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(G*) Renormalizing the unquenched quark model

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Hadrons are typically described using “quenched” constituent quark models, which posit a Hamiltonian acting on the state space of the valence quarks, neglecting mixing of higher Fock states. In recent years, experimentalists have observed states which are not well characterized by these models, motivating quark modellers to examine the effects of unquenching. The resultant mass shifts throw the entire predicted spectrum into disagreement with observation, which may indicate that the leading-order effects of unquenching have been absorbed into the phenomenologically-measured parameters of the quenched Hamiltonian. We have calculated corrections to the spectrum using a formalism which estimates and compensates for the effects of this parameter renormalization, leaving small residual mass shifts which better reflect the observable effects of unquenching.

Keyword-1

Hadrons

Keyword-2

Unquenched quark model

Keyword-3

Renormalization

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