Hidden-charm strong decays of the charmonium-like states $Y(4230)$ and $X2(4014)$

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We have investigated the hidden-charm strong decays of the exotic charmonium-like state $Y(4230)$ 1 and the spin-2 partner $X2(4014)$ of the charmonium-like state $X(3872)$ 2, recently reported by the BES-III and BELLE collaborations. The exotic states Y and $X2$ have been interpreted as four-quark states with molecular-type interpolating currents in the framework of the covariant confined quark model. We evaluate the hidden-charm decay width of Y into a vector and a scalar, with the latter decaying subsequently to a pair of charged pseudoscalar states. The strong decay mode $Y \to \pi^+\pi^-$ has been studied by involving the both scalar resonances $f_0(500)$ and $f_0(980)$, considered quark-antiquark states, while the mode $Y \to K^+K^-$ - via $f_0(980)$. We have calculated the partial widths of the related strong decays and the branching ratio $B(Y \to K^+K^-)/B(Y \to \pi^+\pi^-)$, recently determined by the BES-III Collaboration. The estimated branching ratio and calculated partial strong decay widths are in reasonable agreement with the latest experimental data 1. We have also considered the decay widths of X_2 on the level of two-petal quark loops. The partial widths of the strong decays $X_2 \to \omega\, J/\Psi$ and $X_2 \to \rho^0\, J/\Psi$ have been calculated and the related branching ratio has been analyzed. In the comparison of our approach to the recent $D^*\,\bar{D}^*$ molecular scenario, we have shown the explicit appearance of the threshold effect in the latter models 2. Our theoretical results might be checked by future experiments.

1. Gurjav Ganbold and M. A. Ivanov,
Strong decays of charmonium-like state $Y(4230)$,
Eur. Phys. J. A {\bf 60:13} (2024).

2. Gurjav Ganbold and M. A. Ivanov,
Hidden-charm strong decays of the spin-2 partner of $X(3872)$,
Phys. Rev. D {\bf 111}, 014007 (2025).