H^0

$J = 0$

In the following H^0 refers to the signal that has been discovered in the Higgs searches. Whereas the observed signal is labeled as a spin 0 particle and is called a Higgs Boson, the detailed properties of H^0 and its role in the context of electroweak symmetry breaking need to be further clarified. These issues are addressed by the measurements listed below.

Concerning mass limits and cross section limits that have been obtained in the searches for neutral and charged Higgs bosons, see the sections "Searches for Neutral Higgs Bosons" and "Searches for Charged Higgs Bosons ($H^{\pm}$ and $H^{\pm\pm}$)", respectively.

H^0 MASS

VALUE (GeV)	DOCUMENT ID		TECN	COMMENT
125.09±0.21±0.11	[1,2] AAD	15B	LHC	pp, 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
125.07±0.25±0.14	[2] AAD	15B	LHC	pp, 7, 8 TeV, $\gamma\gamma$
125.15±0.37±0.15	[2] AAD	15B	LHC	pp, 7, 8 TeV, $ZZ^* \rightarrow 4\ell$
126.02±0.43±0.27	AAD	15B	ATLS	pp, 7, 8 TeV, $\gamma\gamma$
124.51±0.52±0.04	AAD	15B	ATLS	pp, 7, 8 TeV, $ZZ^* \rightarrow 4\ell$
125.59±0.42±0.17	AAD	15B	CMS	pp, 7, 8 TeV, $ZZ^* \rightarrow 4\ell$
125.36±0.37±0.18	[1,3] AAD	14W	ATLS	pp, 7, 8 TeV
125.98±0.42±0.28	[3] AAD	14W	ATLS	pp, 7, 8 TeV, $\gamma\gamma$
124.51±0.52±0.06	[3] AAD	14W	ATLS	pp, 7, 8 TeV, $ZZ^* \rightarrow 4\ell$
125.6 ±0.4 ±0.2	[4] CHATRCHYAN	14AA	CMS	pp, 7, 8 TeV, $ZZ^* \rightarrow 4\ell$
122 ±7	[5] CHATRCHYAN	14K	CMS	pp, 7, 8 TeV, $\tau\tau$
124.70±0.31±0.15	[6] KHACHATRY...	14P	CMS	pp, 7, 8 TeV, $\gamma\gamma$
$125.5 \pm 0.2\ ^{+0.5}_{-0.6}$	[1,7] AAD	13AK	ATLS	pp, 7, 8 TeV
126.8 ±0.2 ±0.7	[7] AAD	13AK	ATLS	pp, 7, 8 TeV, $\gamma\gamma$
$124.3\ ^{+0.6}_{-0.5}\ ^{+0.5}_{-0.3}$	[7] AAD	13AK	ATLS	pp, 7, 8 TeV, $ZZ^* \rightarrow 4\ell$
125.8 ±0.4 ±0.4	[1,8] CHATRCHYAN	13J	CMS	pp, 7, 8 TeV
126.2 ±0.6 ±0.2	[8] CHATRCHYAN	13J	CMS	pp, 7, 8 TeV, $ZZ^* \rightarrow 4\ell$
126.0 ±0.4 ±0.4	[1,9] AAD	12AI	ATLS	pp, 7, 8 TeV
125.3 ±0.4 ±0.5	[1,10] CHATRCHYAN	12N	CMS	pp, 7, 8 TeV

[1] Combined value from $\gamma\gamma$ and $ZZ^* \rightarrow 4\ell$ final states.
[2] ATLAS and CMS data are fitted simultaneously.
[3] AAD 14W use 4.5 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.3 fb^{-1} at 8 TeV.
[4] CHATRCHYAN 14AA use 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV.
[5] CHATRCHYAN 14K use 4.9 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV.
[6] KHACHATRYAN 14P use 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV.

[7] AAD 13AK use 4.7 fb^{-1} of pp collisions at E_{cm}=7 TeV and 20.7 fb^{-1} at E_{cm}=8 TeV. Superseded by AAD 14W.

[8] CHATRCHYAN 13J use 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 12.2 fb^{-1} at E_{cm} = 8 TeV.

[9] AAD 12AI obtain results based on 4.6–4.8 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 5.8–5.9 fb^{-1} at E_{cm} = 8 TeV. An excess of events over background with a local significance of 5.9 σ is observed at m_{H^0} = 126 GeV. See also AAD 12DA.

[10] CHATRCHYAN 12N obtain results based on 4.9–5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 5.1–5.3 fb^{-1} at E_{cm} = 8 TeV. An excess of events over background with a local significance of 5.0 σ is observed at about m_{H^0} = 125 GeV. See also CHATRCHYAN 12BY and CHATRCHYAN 13Y.

H^0 SPIN AND *CP* PROPERTIES

The observation of the signal in the $\gamma\gamma$ final state rules out the possibility that the discovered particle has spin 1, as a consequence of the Landau-Yang theorem. This argument relies on the assumptions that the decaying particle is an on-shell resonance and that the decay products are indeed two photons rather than two pairs of boosted photons, which each could in principle be misidentified as a single photon.

