Theory Seminar

Monday, November 26, 2007 2:10 PM 831 Pupin Hall

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"Lattice chirality and the decoupling of mirror fermions"

I will first review the motivation for studying the strong dynamics of chiral gauge theories. After surveying the currently available theoretical tools, I will argue that in the non-supersymmetric case the space-time lattice formulation is the most promising first-principles approach. I will then briefly review the current status of the lattice formulation of chiral gauge theories. I will argue that (as a matter of principle) the lattice allows the construction of chiral gauge theories from vectorlike ones via decoupling of the mirror fermions, without breaking the gauge symmetry. I will describe our construction combining ideas of strong-coupling phases with exact lattice chirality. I will discuss recent and current studies of this construction, the outstanding problems, and directions for the future. The talk is aimed at a general high-energy theory audience and more specialized lattice background is reviewed as needed.