

Flavor Physics workshop 2022 (FPWS2022)

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Loop-diagrammatic evaluation of QCD θ parameter λ and its application to the left-right symmetric model

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Content :

In this paper, we formulate radiatively induced QCD θ parameters through a loop-diagrammatic approach. This method should be more robust derivation compared to an ordinary one: $\theta = \text{arg}(\text{det}(M_u M_d))$, where M_q is a loop-level quark mass matrix. For the application, we investigate the radiatively induced θ parameter in the minimal left-right symmetric model. We analytically confirmed an old result: two-loop induced θ parameter, corresponding to one-loop corrections to the quark mass matrices, completely vanishes. Furthermore, we estimate the size of a non-vanishing radiative θ parameter at three-loop level. We found that the induced neutron electric dipole moment can be smaller than the current experimental bounds.

Primary authors : ■■, ■■ ()

Co-authors :

Presenter : ■■, ■■ ()

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