Concerning distinguishing the spin 0 hypothesis from a spin 2 hypothesis, some care has to be taken in modelling the latter in order to ensure that the discriminating power is actually based on the spin properties rather than on unphysical behavior that may affect the model of the spin 2 state.

Under the assumption that the observed signal consists of a single state rather than an overlap of more than one resonance, it is sufficient to discriminate between distinct hypotheses in the spin analyses. On the other hand, the determination of the *CP* properties is in general much more difficult since in principle the observed state could consist of any admixture of *CP*-even and *CP*-odd components. As a first step, the compatibility of the data with distinct hypotheses of pure *CP*-even and pure *CP*-odd states with different spin assignments has been investigated. In order to treat the case of a possible mixing of different *CP* states, certain cross section ratios are considered. Those cross section ratios need to be distinguished from the amount of mixing between a *CP*-even and a *CP*-odd state, as the cross section ratios depend in addition also on the coupling strengths of the *CP*-even and *CP*-odd components to the involved particles. A small relative coupling implies a small sensitivity of the corresponding cross section ratio to effects of *CP* mixing.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
	[1] ABAZOV	14F	D0	$p\overline{p} \to WH^0, ZH^0$
	[2] CHATRCHYAN	14AA	CMS	$H^0 \to ZZ^*$
	[3] CHATRCHYAN	14G	CMS	$H^0 \to WW^*$
	[4] KHACHATRY...	14P	CMS	$H^0 \to \gamma\gamma$
	[5] AAD	13AJ	ATLS	$H^0 \to \gamma\gamma, ZZ^* \to 4\ell, WW^* \to \ell\nu\ell\nu$
	[6] CHATRCHYAN	13J	CMS	$H^0 \to ZZ^* \to 4\ell$

[1] ABAZOV 14F compare the $J^{CP} = 0^+$ Standard Model assignment with $J^{CP} = 0^-$ and 2^+ (graviton-like coupling) hypotheses in up to 9.7 fb^{-1} of $p\overline{p}$ collisions at $E_{\rm cm} = 1.96$ TeV. They use kinematic correlations between the decay products of the vector boson and the Higgs boson in the final states $ZH \rightarrow \ell\ell b\overline{b}$, $WH \rightarrow \ell\nu b\overline{b}$, and $ZH \rightarrow \nu\nu b\overline{b}$. The 0^- (2^+) hypothesis is excluded at 97.6% CL (99.0% CL). In order to treat the case of a possible mixture of a 0^+ state with another J^{CP} state, the cross section fractions $f_X = \sigma_X/(\sigma_{0^+} + \sigma_X)$ are considered, where $X = 0^-$, 2^+. Values for f_{0^-} (f_{2^+}) above 0.80 (0.67) are excluded at 95% CL under the assumption that the total cross section is that of the SM Higgs boson.

[2] CHATRCHYAN 14AA compare the $J^{CP} = 0^+$ Standard Model assignment with various J^{CP} hypotheses in 5.1 fb^{-1} of pp collisions at $E_{\rm cm} = 7$ TeV and 19.7 fb^{-1} at $E_{\rm cm} = 8$ TeV. $J^{CP} = 0^-$ and $1^{\pm}$ hypotheses are excluded at 99% CL, and several $J = 2$ hypotheses are excluded at 95% CL. In order to treat the case of a possible mixture of a 0^+ state with another J^{CP} state, the cross section fraction $f_{a3} = |a_3|^2\, \sigma_3 \;/\; (|a_1|^2\, \sigma_1 + |a_2|^2\, \sigma_2 + |a_3|^2\, \sigma_3)$ is considered, where the case $a_3 = 1$, $a_1 = a_2 = 0$ corresponds to a pure *CP*-odd state. Assuming $a_2 = 0$, a value for f_{a3} above 0.51 is excluded at 95% CL.

[3] CHATRCHYAN 14G compare the $J^{CP} = 0^+$ Standard Model assignment with $J^{CP} = 0^-$ and 2^+ (graviton-like coupling) hypotheses in 4.9 fb^{-1} of pp collisions at $E_{\rm cm} = 7$ TeV and 19.4 fb^{-1} at $E_{\rm cm} = 8$ TeV. Varying the fraction of the production of the 2^+ state via gg and $q\overline{q}$, 2^+ hypotheses are disfavored at CL between 83.7 and 99.8%. The 0^- hypothesis is disfavored against 0^+ at the 65.3% CL.

[4] KHACHATRYAN 14P compare the $J^{CP} = 0^+$ Standard Model assignment with a 2^+ (graviton-like coupling) hypothesis in 5.1 fb^{-1} of pp collisions at $E_{\rm cm} = 7$ TeV and 19.7 fb^{-1} at $E_{\rm cm} = 8$ TeV. Varying the fraction of the production of the 2^+ state via gg and $q\overline{q}$, 2^+ hypotheses are disfavored at CL between 71 and 94%.

[5] AAD 13AJ compare the spin 0, *CP*-even hypothesis with specific alternative hypotheses of spin 0, *CP*-odd, spin 1, *CP*-even and *CP*-odd, and spin 2, *CP*-even models using the Higgs boson decays $H \rightarrow \gamma\gamma$, $H \rightarrow ZZ^* \rightarrow 4\ell$ and $H \rightarrow WW^* \rightarrow \ell\nu\ell\nu$ and combinations thereof. The data are compatible with the spin 0, *CP*-even hypothesis, while all other tested hypotheses are excluded at confidence levels above 97.8%.

