



Contribution ID: 113

Type: **not specified**

Higgs production in gluon fusion beyond NNLO

The large contributions of known NLO and NNLO QCD corrections to the Higgs cross section call for a reliable prediction of higher order QCD corrections.

In this talk, an approximate expression for the Higgs production inclusive cross section in gluon fusion at NNNLO in QCD with finite top mass is presented.

We argue that an accurate approximation can be constructed combining (and improving) the large- and small- z behaviours of the partonic cross section, which are both known to all orders from soft-gluon (Sudakov) and high-energy (BFKL) resummations, respectively.

We support our argument by comparing our approximation against the known NLO and NNLO results, finding an excellent agreement.

For a 125 GeV Higgs production at LHC at 8 TeV, we find an increase of the order of 15% with respect to the NNLO inclusive cross section, hinting that higher order QCD corrections are possibly underestimated by presently available results from soft-gluon resummation. We also find a significant reduction of the scale uncertainty.

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