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Combined SMEFT interpretation of Higgs, diboson, and top quark data from the LHC

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We present a global interpretation of Higgs, diboson, and top quark production and decay measurements from the LHC in the framework of the Standard Model Effective Field Theory (SMEFT) at dimension six. We constrain simultaneously 36 independent directions in its parameter space, and compare the outcome of the global analysis with that from individual and two-parameter fits. Our results are obtained by means of state-of-the-art theoretical calculations for the SM and the EFT cross-sections, and account for both linear and quadratic corrections in the $1/\Lambda^2$ expansion. We demonstrate how the inclusion of NLO QCD and $\mathcal{O}(\Lambda^{-4})$ effects is instrumental to accurately map the posterior distributions associated to the fitted Wilson coefficients. We assess the interplay and complementarity between the top quark, Higgs, and diboson measurements, deploy a variety of statistical estimators to quantify the impact of each dataset in the parameter space, and carry out fits in BSM-inspired scenarios such as the top-philic model. Our results represent a stepping stone in the ongoing program of model-independent searches at the LHC from precision measurements, and pave the way towards yet more global SMEFT interpretations extended to other high-pT processes as well as to low-energy observables.

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