

Experimental support for a new h_1 resonance around 1830 MeV and theoretical backing from the vector-vector interaction; Prediction of $I=1$ molecular states of $D\bar{D}^*$ and $D^*\bar{D}$ and relationship to the $Z_c(3900)$ and the claimed $Z_c(4025)$.

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Collaboration

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Abstract content

The BES data on the $J/\psi \rightarrow \eta K^0 \bar{K}^0$ reactions show a clear enhancement in the $K^0 \bar{K}^0$ mass distribution close to a resonance around threshold, which in this case would correspond to an h_1 state with quantum numbers $I^G(J^{PC}) = 0^-(1^{\{+-\}})$. A state around 1800 MeV results from the interaction of the $K \bar{K}$ using the local hidden gauge approach. We show that, 1 , we study the contribution of two pion exchange to the interaction and the exchange of a heavy vector J/ψ . We find this latter term 2 with a mass around 4000 MeV, while the effect of the two pion exchange is an attraction but weaker than that from J/ψ exchange. 2 state below threshold around 3990 MeV, we conclude that the BES experiment could be showing the existence of the state that we find \bar{D} in the isospin $I = 1$ channel in the light of recent theoretical advances that allow to combine elements of the local hidden gauge \bar{D} bound state decaying into $\eta_c \rho$ and $\pi J/\psi$ is found. At the same time we reanalyze the data of the BESIII experiment $(D \bar{D})^{\pm}$, from where a $Z_c(3885)$ state was claimed, associated to a peak in the $(D \bar{D})^{\pm}$ invariant mass distribution found at BESIII, reconfirmed at 3896 MeV at Belle, or 3885 MeV at CLEO, could all be the same state and correspond to the one that we find theoretically.

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