[6] CHATRCHYAN 13J study angular distributions of the lepton pairs in the ZZ^* channel where both Z bosons decay to e or μ pairs. Under the assumption that the observed particle has spin 0, the data are found to be consistent with the pure *CP*-even hypothesis, while the pure *CP*-odd hypothesis is disfavored.

H^0 DECAY WIDTH

The total decay width for a light Higgs boson with a mass in the observed range is not expected to be directly observable at the LHC. For the case of the Standard Model the prediction for the total width is about 4 MeV, which is three orders of magnitude smaller than the experimental mass resolution. There is no indication from the results observed so far that the natural width is broadened by new physics effects to such an extent that it could be directly observable. Furthermore, as all LHC Higgs channels rely on the identification of Higgs decay products, the total Higgs width cannot be measured indirectly without additional assumptions. The different dependence of on-peak and off-peak contributions on the total width in Higgs decays to ZZ^* and interference effects between signal and background in Higgs decays to $\gamma\gamma$ can provide additional information in this context. Constraints on the total width from the combination of on-peak and off-peak contributions in Higgs decays to ZZ^* rely on the assumption of equal on- and off-shell effective couplings. Without an experimental determination of the total width or further theoretical assumptions, only ratios of couplings can be determined at the LHC rather than absolute values of couplings.

VALUE (GeV)	CL%	DOCUMENT ID		TECN	COMMENT
<5.0	95	[1] AAD	14W	ATLS	pp, 7, 8 TeV, $\gamma\gamma$
<2.6	95	[1] AAD	14W	ATLS	pp, 7, 8 TeV, $ZZ^* \to 4\ell$
<3.4	95	[2] CHATRCHYAN	14AA	CMS	pp, 7, 8 TeV, $ZZ^* \to 4\ell$
<2.4	95	[3] KHACHATRY...	14P	CMS	pp, 7, 8 TeV, $\gamma\gamma$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.022	95	[4] KHACHATRY...	14D	CMS	pp, 7, 8 TeV, $ZZ^{(*)}$

[1] AAD 14W use 4.5 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.3 fb^{-1} at 8 TeV. The expected limit is 6.2 GeV.

[2] CHATRCHYAN 14AA use 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV. The expected limit is 2.8 GeV.

[3] KHACHATRYAN 14P use 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV. The expected limit is 3.1 GeV.

[4] KHACHATRYAN 14D derive constraints on the total width from comparing $ZZ^{(*)}$ production via on-shell and off-shell H^0. 4ℓ and $\ell\ell\nu\nu$ final states in 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV are used.

H^0 DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Confidence level
Γ_1	WW^*		
Γ_2	ZZ^*		
Γ_3	$\gamma\gamma$		
Γ_4	$b\overline{b}$		
Γ_5	$\mu^+\mu^-$		
Γ_6	$\tau^+\tau^-$		
Γ_7	$Z\gamma$		
Γ_8	invisible	<58 %	95%

H^0 BRANCHING RATIOS

$\Gamma(\text{invisible})/\Gamma_{total}$ — Γ_8/Γ

Invisible final states.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.75	95	[1] AAD	14O	ATLS	$pp \to H^0 ZX$, 7, 8 TeV
<0.58	95	[2] CHATRCHYAN	14B	CMS	$pp \to H^0 ZX$, qqH^0X
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.81	95	[3] CHATRCHYAN	14B	CMS	$pp \to H^0 ZX$, 7, 8 TeV
<0.65	95	[4] CHATRCHYAN	14B	CMS	$pp \to qqH^0X$, 8 TeV

[1] AAD 14O search for $pp \to H^0 Z X$, $Z \to \ell\ell$, with H^0 decaying to invisible final states in 4.5 fb^{-1} at E_{cm} = 7 TeV and 20.3 fb^{-1} at E_{cm} = 8 TeV. The quoted limit on the branching ratio is given for m_{H^0} = 125.5 GeV and assumes the Standard Model rate for $H^0 Z$ production.

[2] CHATRCHYAN 14B search for $pp \to H^0 Z X$, $Z \to \ell\ell$ and $Z \to b\overline{b}$, and also $pp \to qqH^0 X$ with H^0 decaying to invisible final states using data at E_{cm} = 7 and 8 TeV. The quoted limit on the branching ratio is obtained from a combination of the limits from $H^0 Z$ and qqH^0. It is given for m_{H^0} = 125 GeV and assumes the Standard Model rates for the two production processes.

[3] CHATRCHYAN 14B search for $pp \to H^0 Z X$ with H^0 decaying to invisible final states and $Z \to \ell\ell$ in 4.9 fb^{-1} at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV, and also with $Z \to b\overline{b}$ in 18.9 fb^{-1} at E_{cm} = 8 TeV. The quoted limit on the branching ratio is given for m_{H^0} = 125 GeV and assumes the Standard Model rate for $H^0 Z$ production.

