

# Higgs boson pair production via gluon fusion at N3LO in QCD

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We present next-to-next-to-next-to-leading order (N3LO) QCD predictions for the Higgs boson pair production via gluon fusion at hadron colliders in the infinite top-quark mass limit. Besides the inclusive total cross sections at various collision energies, we also provide the invariant mass distribution of the Higgs boson pair. Our results show that the N3LO QCD corrections enhance the next-to-next-to-leading order cross section by 3.0% (2.7%) at  $\sqrt{s} = 13$  (100) TeV, while the scale uncertainty is reduced substantially below 3% (2%). We also find that a judicious scale choice can significantly improve the perturbative convergence. For the invariant mass distribution, our calculation demonstrates that the N3LO corrections improve the scale dependence but almost do not change the shape.

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