Spectrum of Binding System for Heavy Quark with an Anti-sbottom or for a Sbottom and Anti-sbottom Pair

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Abstract: Since long-lived light bottom squark (sbottom) and its anti-particle with a mass close to the bottom quark have not been excluded by experiments so far, so we would like to consider such a sbottom to combine with its anti-particle to form a color singlet meson-like bound state or to combine with a common anti-quark to form a fermion-like one, or accordingly their anti-particles to form an anti-particle bound system. Namely we calculate the low-lying spectrum of the systems specifically based on QCD inspired potential model. To be relativistic as much as possible, we start with the framework of Bethe-Salpeter (BS) equation even for non-relativistic binding systems. Finally, we obtain the requested spectrum by constructing general forms of the BS wave functions and solving the BS equations under instantaneous approximation.

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