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Virtual QCD Corrections to gg->ZH via a Transverse Momentum Expansion

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The associated production of a Higgs and a Z boson at the LHC receives an important contribution from the gluon-initiated channel $gg \to ZH$. Currently, exact analytic results for the NLO QCD corrections to this partonic process are not known, due to the presence of top-quark-mediated two-loop box diagrams in the virtual contribution. The inclusion of the gluon-initiated component at NLO would reduce the theoretical uncertainties of the hadronic process $pp \to ZH$, which also affect the determination of the $H \to b\bar{b}$ decay.

In this poster I will present the calculation of the virtual QCD corrections to $gg \to ZH$ using an analytic approximation, based on the expansion of the amplitude in terms of a small transverse momentum of the final-state particles. This method provides an approximation of the virtual corrections with an accuracy below the percent level for center-of-mass energies up to ~750 GeV, which contribute to ~98% of the hadronic cross section at the LHC. I will also report on the recent combination of these results with the ones obtained from a complementary approach, which is based on the expansion of the amplitude in the high-energy limit. When the results of both expansions are improved using Padé approximants, their combination provides accurate results over the whole phase space.

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