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Parton-Shower Effects in Higgs Production via Vector-Boson Fusion

We present a systematic investigation of parton-shower and matching uncertainties of perturbative origin for Higgs-boson production via vector-boson fusion. To this end we employ different generators at next-to-leading order QCD accuracy matched with shower Monte Carlo programs, PYTHIA8, and HERWIG7, and a next-to-next-to-leading order QCD calculation.

We thoroughly analyse the intrinsic sources of uncertainty within each generator, and then compare predictions among the different tools using the respective recommended setups. Within typical vector-boson fusion cuts, the resulting uncertainties on observables that are accurate to next-to-leading order are at the $10 We furthermore show how a specific recoil sche$ $We conclude that for vector-boson fusion processes an assessment of the uncertainties associated with an NLO+$ $PS simulation at next-to-leading order matched to parton showers based only on the variation of renormalisation, factorisation a$

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