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SU(3) gauge-fermion systems with fundamental flavors

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The renormalization group (RG) beta function characterizes the nature of gauge-fermion systems, describes the running of the renormalized coupling, and connects ultraviolet and infrared regimes of quantum field theories. We use the RG beta function as a tool to explore how gauge-fermion systems with SU(3) gauge group change, when the number of fundamental flavors increases. Using lattice field theory simulations, we aim to establish nonperturbatively e.g. whether a theory with N_f fundamental flavors is conformal exhibiting an infra-red fixed point. Of special interest for constructing BSM theories is to identify the onset of the conformal window. Presently SU(3) with eight fundamental flavors is in the spotlight of our investigations because tantalizing signs of a new phase have emerged.

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