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Signal-background interference effects for Higgs-mediated diphoton production beyond NLO

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Since the discovery of the Higgs boson at the Large Hadron Collider, many of its properties such as the mass and the couplings to Standard Model gauge bosons have been studied extensively and determined to a good level of accuracy. The direct measurement of the Higgs width Γ_H, however, remains elusive due to limited detector resolution. In the past it has been observed that Γ_H can be constrained by studying the interference between the $gg \to H \to \gamma\gamma$ signal and the continuum $gg \to \gamma\gamma$ background. More specifically, one can extract information on Γ_H by investigating the diphoton invariant mass distribution. So far, this study has been performed up to NLO QCD.
Very recently, three-loop amplitudes for the background process $gg \to \gamma\gamma$ have been calculated, thus making possible to extend this analysis up to NNLO QCD. In this talk I will present a first step towards this goal. More precisely, I will discuss an analysis of the diphoton invariant mass distribution at the LHC in an "improved" soft-virtual approximation up to NNLO QCD. I will consider the interplay of signal, background and interference and study the impact of QCD radiative corrections on Γ_H determinations.

Authors: VON MANTEUFFEL, Andreas (Michigan State University); CAOLA, Fabrizio (University of Oxford (GB)); DEVOTO, Federica; TANCREDI, Lorenzo (Technische Universitat Munchen (DE)); BARGIELA, Piotr

Presenter: DEVOTO, Federica

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