

Abstract Submitted  
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**X(3872) as a coupled two-meson molecular state with a tetraquark configuration**<sup>1</sup> SACHIKO TAKEUCHI, Japan College of Social Work, MAKOTO TAKIZAWA, Showa Pharmaceutical Univ., KIYOTAKA SHIMIZU, Dept. of Physics, Sophia Univ. — X(3872) may be a superposition of the two-meson molecular states and the compact tetraquark state because the X(3872) mass is very close to or almost on the threshold and because the quark interaction can be attractive for the tetraquark state. In order to understand its structure, we employ a quark model where the orbital correlations of the four quarks are fully taken into account. The parameters in the model are taken so that the relevant  $q\bar{q}$  meson mass spectrum as well as the  $S$ -wave baryon mass spectrum are reproduced. We also consider the  $c\bar{c}$  core for the isospin  $I=0$  system. The results show that there can be such a bound state, namely a two-meson molecule with a compact tetraquark configuration in the short range region, for each of the  $I=0$  and 1 systems. Their masses can be very close to each other. When the isospin symmetry breaking terms, namely the electromagnetic interaction between quarks as well as the  $ud$ -quark mass difference, are introduced to the system, the effect of the mixing between the  $I=0$  and 1 states can be large. This may be the mechanism of the observed large isospin symmetry breaking of X(3872).

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