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Probing light-quarks Yukawa couplings & new physics in Higgs + jet(b-jet) studies

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We suggest that the exclusive Higgs + light (or b) jet production at the LHC, $pp \rightarrow h + j(j_b)$, is a rather sensitive probe of the light-quarks Yukawa couplings and of new physics (NP) in the Higgs-gluon hgg and quark-gluon qqg interactions. We study the Higgs p_T distribution in $pp \rightarrow h + j(j_b)$, employing non-differential observables to probe the different types of NP relevant for this process, which we parameterize either as scaled SM couplings (the kappa-framework) and/or through new higher dimensional effective operators (the SMEFT framework). We find that the exclusive $h + j(j_b)$ production at the 13 TeV LHC is sensitive to various NP scenarios, with typical scales ranging from a few to $O(10)$ TeV, depending on the flavor, chirality and Lorentz structure of the underlying physics.

Experimental Collaboration

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