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Asymptotically free scaling solutions in nonabelian Higgs models

Content :

We construct asymptotically free renormalization group trajectories for the generic nonabelian Higgs model in four-dimensional spacetime. These ultraviolet-complete trajectories become visible by generalizing the renormalization/boundary conditions in the definition of the correlation functions of the theory. Though they are accessible in a controlled weak-coupling analysis, these trajectories originate from threshold phenomena which are missed in a conventional perturbative analysis relying on the deep Euclidean region. We identify a candidate three-parameter family of renormalization group trajectories interconnecting the asymptotically free ultraviolet regime with a Higgs phase in the low-energy limit. We provide estimates of their low-energy properties in the light of a possible application to the standard model Higgs sector.

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