

# XVth Quark Confinement and the Hadron Spectrum



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## Color-magnetic correlation in SU(3) lattice QCD

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Motivated by color-magnetic instability in QCD [1,2], we investigate spatial color-magnetic correlation in SU(2) and SU(3) lattice QCD. In the Landau gauge, we numerically obtain the spatial color-magnetic correlation  $\langle H_z^a(\mathbf{x}) H_z^a(\mathbf{x} + \mathbf{r}) \rangle$ . Curiously, the correlation is found to be always *negative* for  $\mathbf{r}$  on  $xy$ -plane, apart from the same-point correlation. This behavior seems fairly different from the Savvidy/Copenhagen vacuum [1,2]. From an analytical expression of the gluon propagator  $\langle A_\mu^a(x) A_\mu^a(x) \rangle \propto \frac{e^{-mr}}{r}$  [3] in the Landau gauge, we obtain an analytic form of the magnetic correlation, which agrees with the lattice QCD data.

[1] G.K. Savvidy, Phys. Lett. B71 (1977) 133.

[2] H.B. Nielsen and P. Olesen, Nucl. Phys. B160 (1979) 380.

[3] T. Iritani, H. Suganuma and H. Iida, Phys. Rev. D80 (2009) 114505.

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