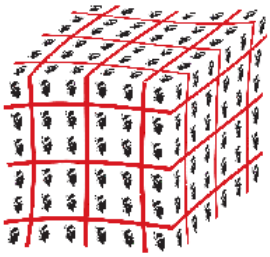

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Lattice QCD Study for Gluon Propagator and Gluon Spectral Function

Monday, 14 June 2010 14:30 (20 minutes)

The gluon propagator is studied in the Landau gauge in SU(3) lattice QCD
at beta=5.7, 5.8 and 6.0 at the quenched level.
Through the functional-form analysis of the gluon propagator
obtained in lattice QCD, we find that the Landau-gauge gluon propagator
is well described by the Yukawa-type function e^{-mr}/r with m=600MeV
for r=0.1-1.0fm in the four-dimensional Euclidean space-time [1].
Associated with the Yukawa-type gluon propagator, we derive analytical
expressions for the effective mass and the spectral function
rho(omega) of the gluon field [1]. As a remarkable fact,
the obtained gluon spectral function rho(omega) is almost negative definite,
except for a positive delta-functional peak at omega=m.
We also investigate the relevant gluonic energy scale for the effective
gluon mass using the new lattice technique in Ref.[2].

References
[1] T. Iritani, H. Suganuma and H. Iida, Phys. Rev. D80, 114505 (2009).
[2] A. Yamamoto and H. Suganuma, Phys. Rev. Lett. 101, 241601 (2008);
Phys. Rev. D79, 054504 (2009); Phys. Rev. D81, 014506 (2010).

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Primary author: SUGANUMA, Hideo (Department of Physics, Kyoto University)

Co-authors: Dr YAMAMOTO, Arata (Department of Physics, Kyoto University); Dr IIDA, Hideaki (RIKEN); Dr IRITANI, Takumi (Department of Physics, Kyoto University)

Presenter: SUGANUMA, Hideo (Department of Physics, Kyoto University)

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