar{q}$, $qc\bar{q}\bar{c}$, $sc\bar{q}\bar{c}$ and $cc\bar{c}\bar{c}$ ($q = u, d$ quark) quark configurations and all S-wave tetraquark masses are evaluated in a constituent quark model where the Cornell-like potential and one-gluon exchange spin-spin coupling are employed.
All model parameters are predetermined by comparing the theoretical and experimental masses of light, strange, charmed and bottom mesons.
The theoretical predictions of the tetraquarks are compared with the observed exotic meson states. Two tentative assignments for light and charmonium-like tetraquarks are suggested respectively.
The work suggests that the $X(6900)$ observed by LHCb is likely to be the first radial excited fully-charm tetraquark state with $J^{PC} = 0^{++}$ in the $\bar{3}_c \otimes 3_c$ configuration, and the ground and second radial excited states of fully-charm tetraquark are around $6450MeV$ and $7250MeV$ respectively.

Preferred track

Hadron Spectroscopy

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