



Contribution ID: 27

Type: **not specified**

Radiative corrections to the QCD θ parameter at the two-loop level

Wednesday 19 February 2025 17:00 (20 minutes)

Radiative corrections to the QCD θ parameter have been evaluated in terms of the imaginary part of the radiative quark mass phase, e.g. using the Fujikawa method. We have evaluated the radiative correction to the QCD θ at the 2-loop level by direct calculation of the Feynman diagram using a toy model with CP-violating Yukawa coupling. We show that the diagrammatic method is consistent with the low energy effective field theory approach and includes the contributions not coming from the quark mass phase. We also show that in some cases the Fujikawa method may not be sufficient to evaluate the QCD θ . This talk is based on JHEP 02 (2024) 195.

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Session Classification: Flavor & Neutrino