

Using volume reduction to study QCD-like theories at large N_c

Tuesday 27 July 2010 11:00 (50 minutes)

I describe ongoing work to implement the idea of volume-reduction for various QCD-like lattice gauge theories. If reduction holds, then many physical, infinite-volume, quantities can be obtained, by doing calculations on lattices of any size, including a single site, and taking the large N_c limit. Reduction holds as long as certain conditions are fulfilled, the most stringent of which is that the Z_{N^4} center symmetry of the single-site model is not spontaneously broken. Previous work has shown that this symmetry is broken for the pure gauge theory (the Eguchi-Kawai model), and for various variants. Following a suggestion from Kovtun, Unsal and Yaffe, we have been investigating the possibility that reduction holds in the presence of dynamical fermions in the adjoint representation. Results will be presented for one and two Dirac fermions. The former theory is related, by large- N_c equivalences, to QCD with two degenerate Dirac flavors; the latter is the large- N_c version of a theory studied recently as a candidate for walking technicolor.

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