[4] CHATRCHYAN 14B search for $pp \to qqH^0 X$ (vector boson fusion) with H^0 decaying to invisible final states in 19.5 fb^{-1} at E_{cm} = 8 TeV. The quoted limit on the branching ratio is given for m_{H^0} = 125 GeV and assumes the Standard Model rate for qqH^0 production.

H^0 SIGNAL STRENGTHS IN DIFFERENT CHANNELS

The H^0 signal strength in a particular final state xx is given by the cross section times branching ratio in this channel normalized to the Standard Model (SM) value, $\sigma \cdot$ B($H^0 \to xx$) / ($\sigma \cdot$ B($H^0 \to xx$))$_{SM}$, for the specified mass value of H^0.

Combined Final States

VALUE	DOCUMENT ID		TECN	COMMENT
1.17±0.17 OUR AVERAGE	Error includes scale factor of 1.2.			
$1.33^{+0.14}_{-0.10}\pm0.15$	[1] AAD	13AK	ATLS	pp, 7 and 8 TeV
$1.44^{+0.59}_{-0.56}$	[2] AALTONEN	13M	TEVA	$p\overline{p} \to H^0 X$, 1.96 TeV
0.87±0.23	[3] CHATRCHYAN	12N	CMS	$pp \to H^0 X$, 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.54^{+0.77}_{-0.73}$	[4] AALTONEN	13L	CDF	$p\overline{p} \to H^0 X$, 1.96 TeV
$1.40^{+0.92}_{-0.88}$	[5] ABAZOV	13L	D0	$p\overline{p} \to H^0 X$, 1.96 TeV
1.4 ±0.3	[6] AAD	12AI	ATLS	$pp \to H^0 X$, 7, 8 TeV
1.2 ±0.4	[6] AAD	12AI	ATLS	$pp \to H^0 X$, 7 TeV
1.5 ±0.4	[6] AAD	12AI	ATLS	$pp \to H^0 X$, 8 TeV

[1] AAD 13AK use 4.7 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.7 fb^{-1} at E_{cm} = 8 TeV. The combined signal strength is based on the $\gamma\gamma$, $ZZ^* \to 4\ell$, and $WW^* \to \ell\nu\ell\nu$ channels. The quoted signal strength is given for m_{H^0} = 125.5 GeV. Reported statistical error value modified following private communication with the experiment.

[2] AALTONEN 13M combine all Tevatron data from the CDF and D0 Collaborations with up to 10.0 fb^{-1} and 9.7 fb^{-1}, respectively, of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[3] CHATRCHYAN 12N obtain results based on 4.9–5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 5.1–5.3 fb^{-1} at E_{cm} = 8 TeV. An excess of events over background with a local significance of 5.0 σ is observed at about m_{H^0} = 125 GeV. The combined signal

strength is based on the $\gamma\gamma$, ZZ^*, WW^*, $\tau^+\tau^-$, and $b\overline{b}$ channels. The quoted signal strength is given for m_{H^0} = 125.5 GeV. See also CHATRCHYAN 13Y.

[4] AALTONEN 13L combine all CDF results with 9.45–10.0 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[5] ABAZOV 13L combine all D0 results with up to 9.7 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[6] AAD 12AI obtain results based on 4.6–4.8 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 5.8–5.9 fb^{-1} at E_{cm} = 8 TeV. An excess of events over background with a local significance of 5.9 σ is observed at m_{H^0} = 126 GeV. The quoted signal strengths are given for m_{H^0} = 126 GeV. See also AAD 12DA.

WW^* Final State

VALUE	DOCUMENT ID		TECN	COMMENT
0.81±0.16 OUR AVERAGE				
$0.72\pm0.12\pm0.10^{+0.12}_{-0.10}$	[1] CHATRCHYAN	14G	CMS	pp, 7, 8 TeV
$0.99^{+0.31}_{-0.28}$	[2] AAD	13AK	ATLS	pp, 7 and 8 TeV
$0.94^{+0.85}_{-0.83}$	[3] AALTONEN	13M	TEVA	$p\overline{p} \to H^0 X$, 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.00^{+1.78}_{-0.00}$	[4] AALTONEN	13L	CDF	$p\overline{p} \to H^0 X$, 1.96 TeV
$1.90^{+1.63}_{-1.52}$	[5] ABAZOV	13L	D0	$p\overline{p} \to H^0 X$, 1.96 TeV
1.3 ±0.5	[6] AAD	12AI	ATLS	$pp \to H^0 X$, 7, 8 TeV
0.5 ±0.6	[6] AAD	12AI	ATLS	$pp \to H^0 X$, 7 TeV
1.9 ±0.7	[6] AAD	12AI	ATLS	$pp \to H^0 X$, 8 TeV
$0.60^{+0.42}_{-0.37}$	[7] CHATRCHYAN	12N	CMS	$pp \to H^0 X$, 7, 8 TeV

[1] CHATRCHYAN 14G use 4.9 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.4 fb^{-1} at E_{cm} = 8 TeV. The last uncertainty in the measurement is theory systematics. The quoted signal strength is given for m_{H^0} = 125.6 GeV.

