

On Possible S-Wave Bound States for an $N\bar{N}$ System Within a Constituent Quark Model

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Abstract: We try to apply a constituent quark model (a variety chiral constituent quark model) and the resonating group approach for the multi-quark problems to compute the effective potential between the $N\bar{N}$ in S-wave (the quarks in the nucleons N and \bar{N} , and the two nucleons relatively as well, are in S wave) so as to see the possibility if there may be a tight bound state of six quarks as indicated by a strong enhancement at threshold of $p\bar{p}$ in J/ψ and B decays. The effective potential which we obtain in terms of the model and approach shows if the experimental enhancement is really caused by a tight S-wave bound state of six quarks, then the quantum number of the bound state is very likely to be $l=1, J^{PC}=0^{-+}$.

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