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Hyperfine splittings of heavy quarkonium hybrids

Monday, 8 July 2024 11:00 (30 minutes)

In the framework of the Born-Oppenheimer effective field theory, the hyperfine structure of heavy quarkonium hybrids at leading order in the $1/m_Q$ expansion is determined by two potentials. We estimate those potentials by interpolating between the known short-distance behavior and the long-distance behavior calculated in the QCD effective string theory. The long-distance behavior depends, at leading order, on two parameters which can be obtained from the long-distance behavior of the heavy quarkonium potentials (up to sign ambiguities). The short-distance behavior depends, at leading order, on two extra parameters, which are obtained from a lattice calculation of the lower-lying charmonium hybrid multiplets. This allows us to predict the hyperfine splitting both of bottomonium hybrids and of higher multiplets of charmonium hybrids. We carry out a careful error analysis and compare with other approaches.

session

F. Heavy Flavor and Quarkonia

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