[2] AAD 13AK use 4.7 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.7 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.5 GeV.

[3] AALTONEN 13M combine all Tevatron data from the CDF and D0 Collaborations with up to 10.0 fb^{-1} and 9.7 fb^{-1}, respectively, of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[4] AALTONEN 13L combine all CDF results with 9.45–10.0 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[5] ABAZOV 13L combine all D0 results with up to 9.7 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[6] AAD 12AI obtain results based on 4.7 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 5.8 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strengths are given for m_{H^0} = 126 GeV. See also AAD 12DA.

[7] CHATRCHYAN 12N obtain results based on 4.9 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 5.1 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.5 GeV. See also CHATRCHYAN 13Y.

ZZ^* Final State

VALUE	DOCUMENT ID		TECN	COMMENT
$\mathbf{1.15^{+0.27}_{-0.23}}$ **OUR AVERAGE** Error includes scale factor of 1.2.				
$1.44^{+0.34}_{-0.31}{}^{+0.21}_{-0.11}$	[1] AAD	15F	ATLS	$pp \to H^0 X$, 7, 8 TeV
$0.93^{+0.26}_{-0.23}{}^{+0.13}_{-0.09}$	[2] CHATRCHYAN	14AA	CMS	pp, 7, 8 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
	[3] AAD	14AR	ATLS	pp, 8 TeV
$1.43^{+0.40}_{-0.35}$	[4] AAD	13AK	ATLS	pp, 7 and 8 TeV
$0.80^{+0.35}_{-0.28}$	[5] CHATRCHYAN	13J	CMS	$pp \to H^0 X$, 7, 8 TeV
1.2 ± 0.6	[6] AAD	12AI	ATLS	$pp \to H^0 X$, 7, 8 TeV
1.4 ± 1.1	[6] AAD	12AI	ATLS	$pp \to H^0 X$, 7 TeV
1.1 ± 0.8	[6] AAD	12AI	ATLS	$pp \to H^0 X$, 8 TeV
$0.73^{+0.45}_{-0.33}$	[7] CHATRCHYAN	12N	CMS	$pp \to H^0 X$, 7, 8 TeV

[1] AAD 15F use 4.5 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.3 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.36 GeV. The signal strength for the gluon fusion production mode is $1.66^{+0.45}_{-0.41}{}^{+0.25}_{-0.15}$, while the signal strength for the vector boson fusion production mode is $0.26^{+1.60}_{-0.91}{}^{+0.36}_{-0.23}$.

[2] CHATRCHYAN 14AA use 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.6 GeV. The signal strength for the gluon fusion and $t\bar{t}H$ production mode is $0.80^{+0.46}_{-0.36}$, while the signal strength for the vector boson fusion and WH^0, ZH^0 production mode is $1.7^{+2.2}_{-2.1}$.

[3] AAD 14AR measure the cross section for $pp \to H^0 X$, $H^0 \to ZZ^*$ using 20.3 fb^{-1} at E_{cm} = 8 TeV. They give $\sigma \cdot B = 2.11^{+0.53}_{-0.47} \pm 0.08$ fb in their fiducial region, where 1.30 ± 0.13 fb is expected in the Standard Model for m_{H^0} = 125.4 GeV. Various differential cross sections are also given, which are in agreement with the Standard Model expectations.

[4] AAD 13AK use 4.7 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.7 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.5 GeV.

[5] CHATRCHYAN 13J obtain results based on $ZZ \to 4\ell$ final states in 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 12.2 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.8 GeV. Superseded by CHATRCHYAN 14AA.

[6] AAD 12AI obtain results based on 4.7–4.8 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 5.8 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strengths are given for m_{H^0} = 126 GeV. See also AAD 12DA.

[7] CHATRCHYAN 12N obtain results based on 4.9–5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 5.1–5.3 fb^{-1} at E_{cm} = 8 TeV. An excess of events over background with a local significance of 5.0 σ is observed at about m_{H^0} = 125 GeV. The quoted signal strengths are given for m_{H^0} = 125.5 GeV. See also CHATRCHYAN 12BY and CHATRCHYAN 13Y.

$\gamma\gamma$ Final State

VALUE	DOCUMENT ID		TECN	COMMENT
$1.17^{+0.19}_{-0.17}$ OUR AVERAGE				
$1.17\pm0.23^{+0.10}_{-0.08}{}^{+0.12}_{-0.08}$	[1] AAD	14BC	ATLS	$pp \to H^0 X$, 7, 8 TeV
$1.14\pm0.21^{+0.09}_{-0.05}{}^{+0.13}_{-0.09}$	[2] KHACHATRY...	14P	CMS	pp, 7, 8 TeV
$5.97^{+3.39}_{-3.12}$	[3] AALTONEN	13M	TEVA	$p\overline{p} \to H^0 X$, 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$1.55^{+0.33}_{-0.28}$	[4] AAD	13AK	ATLS	pp, 7 and 8 TeV
$7.81^{+4.61}_{-4.42}$	[5] AALTONEN	13L	CDF	$p\overline{p} \to H^0 X$, 1.96 TeV
$4.20^{+4.60}_{-4.20}$	[6] ABAZOV	13L	D0	$p\overline{p} \to H^0 X$, 1.96 TeV
1.8 ± 0.5	[7] AAD	12AI	ATLS	$pp \to H^0 X$, 7, 8 TeV
2.2 ± 0.7	[7] AAD	12AI	ATLS	$pp \to H^0 X$, 7 TeV
1.5 ± 0.6	[7] AAD	12AI	ATLS	$pp \to H^0 X$, 8 TeV
$1.54^{+0.46}_{-0.42}$	[8] CHATRCHYAN	12N	CMS	$pp \to H^0 X$, 7, 8 TeV

