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Polyakov loop fluctuations in terms of Dirac eigenmodes

Friday 3 June 2016 12:00 (30 minutes)

We investigate the relation between quark confinement and chiral symmetry breaking in the finite-temperature lattice QCD. First of all, we derive analytical formulae to express the Polyakov loop and its fluctuations in terms of the Dirac eigenmodes[1-3]. Based on the analytical formulae, it is shown that the low-lying Dirac modes have little contribution to the quantities such as the Polyakov loop and its fluctuations while these modes are important for chiral symmetry breaking. In other words, the result means no direct one-to-one correspondence between confinement and chiral symmetry breaking in QCD. In our talk, we present our results including the numerical results and the recent developments.

[1] T. M. Doi, K. Redlich, C. Sasaki and H. Suganuma, Phys. Rev. D92, 094004 (2015).

[2] T. M. Doi, H. Suganuma and T. Iritani, Phys. Rev. D90, 094505 (2014).

[3] H. Suganuma, T. M. Doi and T. Iritani, Prog. Theor. Exp. Phys. 2016, 013B06 (2016).

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