

Dependence of Quark Effective Mass on Gluon Propagators

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(Received: 2005-2-23; Revised:)

Abstract: Based on Dyson-Schwinger Equations (DSEs) in the "rainbow" approximation, the dependence of quark effective mass on gluon propagator is investigated by use of three different phenomenological gluon propagators with two parameters, the strength parameter χ and range parameter Δ . Our theoretical calculations for the quark effective mass $M_f(p^2)$, defined by the self-energy functions $A_f(p^2)$ and $B_f(p^2)$ of the DSEs, show that the dynamically running quark effective mass is strongly dependent on gluon propagator. Therefore, because gluon propagator is completely unknown, the quark effective mass cannot be exactly determined theoretically.

PACS: 14.65.Bt, 24.85.+p, 12.38.Lg, 12.38.Cy

Key words: quark mass, gluon propagator, DSEs, QCD

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