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Chiral models of composite axions and accidental Peccei-Quinn symmetry

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The QCD axion, based on the existence of the anomalous Peccei-Quinn (PQ) symmetry, realizes a simple and elegant solution to the strong CP problem. However, explicit realizations are extremely sensitive to PQ-violating effects in the UV, which can destabilize the axion potential and spoil the solution. In this talk, we introduce a class of composite axion models that provide a natural solution to the strong CP problem. The PQ symmetry is not only accidental, but also naturally protected from higher dimensional operators by the gauge dynamics. The QCD axion emerges as the NGB of a strongly-interacting, chiral sector with no fundamental scalars, where all mass scales are generated dynamically. The model can be easily chosen to be compatible with a grand unified dynamics, and we discuss the case of non-supersymmetric SU(5) unification.

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