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Inclusion of heavy quark spin effects in the $I(J^P)=0(1^-)$ $ud\bar{b}\bar{b}$ four-quark channel in the Born-Oppenheimer approximation

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We refine our previous study of a $\bar{b}\bar{b}ud$ tetraquark resonance with quantum numbers $I(J^P) = 0(1^-)$ which is based on antistatic-antistatic-light-light lattice QCD potentials by including heavy quark spin effects via the mass difference of the B and B^* meson.

This leads to a coupled channel Schroedinger equation where the two channels correspond to BB and B^*B^* respectively. We explore the existence of a tetraquark resonance by searching for T matrix poles in the complex energy plane and find that the heavy quark spins have a significant impact. We also provide an outlook on a possible future finite volume scattering analysis of the same system carried out in full lattice QCD.

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