



Contribution ID: 150

Type: not specified

## Some Relations for Quark Confinement and Chiral Symmetry Breaking in QCD

*Tuesday, 30 August 2016 15:00 (30 minutes)*

We study the relation between quark confinement and chiral symmetry breaking in QCD.

First, we analytically derive some relations of the Polyakov loop or its fluctuations with Dirac eigenmodes for Wilson, clover and Domain-Wall fermions in QCD [1-3]. For these quantities related to confinement, the contribution from the low-lying Dirac eigenmodes is found to be negligibly small, while the modes are essential for chiral symmetry breaking.

Second, we study quark confinement and chiral symmetry breaking in holographic QCD in various space-time dimensions.

- [1] T.M. Doi, H. Suganuma and T. Iritani, Phys. Rev. D90, 094505 (2014).
- [2] T.M. Doi, K. Redlich, C. Sasaki and H. Suganuma, Phys. Rev. D92, 094004 (2015).
- [3] H. Suganuma, T.M. Doi and T. Iritani, Prog. Theor. Exp. Phys. 2016, 013B06 (2016).

### Summary

We study the relation between quark confinement and chiral symmetry breaking in QCD. First, we derive some analytical relations between the Polyakov loop and Dirac eigenmodes for Wilson, clover and Domain-Wall fermions in QCD. Second, we study quark confinement and chiral symmetry breaking in holographic QCD in various space-time dimension.

**Primary author:** SUGANUMA, Hideo (Kyoto U)

**Co-authors:** SASAKI, Chihiro; MATSUMOTO, Kohei (YITP, Kyoto U); REDLICH, Krzysztof (University of Wroclaw); DOI, Takahiro (Kyoto U); NAKAGAWA, Yuya (YITP, Kyoto U)

**Presenter:** SUGANUMA, Hideo (Kyoto U)

**Session Classification:** Section A: Focus Subsection

**Track Classification:** Section A: Vacuum Structure and Confinement