Contribution ID : **51**

Type : **not specified**

Conformal symmetry on the lattice

Friday, 10 October 2008 10:00 (1:00)

Abstract content

The conformal window in a gauge field theory with N_f light fermions is the range of N_f values such that the theory is asymptotically free and the infrared coupling is governed by a fixed point. In an SU(N) gauge theory with N_f fermions in the fundamental representation, the conformal window ranges from $11N/2$ down to some critical value N_c at which a transition is expected to one in which there is no fixed point, chiral symmetry is broken spontaneously, and confinement sets in. I will describe recent work providing the first non-perturbative evidence, using lattice simulations, that the lower end of the conformal window for an SU(3) gauge theory lies in the range $8 < N_c < 12$. Gauge theories in or near the conformal window could play a key role in describing physics beyond the standard model. If the fermions carry electroweak quantum numbers, and if N_f lies outside but near the conformal window, then the theory could drive electroweak breaking, forming the basis of walking technicolor theories. If the fermions do not carry electroweak quantum numbers, then N_f could lie within the conformal window, and the theory could describe some new, conformal sector, possibly coupled to the standard model through SU(N) invariant operators. It is important to learn as much as possible about the extent of the conformal window in these theories, as well as the order of the transition at N_c and the properties of the theory within the window and near it.

Summary

Primary author(s) : Dr. APPELQUIST, Thomas (Yale U.)

Presenter(s) : Dr. APPELQUIST, Thomas (Yale U.)

Session Classification : Review Talks