[1] AAD 14BC use 4.5 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.3 fb^{-1} at E_{cm} = 8 TeV. The last uncertainty in the measurement is theory systematics. The quoted signal strength is given for m_{H^0} = 125.4 GeV. The signal strengths for the individual production modes are: 1.32 ± 0.38 for gluon fusion, 0.8 ± 0.7 for vector boson fusion, 1.0 ± 1.6 for WH^0 production, $0.1^{+3.7}_{-0.1}$ for ZH^0 production, and $1.6^{+2.7}_{-1.8}$ for $t\overline{t}H^0$ production.

[2] KHACHATRYAN 14P use 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV. The last uncertainty in the measurement is theory systematics. The quoted signal strength is given for m_{H^0} = 124.7 GeV. The signal strength for the gluon fusion and $t\overline{t}H$ production mode is $1.13^{+0.37}_{-0.31}$, while the signal strength for the vector boson fusion and WH^0, ZH^0 production mode is $1.16^{+0.63}_{-0.58}$.

[3] AALTONEN 13M combine all Tevatron data from the CDF and D0 Collaborations with up to 10.0 fb^{-1} and 9.7 fb^{-1}, respectively, of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[4] AAD 13AK use 4.7 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.7 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.5 GeV.

[5] AALTONEN 13L combine all CDF results with 9.45–10.0 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[6] ABAZOV 13L combine all D0 results with up to 9.7 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[7] AAD 12AI obtain results based on 4.8 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 5.9 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strengths are given for m_{H^0} = 126 GeV. See also AAD 12DA.

[8] CHATRCHYAN 12N obtain results based on 5.1 fb^{-1} of pp collisions at E_{cm}=7 TeV and 5.3 fb^{-1} at E_{cm}=8 TeV. The quoted signal strength is given for m_{H^0}=125.5 GeV. See also CHATRCHYAN 13Y.

$b\overline{b}$ Final State

VALUE	DOCUMENT ID	TECN	COMMENT
0.85±0.29 OUR AVERAGE			
0.52±0.32±0.24	[1] AAD 15G	ATLS	$pp \to H^0 W/ZX$, 7, 8 TeV
1.0 ±0.5	[2] CHATRCHYAN 14AI	CMS	$pp \to H^0 W/ZX$, 7, 8 TeV
$1.59^{+0.69}_{-0.72}$	[3] AALTONEN 13M	TEVA	$p\overline{p} \to H^0 X$, 1.96 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$1.72^{+0.92}_{-0.87}$	[4] AALTONEN 13L	CDF	$p\overline{p} \to H^0 X$, 1.96 TeV
$1.23^{+1.24}_{-1.17}$	[5] ABAZOV 13L	D0	$p\overline{p} \to H^0 X$, 1.96 TeV
0.5 ±2.2	[6] AAD 12AI	ATLS	$pp \to H^0 W/ZX$, 7 TeV
	[7] AALTONEN 12T	TEVA	$p\overline{p} \to H^0 W/ZX$, 1.96 TeV
$0.48^{+0.81}_{-0.70}$	[8] CHATRCHYAN 12N	CMS	$pp \to H^0 W/ZX$, 7, 8 TeV

[1] AAD 15G use 4.7 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.3 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.36 GeV.

[2] CHATRCHYAN 14AI use up to 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and up to 18.9 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV. See also CHATRCHYAN 14AJ.

[3] AALTONEN 13M combine all Tevatron data from the CDF and D0 Collaborations with up to 10.0 fb^{-1} and 9.7 fb^{-1}, respectively, of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[4] AALTONEN 13L combine all CDF results with 9.45–10.0 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[5] ABAZOV 13L combine all D0 results with up to 9.7 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[6] AAD 12AI obtain results based on 4.6–4.8 fb^{-1} of pp collisions at E_{cm} = 7 TeV. The quoted signal strengths are given in their Fig. 10 for m_{H^0} = 126 GeV. See also Fig. 13 of AAD 12DA.

[7] AALTONEN 12T combine AALTONEN 12Q, AALTONEN 12R, AALTONEN 12S, ABAZOV 12O, ABAZOV 12P, and ABAZOV 12K. An excess of events over background is observed which is most significant in the region m_{H^0} = 120–135 GeV, with a local significance of up to 3.3 σ. The local significance at m_{H^0} = 125 GeV is 2.8 σ, which corresponds to $(\sigma(H^0 W) + \sigma(H^0 Z)) \cdot B(H^0 \to b\overline{b}) = (0.23^{+0.09}_{-0.08})$ pb, compared to the Standard Model expectation at m_{H^0} = 125 GeV of 0.12 ± 0.01 pb. Superseded by AALTONEN 13M.

