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Composite Higgs model from the lattice: Infrared fixed point and anomalous dimensions

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We use the continuous renormalization-group method, based on the gradient flow, to study a candidate theory of composite Higgs and a partially composite top. The model is an $SU(4)$ gauge theory with four Dirac fermions in each of the fundamental and two-index antisymmetric representations. Our lattice action includes a set of Pauli-Villars fields, which decouple in the continuum limit while allowing us to reach much stronger renormalized coupling than otherwise possible. We find that the theory has an infrared fixed point at $g^2 \approx 15.5$ in the gradient flow scheme. The mass anomalous dimensions are large at the fixed point. On the other hand, the anomalous dimensions of top-partner operators do not exceed 0.5 at the fixed point. This disfavors the theory as a model of partial compositeness.

Topical area

Particle Physics Beyond the Standard Model

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