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Top-Yukawa-induced corrections to Higgs pair production

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After the discovery of the Higgs boson in 2012, the measurements of the Higgs self coupling is still a challenge for current and future experiments in particle physics. Higgs-boson pair production via gluon fusion is a loop-induced process. In order to increase the accuracy of the theoretical predictions for this process, higher-order corrections are necessary to reduce theoretical uncertainties and to describe differential distributions reliably. The next-to-leading order (NLO) corrections involve the evaluation of two-loop Feynman diagrams. In particular, for electroweak (EW) corrections, many different mass scales appear in the calculation, such as the gauge boson, bottom, top quark, and Higgs boson masses. Further complications include numerical instabilities due to virtual thresholds which require careful treatment.

In my talk, I will present results for the EW corrections induced by the top Yukawa coupling with contributions from light-quark loops without using any reduction techniques to master integrals. The calculations are done by keeping the masses as fully symbolic parameters, allowing, in the future, for a study of parametric and mass scheme/scale uncertainties.

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