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Light scalars at low energies: some exact results from QCD-like theories

In this talk, I will present some exact results in supersymmetric QCD involving a light neutral chiral superfield. Using symmetry arguments, I will derive the exact low-energy superpotential, which describes the interactions between mesons and the additional scalar and pseudoscalar components of the neutral chiral superfield. The low-energy effective scalar potential will be determined under anomaly-mediated supersymmetry breaking. I will demonstrate that the pseudoscalar component can act as an axion, rotating the θ angle and predict its mass, while the scalar component functions as a dilaton. Extending these results to non-supersymmetric QCD, I will derive couplings between the mesons and a Higgs-mixed scalar by matching the chiral Lagrangian with the theory above the confinement scale, and constrain these interactions from Kaon decay.

Field of contribution

Phenomenology

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