



Contribution ID: 65

Type: 3rd week (Nishinomiya-Yukawa symposium)

Veneziano's ghost and the chiral phase transition.

Wednesday, October 30, 2024 2:00 PM (1 hour)

An elementary argument suggests that for the chiral phase transition, if the interactions which violate the anomalous axial $U(1)_A$ symmetry are induced by instantons, then for three flavors, the chiral transition is inescapably of first order in the chiral limit. Numerical simulations on the lattice indicate that the first order region is much smaller than expected. I consider the effective Lagrangian for a large number of colors, which involves a ghost particle introduced by Veneziano. Generalizing this to a large number of flavors suggests the approximate restoration of the $U(1)_A$ symmetry near the chiral phase transition.

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Session Classification: Nishinomiya-Yukawa workshop