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Exploring possibly existing qq -anti- b -anti- b tetraquark states with $qq = ud, ss, cc$

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We explore the possible existence of qq -anti- b -anti- b tetraquark states, where qq denotes two up/down, strange or charm quarks. To this end we compute potentials of two static antiquarks in the presence of the two quarks qq of finite mass using lattice QCD. Then we check, whether these potentials are sufficiently attractive to host bound states. We find strong indication for a bound four-quark state for $qq=(ud-du)/\sqrt{2}$, i.e. isospin $I=0$. At the same time there is clear evidence against the existence of qq -anti- b -anti- b tetraquarks with strange or charm flavor or isospin $I=1$.

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