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CP violating invariants in SMEFT

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The Standard Model Effective Field Theory (SMEFT) is a framework that incorporates in a fairly model-independent way possible deviations from the Standard Model (SM). The additional terms it contains, in the form of higher-dimensional operators, may include new sources of CP violation that could spoil the delicate CKM mechanism characterizing the SM. We argue that the best way to capture such additional sources is via quantities that are invariant under unitary flavor rotations. This realization leads to the unanticipated result that a good fraction of the new sources first appear in observables at an order higher than expected. For those that do show up at the expected order, we study the conditions that would make their size comparable to the SM CP violation.

Orateur: GENDY ABD EL SAYED, Emanuele (DESY)**Classification de Session:** Theory