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Interplay of chiral transitions in the standard model

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We investigate nonperturbative aspects of the interplay of chiral transitions in the standard model in the course of the renormalization flow. We focus on the chiral symmetry breaking mechanisms provided by the QCD and the electroweak sectors, the latter of which we model by a Higgs-top-bottom Yukawa theory. The interplay becomes quantitatively accessible by accounting for the fluctuation-induced mixing of the electroweak Higgs field with the mesonic composite fields of QCD. In fact, our approach uses dynamical bosonization and treats these scalar fields on the same footing. In the first project we look at the changed infrared behaviour of the theory under inclusion of the QCD sector, compared to the pure Higgs-top-bottom model, with a focus on studying the naturalness problem in the model. In the current project we investigate UV completions within the Higgs-QCD model, a first analysis shows the existence of CEL-like scaling solutions.

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