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The conformal fixed point of the SU(3) gauge theory with 10 fundamental flavors

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The SU(3) gauge theory with $N_f = 10$ fundamental flavors is thought to be close to the sill of the conformal window. I describe a recent study of this system using the continuous β function method based on the gradient flow. We use a Pauli-Villars improved gauge action and several gradient flow transformations. These features allow us to study the system at much stronger gauge couplings than previously possible. Prior lattice studies could not explore gauge couplings above $g^2 \approx 10$. We find strong evidence of a conformal infrared fixed point at $g^2 \approx 15$. The mass anomalous dimension at the conformal fixed point is $\gamma_m \approx 0.6$, indicating that the theory is well above the sill of the conformal window. Our results are consistent with those of prior studies where their domains overlap.

Topical area

Particle Physics Beyond the Standard Model

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