

**P -wave states
 T_{bb}^{--} from diquarks**

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We investigate the P -wave states T_{bb}^{--} in the isospin singlet and three excited modes [excitation occurring in the diquark $[bb]_{c_1}^{s_1}$ (ρ -mode), antidiquark $[\bar{u}\bar{d}]_{c_2}^{s_2}$ (r -mode) or between them (λ -mode)] from diquarks in a quark model. We analyze the dynamical behaviors of the diquark $[bb]_{c_1}^{s_1}$, antidiquark $[\bar{u}\bar{d}]_{c_2}^{s_2}$ and their correlations in the states T_{bb}^{--} by decomposing the interactions from various sources in the model. The absolute dominant color-spin configuration, more than 99%, in the ρ -mode with 1^1P_1 is $[bb]_3^0[\bar{u}\bar{d}]_3^0$. Its energy is lower by about 18 MeV than the threshold $\bar{B}\bar{B}$ so that it can establish a compact bound state. The chromomagnetic and meson-exchange interactions in the antidiquark $[\bar{u}\bar{d}]_3^0$ are responsible for its binding mechanism. Two other excited modes are higher than their respective threshold. The color configuration $\mathbf{6} \otimes \bar{\mathbf{6}}$ need to be handled discreetly in the tetraquark states.

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