

## CP violation in gluon-induced diboson processes

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The existence of CP violation is key to address the mystery of matter-antimatter asymmetry in the Universe. As the amount of CP violation in the SM is insufficient, the search for new sources of CP violation is of high priority for the LHC programme. We study CP violation within the Standard Model Effective Field Theory, focusing on the impact of CP-odd dimension-6 operators in gluon-induced diboson production. We start by extending the SMEFTatNLO implementation to include the relevant operators and study double Higgs, double Z/W, and associated ZH and H+jet production. In addition we compute analytically the helicity amplitudes of the aforementioned processes at one loop and with one insertion of a CP-odd operator. We analyse the impact of CP-even and CP-odd operators on kinematic distributions of key observables in these processes. We identify certain observables that can lead to powerful probes of these operators and discrimination between CP-even and CP-odd interactions at the HL-LHC.

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