

Small size instanton effects in composite axion models

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We examine phenomenological properties of a heavy axion by considering small size instanton effects coming from an additional axicolor non-Abelian gauge group. To properly take instanton effects into account, we develop a new method to derive and diagonalize the mass matrix of pseudoscalar fields of the theory. Applying our new method for theories without axicolor instanton effects leads to good agreement with established effective field theory calculations. Using our method on axion models with additional non-Abelian gauge symmetries, the small size instanton effects shifts the electromagnetic decay constant F_a and axion mass m_a , which we show as new bands in the $\{m_a, G_{a\gamma\gamma}\}$ -plane. Our results show that the axion can be heavy and still solve the Strong CP-problem. Such an axion is unconstrained by stellar cooling bounds and could be probed by future colliders such as FCC.

Do you wish to attend the workshop on-site?

yes

Summary

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