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CP-Violating Invariants in the SMEFT

lundi 30 mai 2022 14:00 (20 minutes)

In the Standard Model, CP violation in the Electroweak sector is parametrized by the Jarlskog Invariant. This is the order parameter of CP-violation, in the sense that it vanishes iff CP is conserved. When higher dimensional operators are allowed, and the Standard Model Effective Field Theory is constructed, numerous new sources for CP violation can appear. However, the description of CP violation as a collective effect, present in the SM, is inherited by its Effective extension.

Here, I argue that such a behaviour has to be captured, at dimension 6, by flavor invariant, CP violating objects, linear in the Wilson coefficients. Such a description ensures that CP violation in the SMEFT is treated in a basis independent manner. In particular, I claim these are the objects that have to vanish, together with the SM Jarlskog Invariant, for CP to be conserved, and viceversa. Different assuptions on the flavor structure of the SMEFT operators lead to invariants with different relative importance. A consistent way to address this issue in our framework is presented.

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