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Surveying the Left-Right Symmetric $SO(10)$ Landscape

Tuesday 9 May 2017 17:30 (15 minutes)

Grand Unified Theories (GUTs) are well-motivated extensions of the Standard Model. They represent a theoretically sound approach to explore physics at very high scales given the lack of firm signs of new physics near the electroweak scale. This talk will focus on $SO(10)$ -symmetric models with a two-step symmetry breaking chain, where the only intermediate scale respects the left-right symmetric gauge group $SU(3) \times SU(2)_L \times SU(2)_R \times U(1)_{B-L}$. We scan through all possible minimal non-SUSY left-right symmetric models fulfilling the unification condition in an automated way. A group-theoretical top-to-bottom approach is used for the generation of beta functions corresponding to different field contents. The subsequent one-loop RGE analysis provides us with the unknown new-physics scales and couplings. Based on these quantities we show which (and what portion) of the constructed models are excluded when current and future experimental limits on observables such as proton decay, neutron-antineutron oscillations or lepton flavour violation are imposed. Besides the particular restrictions, a number of other interesting remarks on specific types of models can be made.

Summary

Grand Unified Theories (GUTs)

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