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WG1: Higgs gluon-fusion production: Inclusive Cross Sections at 27 TeV

On this page we document cross section predictions for a standard model Higgs boson in the gluon fusion production mode at the LHC. To derive predictions we include contributions based on perturbative computations of scattering cross sections as studied in ref [\[1\]](#). Included are perturbative QCD cross section through N3LO, electro-weak and approximated mixed QCD-electro-weak corrections as well as effects of finite quark masses. To derive theoretical uncertainties we follow the prescriptions outlined in ref [\[2\]](#). As an input we use the following:

Center of Mass Energy:	27 TeV
m_top(m_top)	162.7 GeV
m_bottom(m_bottom)	4.18 GeV
m_charm(3 GeV)	0.986 GeV
alpha_S(m_Z)	0.118
PDF	PDF4LHC15_nnlo_100 [3]

All quark masses are treated in the MSbar scheme. To derive numerical predictions we use the program ihixs [\[4\]](#). We vary the exact value of the Higgs boson mass according to the table below. The table contains a prediction for the gluon fusion cross section, associated theory uncertainties and PDF and strong coupling uncertainties for every Higgs boson mass. The PDF and strong coupling uncertainty are listed each individually and combined in quadrature but should only be taken into account once.

mH [GeV]	Cross Section [pb]	+ Theory [%]	- Theory [%]	PDF+Al pha_S [%]	Al pha_S [%]	PDF [%]
125.09	146.65	4.53	-6.43	3.30	2.66	1.95
124.59	147.55	4.55	-6.45	3.30	2.67	1.95
125.59	145.75	4.52	-6.42	3.30	2.66	1.95
120.00	156.35	4.64	-6.60	3.33	2.69	1.97
120.50	155.36	4.63	-6.58	3.33	2.69	1.97
121.00	154.36	4.62	-6.56	3.33	2.69	1.97
121.50	153.38	4.61	-6.55	3.32	2.68	1.96
122.00	152.41	4.60	-6.54	3.32	2.68	1.96
122.50	151.45	4.59	-6.52	3.32	2.68	1.96
123.00	150.50	4.58	-6.50	3.31	2.68	1.96
123.50	149.56	4.57	-6.49	3.31	2.67	1.96
124.00	148.64	4.56	-6.47	3.31	2.67	1.95
124.10	148.45	4.56	-6.47	3.31	2.67	1.95
124.20	148.27	4.56	-6.46	3.31	2.67	1.95
124.30	148.08	4.55	-6.46	3.31	2.67	1.95
124.40	147.90	4.55	-6.46	3.31	2.67	1.95
124.50	147.72	4.55	-6.46	3.31	2.67	1.95
124.60	147.53	4.55	-6.45	3.30	2.67	1.95
124.70	147.35	4.54	-6.45	3.30	2.67	1.95
124.80	147.17	4.54	-6.44	3.30	2.67	1.95

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124.90	146.99	4.54	-6.44	3.30	2.67	1.95
125.00	146.81	4.54	-6.44	3.30	2.67	1.95
125.10	146.63	4.53	-6.43	3.30	2.66	1.95
125.20	146.45	4.53	-6.43	3.30	2.66	1.95
125.30	146.27	4.53	-6.43	3.30	2.66	1.95
125.40	146.09	4.53	-6.42	3.30	2.66	1.95
125.50	145.91	4.52	-6.42	3.30	2.66	1.95
125.60	145.73	4.52	-6.42	3.30	2.66	1.95
125.70	145.55	4.52	-6.41	3.30	2.66	1.95
125.80	145.37	4.52	-6.41	3.30	2.66	1.95
125.90	145.20	4.52	-6.41	3.30	2.66	1.95
126.00	145.02	4.51	-6.40	3.30	2.66	1.95
126.50	144.14	4.50	-6.39	3.29	2.66	1.94
127.00	143.26	4.49	-6.37	3.29	2.66	1.94
127.50	142.40	4.48	-6.36	3.29	2.65	1.94
128.00	141.54	4.48	-6.34	3.28	2.65	1.94
128.50	140.69	4.47	-6.33	3.28	2.65	1.94
129.00	139.84	4.46	-6.31	3.28	2.65	1.93
129.50	139.00	4.46	-6.30	3.27	2.64	1.93
130.00	138.18	4.45	-6.29	3.27	2.64	1.93

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