UM Physics Department

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Title: Confinement transition in a (2+1)-dimensional gauge theory with massless fermions

Abstract:

I will discuss a confinement transition in a system of Nf flavors of interacting massless Dirac fermions charged under a U(1) gauge field in 2+1 dimensions. The model is inspired by frustrated magnets studied in the condensed matter community, but can also be viewed as a toy model for (3+1)-dimensional QCD. Using Monte Carlo simulations, we have investigated a lattice regularization that exhibits a continuous transition at zero temperature between a gapless deconfined phase, described by three-dimensional quantum electrodynamics, and a gapped confined phase, in which the system develops long-range order. I will argue that the quantum critical point is in the QED3-Gross-Neveu-XY universality class and I will compare the numerical results with those obtained from large-Nf and epsilon-expansion approaches.