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Phenomenological implications of the NLHT

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In this talk we will briefly review the New Littlest Higgs model with T-parity (NLHT). This is introduced to cure the pathologies of the Littlest Higgs model with T-parity (LHT) in the fermionic sector. As a result of this, the NLHT includes new T-odd scalar particles and heavy fermions. The scalar fields receives their masses from the Coleman-Weinberg potential, independent of the scale of spontaneous breaking of the global symmetry f, and thus potentially light. The extra heavy fermions recieve their masses from a new Yukawa Lagrangian while the top sector is realized similarly to that of the LHT. To constraint the model parameter space, we work in a simplified version with degenerate Yukawa couplings for heavy leptons and quarks. Imposing that no mass exceeds the cutoff scale, current bounds on vector-like quarks and heavy lepton masses compatible with the stable dark photon as our dark matter candidate, we get that the scale f and the particle spectrum is bounded from below and above, the Yukawa coupling of heavy leptons gets fixed and the Yukawa coupling from quarks becomes greatly correlated to the top quark Yukawa couplings. We also study the dominant new T-odd scalar fields decay channels and lifetime.

Abstract

In this talk we will briefly review the New Littlest Higgs model with T-parity (NLHT). This is introduced to cure the pathologies of the Littlest Higgs model with T-parity (LHT) in the fermionic sector. As a result of this, the NLHT includes new T-odd scalar particles and heavy fermions. The scalar fields receives their masses from the Coleman-Weinberg potential, independent of the scale of spontaneous breaking of the global symmetry f, and thus potentially light. The extra heavy fermions recieve their masses from a new Yukawa Lagrangian while the top sector is realized similarly to that of the LHT. To constraint the model parameter space, we work in a simplified version with degenerate Yukawa couplings for heavy leptons and quarks. Imposing that no mass exceeds the cutoff scale, current bounds on vector-like quarks and heavy lepton masses compatible with the stable dark photon as our dark matter candidate, we get that the scale f and the particle spectrum is bounded from below and above, the Yukawa coupling of heavy leptons gets fixed and the Yukawa coupling from quarks becomes greatly correlated to the top quark Yukawa couplings. We also study the dominant new T-odd scalar fields decay channels and lifetime.

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