

Validity of Parametrized Quark Propagator

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Abstract: Based on an extensively study of the Dyson-Schwinger equations for a fully dressed quark propagator in the "rainbow" approximation, a parametrized fully dressed quark propagator is proposed in this paper. The parametrized propagator describes a confining quark propagator in hadron since it is analytic everywhere in complex p^2 -plane and has no Lemmann representation. The validity of the new propagator is discussed by comparing its predictions on self-energy functions $A_f(p^2)$, $B_f(p^2)$ and effective mass $M_f(p^2)$ of quark with flavor f to their corresponding theoretical results produced by Dyson-Schwinger equations. Our comparison shows that the parametrized quark propagator is a good approximation to the fully dressed quark propagator given by the solutions of Dyson-Schwinger equations in the rainbow approximation and is convenient to use in any theoretical calculations.

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