[8] CHATRCHYAN 12N obtain results based on 5.0 fb^{-1} of pp collisions at E_{cm}=7 TeV and 5.1 fb^{-1} at E_{cm}=8 TeV. The quoted signal strength is given for m_{H^0}=125.5 GeV. See also CHATRCHYAN 13Y.

$\mu^+\mu^-$ Final State

VALUE	CL%	DOCUMENT ID	TECN	COMMENT
<7.0	95	[1] AAD 14AS	ATLS	$pp \to H^0 X$, 7, 8 TeV

[1] AAD 14AS search for $H^0 \to \mu^+\mu^-$ in 4.5 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.3 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.5 GeV.

$\tau^+\tau^-$ Final State

VALUE	DOCUMENT ID		TECN	COMMENT
0.79±0.26 OUR AVERAGE				
0.78±0.27	[1] CHATRCHYAN	14K	CMS	$pp \to H^0 X$, 7, 8 TeV
$1.68^{+2.28}_{-1.68}$	[2] AALTONEN	13M	TEVA	$p\overline{p} \to H^0 X$, 1.96 TeV
$0.4\ ^{+1.6}_{-2.0}$	[3] AAD	12AI	ATLS	$pp \to H^0 X$, 7 TeV
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$0.00^{+8.44}_{-0.00}$	[4] AALTONEN	13L	CDF	$p\overline{p} \to H^0 X$, 1.96 TeV
$3.96^{+4.11}_{-3.38}$	[5] ABAZOV	13L	D0	$p\overline{p} \to H^0 X$, 1.96 TeV
$0.09^{+0.76}_{-0.74}$	[6] CHATRCHYAN	12N	CMS	$pp \to H^0 X$, 7, 8 TeV

[1] CHATRCHYAN 14K use 4.9 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV. See also CHATRCHYAN 14AJ.

[2] AALTONEN 13M combine all Tevatron data from the CDF and D0 Collaborations with up to 10.0 fb^{-1} and 9.7 fb^{-1}, respectively, of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[3] AAD 12AI obtain results based on 4.7 fb^{-1} of pp collisions at E_{cm} = 7 TeV. The quoted signal strengths are given in their Fig. 10 for m_{H^0} = 126 GeV. See also Fig. 13 of AAD 12DA.

[4] AALTONEN 13L combine all CDF results with 9.45–10.0 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[5] ABAZOV 13L combine all D0 results with up to 9.7 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[6] CHATRCHYAN 12N obtain results based on 4.9 fb^{-1} of pp collisions at E_{cm}=7 TeV and 5.1 fb^{-1} at E_{cm}=8 TeV. The quoted signal strength is given for m_{H^0}=125.5 GeV. See also CHATRCHYAN 13Y .

$Z\gamma$ Final State

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<11	95	[1] AAD	14J	ATLS	$pp \to H^0 X$, 7, 8 TeV
< 9.5	95	[2] CHATRCHYAN	13BK	CMS	$pp \to H^0 X$, 7, 8 TeV

[1] AAD 14J search for $H^0 \to Z\gamma \to \ell\ell\gamma$ in 4.5 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.3 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.5 GeV.

[2] CHATRCHYAN 13BK search for $H^0 \to Z\gamma \to \ell\ell\gamma$ in 5.0 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.6 fb^{-1} at E_{cm} = 8 TeV. A limit on cross section times branching ratio which corresponds to (4–25) times the expected Standard Model cross section is given in the range m_{H^0} = 120–160 GeV at 95% CL. The quoted limit is given for m_{H^0} = 125 GeV, where 10 is expected for no signal.

$t\overline{t}H^0$ Production

Signal strengh relative to the Standard Model cross section.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
$2.5\ ^{+0.9}_{-0.8}$ OUR AVERAGE					
$1.4\ ^{+2.1}_{-1.4}\ ^{+0.6}_{-0.3}$		[1] AAD	15	ATLS	pp, 7, 8 TeV

$2.8\ ^{+1.0}_{-0.9}$		[2] KHACHATRY...	14H	CMS	pp, 7, 8 TeV

• • • We do not use the following data for averages, fits, limits, etc. • • •

$9.49^{+6.60}_{-6.28}$		[3] AALTONEN	13L	CDF	$p\overline{p}$, 1.96 TeV
<5.8	95	[4] CHATRCHYAN	13X	CMS	$pp \to H^0 t\overline{t} X$

[1] AAD 15 search for $t\overline{t}H^0$ production with H^0 decaying to $\gamma\gamma$ in 4.5 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 20.3 fb^{-1} at E_{cm} = 8 TeV. The quoted result on the signal strength is equivalent to an upper limit of 6.7 at 95% CL and is given for m_{H^0} = 125.4 GeV.

[2] KHACHATRYAN 14H search for $t\overline{t}H^0$ production with H^0 decaying to $b\overline{b}$, $\tau\tau$, $\gamma\gamma$, WW^*, and ZZ^*, in 5.1 fb^{-1} of pp collisions at E_{cm} = 7 TeV and 19.7 fb^{-1} at E_{cm} = 8 TeV. The quoted signal strength is given for m_{H^0} = 125.6 GeV.

