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Complete SMEFT predictions for four top quark production at hadron colliders

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We study four top quark production at hadron colliders in the Standard Model Effective Field Theory (SMEFT). We perform an analysis at the tree-level, including all possible QCD- and EW-coupling orders and relevant dimension-six operators. We find several cases where formally subleading terms give rise to significant contributions, potentially providing sensitivity to a broad class of operators. Inclusive and differential predictions are presented for the LHC and a future pp circular collider operating at 100 TeV. We estimate the sensitivity of different operators and perform a simplified chi-square fit to set limits on SMEFT Wilson coefficients. In so doing, we assess the importance of including subleading terms and differential information in constraining new physics contributions. Finally, we compute the SMEFT predictions for the double insertion of dimension-six operators and scrutinise the possible enhancements to the sensitivity induced by a specific class of higher order terms in the EFT series.

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