On the origin of the narrow peak and the isospin symmetry breaking of X(3872)$^1$ SACHIKO TAKEUCHI, Japan College of Social Work, KIYOTAKA SHIMIZU, Department of Physics, Sophia University, MAKOTO TAKIZAWA, Showa Pharmaceutical University — The X(3872) is investigated by a $c\bar{c}$-two-meson hybrid model. The two-meson state consists of the $D^0\bar{D}^{*0}$, $D^+D^{*-}$, $J/\psi\rho$, and $J/\psi\omega$. The energy dependent decay widths of the $\rho$ and $\omega$ mesons are taken into account. With reasonable assumptions we found that the X(3872) can be a shallowly bound state or a low-energy resonance. In either case, it is found that very narrow $J/\psi\rho$ and $J/\psi\omega$ peaks appear around the $D^0\bar{D}^{*0}$ threshold in the $B$ meson decay. Also, the isospin symmetry breaking of large size is found in the X(3872) decay; the strength of the $J/\psi\omega$ peak is only 2.66 times as large as that of the $J/\psi\rho$. The isospin symmetry breaking in the present model comes from the difference in the meson masses and widths. The size of the breaking in the decay becomes larger as the $c\bar{c}$-$D\bar{D}^*$ coupling becomes weaker. The relative strength of the $D^0\bar{D}^{*0}$ below the $D^+D^{*-}$ threshold also varies largely according to the size of this coupling. It is also found that the branching ratio of the $D^0\bar{D}^{*0}$ and the $J/\psi\rho$, which is still controversial experimentally, is a good indicator whether the X(3872) peak is a bound state or a threshold effect.

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