

Directions for Model Building beyond Asymptotic Freedom

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It is widely appreciated that the Standard Model is incomplete. Yet, and despite of significant experimental efforts, clear-cut signatures for new physics are unavailable. Also, theory guidance beyond the paradigms of asymptotic freedom or effective theories is scarce.

In this talk, I discuss top-down and bottom-up directions for model building. From a bottom-up perspective, it is proposed to turn the quest for vacuum stability into a primary model building task. The rationale for this is that while the onset of the SM instability around 10^{11} GeV is a high energy effect, a solution may arise from any scale below the Planck scale. Using the renormalisation group, I explain perturbative mechanisms for stability and sketch out the landscape of Planck-safe models. From a top-down angle, prospects for asymptotically safe UV completions of the SM are discussed. Concrete model building results and challenges are highlighted in the context of supersymmetry and UV-safe extensions of the MSSM.

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