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Constructing a composite Higgs model with built-in large separation of scales

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Experimentally a light 125 GeV Higgs boson has been observed but so far no other heavier resonances. Viable models to describe the Higgs boson as composite particle require hence to exhibit a large separation of scales which e.g. occurs in systems located near a conformal fixed point.

First I present our nonperturbative gradient flow step-scaling calculation of the renormalization group beta function for an SU(3) gauge theory with 10 massless, fundamental flavors. The steps of our calculation are detailed and the quality of our set-up using stout-smeared Möbius domain wall fermions with Symanzik gauge action combined with Zeuthen flow measurements is demonstrated. Taking advantage of our step-scaling results, I will use the same set-up to construct a mass-split composite Higgs model with large scale separation, show first results, and demonstrate some of its features. This work is part of the research program by the LSD collaboration.

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