[3] AALTONEN 13L combine all CDF results with 9.45–10.0 fb^{-1} of $p\overline{p}$ collisions at E_{cm} = 1.96 TeV. The quoted signal strength is given for m_{H^0} = 125 GeV.

[4] CHATRCHYAN 13X search for $H^0 t\overline{t}$ production followed by $H^0 \to b\overline{b}$, one top decaying to $\ell\nu$ and the other to either $\ell\nu$ or $q\overline{q}$ in 5.0 fb^{-1} and 5.1 fb^{-1} of pp collisions at E_{cm} = 7 and 8 TeV. A limit on cross section times branching ratio which corresponds to (4.0–8.6) times the expected Standard Model cross section is given for m_{H^0} = 110–140 GeV at 95% CL. The quoted limit is given for m_{H^0} = 125 GeV, where 5.2 is expected for no signal.

H^0 REFERENCES

AAD	15	PL B740 222	G. Aad *et al.*	(ATLAS Collab.)
AAD	15B	PRL 114 191803	G. Aad *et al.*	(ATLAS and CMS Collab.)
AAD	15F	PR D91 012006	G. Aad *et al.*	(ATLAS Collab.)
AAD	15G	JHEP 1501 069	G. Aad *et al.*	(ATLAS Collab.)
AAD	14AR	PL B738 234	G. Aad *et al.*	(ATLAS Collab.)
AAD	14AS	PL B738 68	G. Aad *et al.*	(ATLAS Collab.)
AAD	14BC	PR D90 112015	G. Aad *et al.*	(ATLAS Collab.)
AAD	14J	PL B732 8	G. Aad *et al.*	(ATLAS Collab.)
AAD	14O	PRL 112 201802	G. Aad *et al.*	(ATLAS Collab.)
AAD	14W	PR D90 052004	G. Aad *et al.*	(ATLAS Collab.)
ABAZOV	14F	PRL 113 161802	V.M. Abazov *et al.*	(D0 Collab.)
CHATRCHYAN	14AA	PR D89 092007	S. Chatrchyan *et al.*	(CMS Collab.)
CHATRCHYAN	14AI	PR D89 012003	S. Chatrchyan *et al.*	(CMS Collab.)
CHATRCHYAN	14AJ	NATP 10 557	S. Chatrchyan *et al.*	(CMS Collab.)
CHATRCHYAN	14B	EPJ C74 2980	S. Chatrchyan *et al.*	(CMS Collab.)
CHATRCHYAN	14G	JHEP 1401 096	S. Chatrchyan *et al.*	(CMS Collab.)
CHATRCHYAN	14K	JHEP 1405 104	S. Chatrchyan *et al.*	(CMS Collab.)
KHACHATRY...	14D	PL B736 64	V. Khachatryan *et al.*	(CMS Collab.)
KHACHATRY...	14H	JHEP 1409 087	V. Khachartryan *et al.*	(CMS Collab.)
KHACHATRY...	14P	EPJ C74 3076	V. Khachatryan *et al.*	(CMS Collab.)
AAD	13AJ	PL B726 120	G. Aad *et al.*	(ATLAS Collab.)
AAD	13AK	PL B726 88	G. Aad *et al.*	(ATLAS Collab.)
AALTONEN	13L	PR D88 052013	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	13M	PR D88 052014	T. Aaltonen *et al.*	(CDF and D0 Collab.)
ABAZOV	13L	PR D88 052011	V.M. Abazov *et al.*	(D0 Collab.)
CHATRCHYAN	13BK	PL B726 587	S. Chatrchyan *et al.*	(CMS Collab.)
CHATRCHYAN	13J	PRL 110 081803	S. Chatrchyan *et al.*	(CMS Collab.)
CHATRCHYAN	13X	JHEP 1305 145	S. Chatrchyan *et al.*	(CMS Collab.)
CHATRCHYAN	13Y	JHEP 1306 081	S. Chatrchyan *et al.*	(CMS Collab.)
AAD	12AI	PL B716 1	G. Aad *et al.*	(ATLAS Collab.)
AAD	12DA	SCI 338 1576	G. Aad *et al.*	(ATLAS Collab.)
AALTONEN	12Q	PRL 109 111803	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	12R	PRL 109 111804	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	12S	PRL 109 111805	T. Aaltonen *et al.*	(CDF Collab.)
AALTONEN	12T	PRL 109 071804	T. Aaltonen *et al.*	(CDF and D0 Collab.)
ABAZOV	12K	PL B716 285	V.M. Abazov *et al.*	(D0 Collab.)

ABAZOV	12O	PRL 109 121803	V.M. Abazov *et al.*	(D0 Collab.)
ABAZOV	12P	PRL 109 121804	V.M. Abazov *et al.*	(D0 Collab.)
CHATRCHYAN	12BY	SCI 338 1569	S. Chatrchyan *et al.*	(CMS Collab.)
CHATRCHYAN	12N	PL B716 30	S. Chatrchyan *et al.*	(CMS Collab.)