

The new and gauge invariant Littlest Higgs Model with T-parity

Monday, 21 March 2022 16:00 (15)

In this talk we will first review the Littlest Higgs model with T-parity (LHT), based on the global symmetry group $SU(5)$ broken spontaneously to $SO(5)$, to highlight the pathologies it presents due to the non trivial interplay between the discrete T-parity symmetry and the non-linear realization of the global symmetry. In particular, we will show that the Yukawa Lagrangian responsible for providing mass terms for the heavy fermions is not gauge invariant because their right-handed components transforms in a non-linear representation of $SO(5)$ and such a transformation does not commute, not even restricting to the gauged subgroup, with T-parity. To cure this issue, while preserving most of the structure of the original LHT, we propose to enlarge the global symmetry group with an extra $[SU(2) \times U(1)]^2$ factor broken spontaneously to $[SU(2) \times U(1)]$ giving rise to new T-odd scalars. This also allows us to introduce the minimal set of fermionic degrees of freedom required to give masses to all fermions while preserving gauge invariance.

Abstract

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