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Higgs pair production at NNNLO

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The Higgs boson pair production via gluon fusion at high-energy hadron colliders, such as the LHC, is vital in deciphering the Higgs potential and in pinning down the electroweak symmetry breaking mechanism. In this talk, I will present the NNNLO QCD calculations in the infinite top-quark mass limit and predictions for both the inclusive and differential cross-sections. At the inclusive level, the scale uncertainties are reduced by a factor of four compared with NNLO results. Given that the inclusion of the top-quark mass effects is essential for the phenomenological applications, we use several schemes to incorporate the NNNLO results in the infinite top-quark mass limit and the NLO results with full top-quark mass dependence and present theoretical predictions for the cross-sections. Our results provide one of the most precise theoretical inputs for the analyses of the Higgs boson pair events.

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