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Precise probing of the inert Higgs-doublet model at the LHC

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The inert Higgs-doublet model provides a simple framework to accommodate a viable Higgs portal scalar dark matter candidate, together with other heavier scalars of mass 100 GeV or more. We study the effect of next-to-leading order (NLO) QCD corrections in this scenario in the context of the Large Hadron Collider. $\mathcal{O}(\alpha_s)$ corrections to the gluon-gluon-Higgs effective coupling have been taken into account in this study wherever appropriate. We find such corrections have a significant impact on various kinematic distributions and reduce scale uncertainties substantially. Fixed order NLO results are matched to the `Pythia8` parton shower (PS) and the di-fatjet signal associated with the missing transverse momentum is analyzed, as this channel has the ability to explore its entire parameter space during the next phase of the LHC run. A closer look at the NLO+PS computation indicates a sizable NLO effect together with a subdued contribution from associated production of the heavy scalar compared to the pair production, thereby leading to a refined analysis strategy during the multivariate analysis of this signal.

Session

Beyond the Standard Model

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