



Multiple massless quarks and heavy axions to solve strong CP

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We present models solving the strong CP problem with PQ symmetries in a novel way. Embedding QCD in a product $SU(3)^N$ gauge group at high energies generates large non-perturbative PQ-violating effects that allows us to rescue the massless quark solution or generate axion masses much larger than for the standard QCD axion. This mechanism avoids the introduction of a discrete Z_2 symmetry and associated 'mirror' copies of the SM fermions, and also avoids the introduction and stabilization of new light colored states to modify the running of the QCD gauge coupling as found in other heavy axion models.



PHYSICS