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Total Asymptotic Freedom Beyond the Standard Model -- Without New Particles

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Content :

Recent studies have provided evidence for the existence of new totally asymptotically free trajectories in non-Abelian particle models without asymptotic symmetry in the high-energy limit. These results have been obtained in a general SU(NL)×SU(Nc) Higgs-Yukawa model that includes the non-Abelian sector of the standard model, by means of the standard one-loop study of a generic Higgs potential (functional perturbation theory). The existence of these solutions has been argued to be a scheme-independent phenomenon, visible both in the MS-bar scheme as well as in mass-dependent schemes based on general momentum-space infrared regularizations. We discuss the significance of these solutions for the construction of natural extensions of the standard model based on radiative electroweak symmetry breaking, and report on their generalization upon the inclusion of the U(1) hypercharge gauge sector of the standard model.

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