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Symmetric Mass Generation

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In recent years tantalizing signs for a novel phase have been reported that is chirally symmetric but nevertheless exhibits massive bound states. The necessary condition for such a phase, referred to as Symmetric Mass Generation (SMG), is the cancellation of all (continuous and discrete) 't Hooft anomalies. In 3+1 dimensions this occurs in systems containing a multiple of 16 massless Weyl fermions. SMG was originally discovered in lower dimensional condensed matter systems.
We present results investigating four dimensional field theories with gauge group SU(3). Our findings suggest that SU(3) with $N_f = 8$ fundamental fermions exhibits an SMG phase not only on the lattice but also in the infinite cutoff continuum limit. If confirmed, SMG could provide a new UV completion of the standard model and give rise to new scenarios for beyond standard model physics.

Secondary track

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