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## Finite-temperature phase transition of $N_f=3$ QCD with exact center symmetry

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By imposing flavor-dependent boundary conditions on quarks, we construct three-flavour  $SU(3)$  gauge theory reconciling fundamental fermion representation and exact  $Z_3$  center symmetry.

In this talk, we show the first result of lattice simulation on this QCD-like theory, which we call  $Z_3$ -QCD, with emphasis on the finite-temperature phase transition with respect to center and chiral symmetries. On the lattice, we formulate  $Z_3$ -symmetric  $SU(3)$  gauge theory with three fundamental Wilson quarks by twisting quark boundary conditions in a compact dimension.

We calculate the finite-temperature vacuum expectation value of Polyakov loop and the chiral condensate. We find out the first-order center phase transition where the hysteresis of temperature dependence exists depending on cold and hot starts. We also discuss the chiral crossover transition, and its relation to the center phase transition.

**Primary author:** Prof. MISUMI, Tatsuhiro (Akita University / Keio University)

**Co-authors:** Dr ITOU, Etsuko (KEK); Dr IRITANI, Takumi (Yukawa Institute of Theoretical Physics)

**Presenter:** Prof. MISUMI, Tatsuhiro (Akita University / Keio University)

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