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Heavy baryon spectroscopy in a quark-diquark approach

We present results for the heavy baryon spectrum for ground and excited states with quantum numbers $J^P = 1/2^+$ and $3/2^+$ using functional methods in QCD. To this end, we reduce the three-quark Faddeev equations to two-body equations via the quark-diquark approach, where the baryons are treated as bound states of quarks and effective diquarks. The resulting Bethe-Salpeter equation amounts to a quark ping-pong exchange for the interaction kernel, where the quark and diquark ingredients are determined in a rainbow-ladder truncation. Our results show an overall agreement of the ground state masses with experiment. The single charmed baryon ground state masses agree with lattice QCD and theoretical calculations using QCD potential models. Double and triple charmed baryons were also calculated. A partial wave analysis of the ground and excited states shows that relativistic effects are present in the baryon amplitudes.

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