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WG1: Higgs gluon-fusion production

Previous page: LHCHXS WGGGF

Group Contacts

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Projects

Uncertainties - Note in preparation

Inclusive Cross Sections for the LHC at 27 TeV

Predictions for the inclusive gluon fusion production cross section of a Higgs boson at the LHC at 27 TeV

Boosted Higgs

Ongoing benchmarking. A note will be written in the future.

A temporary and interim recommendation is to use the NNLOPS [code](#) with the default set-up for top mass effects. This has been benchmarked against more accurate perturbative codes. See [this talk](#) for further detail.

Note: Recommended predictions for the boosted-Higgs cross section, on [cds](#).

Study of bottom quark mass effects in the Higgs transverse momentum distribution

Ongoing - early 2018.

Meetings

16.3.2017 - WG1 ggF subgroup meeting: uncertainties in kinematic regions [code](#)

1.11.2017 - WG1 ggF subgroup meeting: Boosted Higgs [code](#)

10.1.2018 - 12.1.2018 - Joint meeting with WG1 - VBF sub - group [code](#)

12.04.2019 - WG1 ggF subgroup meeting: Boosted Higgs [code](#)

Benchmarks

Production cross section

Explicit predictions for the Higgs boson production cross section via the

gluon fusion production mode according to [iHixs](#).

Uncertainties were estimated using the prescription of [YR4](#).

E_{CM}	σ	$\delta(\text{theory})$	$\delta(\text{PDF})$	$\delta(\alpha_s)$
2 TeV	1.10 pb	$+0.05\text{pb}$ -0.09pb (+4.17%) (-8.02%)	$\pm 0.03\text{pb}$ ($\pm 3.17\%$)	$+0.04\text{pb}$ (+3.69%) -0.04pb (-3.36%)
7 TeV	16.87 pb	$+0.70\text{pb}$ -1.14pb (+4.17%) (-6.76%)	$\pm 0.31\text{pb}$ ($\pm 1.89\%$)	$+0.44\text{pb}$ (+2.66%) -0.45pb (-2.68%)
8 TeV	21.45 pb	$+0.90\text{pb}$ -1.43pb (+4.18%) (-6.69%)	$\pm 0.40\text{pb}$ ($\pm 1.87\%$)	$+0.56\text{pb}$ (+2.63%) -0.56pb (-2.66%)
13 TeV	48.68 pb	$+2.07\text{pb}$ -3.16pb (+4.26%) (-6.48%)	$\pm 0.89\text{pb}$ ($\pm 1.85\%$)	$+1.25\text{pb}$ (+2.59%) -1.26pb (-2.62%)
14 TeV	54.80 pb	$+2.34\text{pb}$ -3.54pb (+4.28%) (-6.46%)	$\pm 1.00\text{pb}$ ($\pm 1.86\%$)	$+1.40\text{pb}$ (+2.60%) -1.42pb (-2.62%)
28 TeV	154.63 pb	$+7.02\text{pb}$ -9.93pb (+4.54%) (-6.42%)	$\pm 2.98\text{pb}$ ($\pm 1.96\%$)	$+4.10\text{pb}$ (+2.70%) -4.03pb (-2.65%)
100 TeV	808.23 pb	$+44.53\text{pb}$ -56.95pb (+5.51%) (-7.05%)	$\pm 19.98\text{pb}$ ($\pm 2.51\%$)	$+24.89\text{pb}$ (+3.12%) -21.71pb (-2.72%)

Differential distributions

Available Tools

- [iHixs](#) (F. Dulat, A. Lazopoulos, B. Mistlberger): Program for inclusive Higgs boson cross-section at hadron colliders;
- [ggHiggs](#) (M Bonvini et al): Program for inclusive Higgs boson cross-section at hadron colliders;
- [HRes](#) (D. de Florian, G. Ferrera, M. Grazzini, D. Tommasini): Exclusive cross section at QCD NNLL (transverse momentum resummation);
- [HIGLU](#) (M Spira): Inclusive cross section at QCD NLO, full top and bottom mass effects, and NNLO QCD corrections included in the heavy top limit;
- [gg2VV](#) (N. Kauer): Parton-level integrator and event generator for $gg(\text{H})\text{VV}$ and $gg(\text{H})\text{ZZ}$ processes;
- [SusH](#) (R. Harlander, S. Liebler, H. Mantler): A program for the calculation of Higgs production in gluon fusion and bottom-quark annihilation in the Standard Model and the MSSM
- [MCFM](#): (J. Campbell, K. Ellis, W. Giele, C. Williams): Multi-purpose generator.
- [MG5_aMC@NLO](#): (J. Alwall, R. Frederix, S. Frixione, V. Hirschi, F. Maltoni, O. Mattelaer, H.-S. Shao, T. Stelzer, P. Torrielli, M. Zaro): Multi-purpose generator.
- [Matrix](#): (M. Grazzini, S. Kallweit, M. Wiesemann): Multi-purpose generator.
- [Powheg](#): (S. Alioli, K. Hamilton, P. Nason, C. Oleari, E. Re, G. Zanderighi): Multi-purpose generator.
- [aMC@NLO](#): (S. Frixione, F. Stoeckli, P. Torrielli, B. Webber, C. White): Multi-purpose generator.

References

[TBU]

This topic: LHCPHysics > LHCHXSWGGEF_RUN2

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