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# KMI - Theory Seminar

Thursday, April 25, 2013

5:00 pm, KMI Science Symposia (ES-635)

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“IRFP conformal dynamics in many flavor lattice QCD in the light of thermal chiral phase transition”

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## Abstract:

Novel (pre-)conformal phase associated with the infra-red fixed point (IRFP) is anticipated to emerge due to non-perturbative interactions in asymptotically free non-Abelian gauge theories when the number of fermion species ( $N_f$ ) exceeds a critical value ( $N_f = N_f^*$ ).

The pre-conformal dynamics has been advocated as a basis for strongly interacting mechanisms of electroweak symmetry breaking (walking technicolor scenario). Lattice Monte-Carlo simulations are now expected to provide a solid theoretical base for this new class of strongly interacting gauge theories.

We first briefly review the general motivation to considering the IRFP (pre-) conformality.

Then, we particularly investigate the IRFP conformality in colour  $SU(N_c=3)$  gauge theory with a variable number  $N_f$  of fundamental fermions by using lattice Monte-Carlo simulations.

We evaluate the thermal chiral phase transition as a function of  $N_f$ , and propose three independent estimates of  $N_f^*$ , which are consistent to each other within error-bars. This strongly indicates the existence of the conformal phase in large  $N_f$  region.