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The χ_{cJ} decay to $\phi K^* \bar{K}$, $\phi h_1(1380)$ testing the nature of axial vector meson resonances

We perform a theoretical study of the $\chi_{cJ} \rightarrow \phi K^* \bar{K} \rightarrow \phi K \pi \bar{K}$ reaction taking into account the $K^* \bar{K}$ final state interaction, which in the chiral unitary approach is responsible, together with its coupled channels, for the formation of the low lying axial vector mesons, in this case the $h_1(1380)$ given the selection of quantum numbers. Based on this picture we can easily explain why in the χ_{c0} decay the $h_1(1380)$ resonance is not produced, and, in the case of χ_{c1} and χ_{c2} decay, why a dip in the $K^+ \pi^0 K^-$ mass distribution appears in the 1550-1600 MeV region, that in our picture comes from a destructive interference between the tree level mechanism and the rescattering that generates the $h_1(1380)$ state. Such a dip is not reproduced in pictures where the nominal $h_1(1380)$ signal is added incoherently to a background, which provides support to the picture where the resonance appears from rescattering of vector-pseudoscalar components.

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