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RBI-T-WINNING seminari



Revisiting short-distance QCD corrections for kaon mixing in Left-Right Models

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Abstract:

Left-Right (LR) models are extensions of the Standard Model where left-right symmetry is restored at high energies, and which are strongly constrained by kaon mixing described in the framework of the $\Delta S = 2$ effective Hamiltonian. I consider the short-distance QCD corrections to this Hamiltonian both in the Standard Model (SM) and in LR models. The leading logarithms occurring in these short-distance corrections can be resummed within a rigorous Effective Field Theory (EFT) approach integrating out heavy degrees of freedom progressively, or using an approximate simpler "method of regions" identifying the ranges of loop momentum generating large logarithms in the relevant two-loop diagrams. I compare the two approaches in the SM at next-to-leading order, finding a very good agreement when one scale dominates the problem, but only a fair agreement in the presence of a large logarithm at leading order. Then I compute the short-distance QCD corrections for LR models at next-to-leading order using the "method of regions," and I compare the results with the EFT approach with two charm quarks for the WW' box (together with additional diagrams forming a gauge-invariant combination), where a large logarithm occurs already at leading order. I conclude by providing next-to-leading-order estimates for cc , ct , tt contributions in LR models.

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