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Conformality, dynamical chiral symmetry breaking and confinement: cartography of strong dynamics

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(Tentative abstract) We study the interplay between colour-confining and chiral symmetry-breaking dynamics in gauge-fermion theories. We target the challenging many-flavour limit of theory space using the non-perturbative functional Renormalisation Group approach. This work connects the QCD-like regime, in quantitative agreement with Lattice data, with the perturbative conformal limit of theory space. Utilising bosonisation techniques, we obtain the theory's fundamental parameters and the relation between scales purely from first principles. Finally, we investigate interesting near-conformal theories and provide a quantitative estimate for the lower boundary of the Caswell-Bank-Zaks window. This work offers a self-consistent framework for charting the landscape of strongly interacting gauge-fermion theories necessary to reliably study strong extensions of the Standard Model of particle physics.

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