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Hadron phenomenology from first-principle QCD studies

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The dressed gluon-quark vertex is a fundamental ingredient of the kernels appearing in the one- and two-body problems.
We present a novel representation of this vertex in terms
of the gluon-quark scattering matrix, and develop a method capable of
elucidating a quark-antiquark Bethe-Salpeter kernel that is symmetry-consistent with a given quark gap equation.
A main advantage of this scheme is its ability to expose and capitalize on graphic symmetries within the kernels. We then focus on the first element of the resulting Bethe-Salpeter kernel, namely the
one-gluon exchange diagram with both gluon-quark vertices fully dressed, and show how a renormalization-group
invariant and process independent combination may be constructed, which serves as a bridge between "bottom-up" and "top down" approaches.

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