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The Higgs-top CP phase with tth at the 14 TeV LHC and 100 TeV FCC

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Precision measurement of the Higgs boson properties is an important topic at the LHC and future collider experiments. We studied the potential to directly probe the maginitude and CP phase of the top quark Yukawa coupling in $t\bar{t}h$ production with $h \to b\bar{b}$. The BDRS algorithm is used to tag the boosted Higgs, while the $t\bar{t}$ rest frame is constructed using M_2 assisted reconstruction. Further, sideband events of the major background $t\bar{t}b\bar{b}$ are used to reduce the corresponding systematics, and the $t\bar{t}Z$ process is used to reduce the systematics of the signal. With these excellent handles on the uncertainties, we can achieve high precision on measuring both the maginitude and CP phase of the top Yukawa couplings.

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