

A relation between deformed superspace and Lee-Wick higher-derivative theories

Tuesday, 25 August 2015 15:30 (30 minutes)

We propose a non-anticommutative superspace with the interesting property of relating to Lee-Wick type of higher derivatives theories, which are known for their interesting properties, and have lead to proposals of phenomenologically viable higher derivatives extensions of the Standard Model. The deformation of superspace we consider does not preserve supersymmetry or associativity in general, however, we show that a non-anticommutative version of the Wess-Zumino model can be properly defined. In fact, the definition of chiral and antichiral superfields turns out to be simpler in our case than in the well known $N = 1/2$ supersymmetric case. We show that, when the theory is truncated at the first nontrivial order in the deformation parameter, supersymmetry is restored, and we end up with a well known Lee-Wick type of higher derivative extension of the Wess-Zumino model. Thus we show how non-anticommutativity could provide an alternative mechanism for generation of these kind of higher derivative theories.

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Session Classification: Fundamental/String Theory

Track Classification: Fundamental and String Theory