

Influence of the quark-gluon vertex on the analytic structure of the quark propagator in Landau gauge

The transverse part of the quark-gluon vertex in quenched QCD in Landau gauge is determined by solving a system of Dyson-Schwinger equations. We observe that the angular dependence of the calculated form factors appears to be relatively weak. However, we argue that this does not imply a planar degeneracy for this vertex, as even this slight dependence can significantly alter derived quantities, such as the mass function of the quark propagator. For a self-consistently coupled system of 3PI Dyson-Schwinger equations for the quark propagator and the quark-gluon vertex, we find that the propagator is identical within numerical errors when obtained either from a decoupling or scaling solution input. Furthermore, our results show that the quark propagator is consistent with possessing poles only on the real time-like half-axis.

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