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# Study of Tcc and X(3872)

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We have investigated the internal structure of the open- and hidden-charmed($DD^*/D\bar{D}^*$) molecules in the unified framework. We first fit the experimental lineshape of the $T_{cc}^+$ state and extract the $DD^*$ interaction, from which the $T_{cc}^+$ is assumed to arise solely. Then we obtain the $D\bar{D}^*$ interaction by charge conjugation. Our results show that the $D\bar{D}^*$ interaction is attractive but insufficient to form $X(3872)$. Instead, its formation requires the crucial involvement of the coupled channel effect between the $D\bar{D}^*$ and ccbar components, although the ccbar accounts for approximately $1\%$ only. Besides $X(3872)$, we have obtained a higher-energy state around $3957.9$ MeV with a width of $16.7$ MeV, which may be a potential candidate for the $X(3940)$. In $J^{PC} = 1^{+-}$ sector, we have found two resonances related to the iso-vector $Z_c$ and the iso-scalar $h_c(2P)$, respectively. Our combined study provides valuable insights into the nature of these $DD^*/D\bar{D}^*$ exotic states.

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