Confinement Mechanism in Tetraquark States: An Application to the Fully Heavy Tetraquark State

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Content

In this talk, I will introduce a new color basis system and confinement mechanism for multi-quark systems according to the string-type picture of QCD. The color string configurations in the strong coupling QCD are implemented in the set of color basis states. The extended color Hilbert space for $QQ\bar Q\bar Q$ systems includes a ``hidden color'' state, which mixes with two-meson states $Q\bar Q+Q\bar Q$. This mixing effect leads to an attractive potential sufficient to form a bound state. We apply a realistic Hamiltonian model with the new scheme to fully charmed tetraquark states, $cc\bar c\bar c$, and find a bound and two resonant states, which could potentially correspond to the $cc\bar c\bar c$ tetraquark candidates recently observed in experiments. The results will be compared with the conventional confinement potential which is taken as the sum of the two-body color-dependent linear potentials.

Reference

[1] Phys.Rev.D 108 (2023) 7, L071501
[2] Phys.Rev.D 111 (2025) 1, 014018

Field of Research: Heavy flavor systems

Experiment / Theory: Theory

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