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Tetraquark channels with $\bar{b}b$ pair in the static limit

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In 2011, Belle discovered two Z_b^+ hadrons with quark content $\bar{b}b\bar{d}u$. Lattice study of hadrons with this quark content is challenging because they can decay to two B-mesons and also to a bottomonium and a light meson, leading to a large number of decay channels. We present a lattice study of the $\bar{b}b\bar{d}u$ system with the static bottom quarks. Only the channel that couples to $\bar{b}b + \pi$ was explored on the lattice before — it features an attractive potential for the $B\bar{B}^*$ and a bound state below the threshold. Our lattice study incorporates channels with other quantum numbers that have not been investigated before. Eigen-energies of the system are extracted as a function of separation between $\bar{b}$ and b in all channels.

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