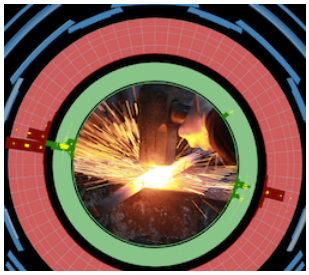

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Classically Conformal Left-Right Model and the Higgs Vacuum Stability

Tuesday 10 May 2016 16:45 (15 minutes)

Expanding the Standard Model(SM) through the incorporation of L-R symmetric gauge extension that exhibits conformal invariance at the classical level, it is possible to remedy the Higgs vacuum instability problem. The model includes a $SU(3)_C \times SU(2)_L \times SU(2)_R \times \mathrm{U}(1)_{B-L}$ gauge group, Higgs bi-doublet which includes the SM Higgs, and a $SU(2)_R$ scalar doublet field. The Coleman-Weinberg mechanism radiatively breaks $SU(2)_R \times \mathrm{U}(1)_{B-L}$ down to $U(1)_Y$. This $SU(2)_R$ VEV in turn produces a negative mass^2 coupling to the Higgs bi-doublet field which results in Electro-Weak Symmetry Breaking. On the pretext of solving the Higgs vacuum instability problem, a viable parameter region is found such that the vacuum remains stable. Within this parameter region the naturalness of the theory is investigated. As the heavy gauge bosons from the $SU(2)_R \times \mathrm{U}(1)_{B-L}$ breaking contribute to the Higgs mass corrections, there must be a bound on these contributions so as to avoid a fine tuning scenario at the Electro-Weak scale. These heavy gauge bosons are within the reach of LHC run 2 in the coming future.

Summary

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