Irrelevance of anomalous breaking of axial U(1) symmetry and the U(1) problem

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Content

The η and η' mesons are conventionally known to receive contribution from the anomalous breaking of axial U(1) symmetry, and they are considered to not be the Nambu-Goldstone (NG) bosons of the spontaneous chiral SU(3) x SU(3) symmetry breaking of QCD. However, it has recently been shown that this axial U(1) anomaly is not actually physical [1,2]. In this talk, we first review this statement and then propose a mechanism in which η and η' mesons are NG bosons while being consistent with the axial U(1) problem [3].

Reference

[1] N. Yamanaka, arXiv:2212.10994 [hep-th].
[2] N. Yamanaka, arXiv:2212.11820 [hep-ph].
[3] N. Yamanaka, arXiv:2411.02792 [hep-ph].

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