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Hidden charmonium decays of spin-2 partner of X(3872)

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In this work, we investigated in detail the widths of the X_2 decaying to $J/\psi V$ ($V = \rho^0, \omega$) and to $\eta_c P$ ($P = \pi^0, \eta, \eta'$) using the effective Lagrangian approach. In calculations, we assume the X_2 as a molecular state of the $D^{*0}\bar{D}^{*0}$ and $D^{*+}D^{*-}$ with equal proportion. Moreover, we only consider the contributions from the triangle hadron loops made of the charmed mesons $D^{(*)}$ and $\bar{D}^*$.We found that the processes $X_2 \to J/\psi\rho^0$ and $\eta_c\pi^0$ are both isospin breaking, while the processes $X_2 \to J/\psi\omega$ and $\eta_c\eta$ (η') are of isospin conservation. We also investigated the dependence of the ratios between these widths on the X_2 mass and on the η-η' mixing angle, which may be good quantities for experiments. We hope that these calculation results would be checked experimentally in the future.

Primary author(s) : Prof. LI, Gang (Qufu Normal University); WU, Jia Jun (HIAS-UCAS); ZHENG, Yuanxin (Qufu Normal University); LIU , Shidong (Qufu Normal University); CAI, Zuxin (Qufu Normal University); WU, Qi (Henan Normal University)

Presenter(s) : ZHENG, Yuanxin (Qufu Normal University)

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