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Role of the $h_1(1800)$ and $f_1(1285)$ states in the J/ψ decays

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The BES data on the $J/\psi \to \eta K^{*0}\bar{K}^{*0}$ reaction show a clear enhancement in the $K^{*0}\bar{K}^{*0}$ mass distribution close to the threshold of this channel. Such an enhancement is usually a signature of a $L = 0$ resonance around threshold, which in this case would correspond to an h_1 state with quantum numbers $I^G(J^{PC}) = 0^-(1^{+-})$. We study the state around 1800 MeV results from the interaction of the $K^*\bar{K}^*$ in $J/\psi \to \eta K^{*0}\bar{K}^{*0}$ decay, confirming the relationship of the enhancement in the invariant mass spectrum with the h_1 resonance. The role of $f_1(1285)$ resonance in the $J/\psi \to \phi\bar{K}K^*$ and $J/\psi \to \phi f_1(1285)$ decays are also investigated. The theoretical approach is based on the results of chiral unitary theory where the $f_1(1285)$ resonance is dynamically generated from the $K^*\bar{K} - c.c.$ interaction. In order to further test the dynamical nature of the $f_1(1285)$ state, we investigate the $J/\psi \to \phi\bar{K}K^*$ decay close to the $\bar{K}K^*$ threshold and make predictions for the ratio of the invariant mass distributions of the $J/\psi \to \phi\bar{K}K^*$ decay and the $J/\psi \to \phi f_1(1285)$ partial decay width with all the parameters of the mechanism fixed in previous studies. The results can be tested in future experiments and therefore offer new clues on the nature of the $h_1(1800)$ and $f_1(1285)$ states.

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