



$$J = 0$$

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, $ZZ^* \rightarrow 4\ell$ |
| 125.02 ^{+0.26+0.14} _{-0.27-0.15} | 3 KHACHATRYAN...15AM | CMS | pp , 7, 8 TeV |
| 125.36±0.37±0.18 | 1,4 AAD | 14W ATLS | pp , 7, 8 TeV |
| 125.98±0.42±0.28 | 4 AAD | 14W ATLS | pp , 7, 8 TeV, $\gamma\gamma$ |
| 124.51±0.52±0.06 | 4 AAD | 14W ATLS | pp , 7, 8 TeV, $ZZ^* \rightarrow 4\ell$ |
| 125.6 ±0.4 ±0.2 | 5 CHATRCHYAN 14AA | CMS | pp , 7, 8 TeV, $ZZ^* \rightarrow 4\ell$ |
| 122 ±7 | 6 CHATRCHYAN 14K | CMS | pp , 7, 8 TeV, $\tau\tau$ |
| 124.70±0.31±0.15 | 7 KHACHATRYAN...14P | CMS | pp , 7, 8 TeV, $\gamma\gamma$ |
| 125.5 ±0.2 ^{+0.5} _{-0.6} | 1,8 AAD | 13AK ATLS | pp , 7, 8 TeV |
| 126.8 ±0.2 ±0.7 | 8 AAD | 13AK ATLS | pp , 7, 8 TeV, $\gamma\gamma$ |
| 124.3 ^{+0.6+0.5} _{-0.5-0.3} | 8 AAD | 13AK ATLS | pp , 7, 8 TeV, $ZZ^* \rightarrow 4\ell$ |
| 125.8 ±0.4 ±0.4 | 1,9 CHATRCHYAN 13J | CMS | pp , 7, 8 TeV |
| 126.2 ±0.6 ±0.2 | 9 CHATRCHYAN 13J | CMS | pp , 7, 8 TeV, $ZZ^* \rightarrow 4\ell$ |
| 126.0 ±0.4 ±0.4 | 1,10 AAD | 12AI ATLS | pp , 7, 8 TeV |
| 125.3 ±0.4 ±0.5 | 1,11 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 KHACHATRYAN 15AM use up to 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and up to 19.7 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$.

⁴ AAD 14W use 4.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 20.3 fb^{-1} at 8 TeV.

⁵ CHATRCHYAN 14AA use 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 19.7 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$.

- ⁶ CHATRCHYAN 14K use 4.9 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 19.7 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$.
- ⁷ KHACHATRYAN 14P use 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 19.7 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$.
- ⁸ AAD 13AK use 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 20.7 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. Superseded by AAD 14W.
- ⁹ CHATRCHYAN 13J use 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 12.2 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$.
- ¹⁰ AAD 12AI obtain results based on $4.6\text{--}4.8 \text{ fb}^{-1}$ of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and $5.8\text{--}5.9 \text{ fb}^{-1}$ at $E_{\text{cm}} = 8 \text{ TeV}$. An excess of events over background with a local significance of 5.9σ is observed at $m_{H^0} = 126 \text{ GeV}$. See also AAD 12DA.
- ¹¹ CHATRCHYAN 12N obtain results based on $4.9\text{--}5.1 \text{ fb}^{-1}$ of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and $5.1\text{--}5.3 \text{ fb}^{-1}$ at $E_{\text{cm}} = 8 \text{ TeV}$. An excess of events over background with a local significance of 5.0σ is observed at about $m_{H^0} = 125 \text{ GeV}$. 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.

| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|--------------|---|-------------|---|
| • • • | We do not use the following data for averages, fits, limits, etc. • • • | | |
| 1 | AAD | 16 ATLS | $H^0 \rightarrow \gamma\gamma$ |
| 2 | AAD | 15AX ATLS | $H^0 \rightarrow WW^*$ |
| 3 | AAD | 15CI ATLS | $H^0 \rightarrow ZZ^*, WW^*, \gamma\gamma$ |
| 4 | AALTONEN | 15 TEVA | $p\bar{p} \rightarrow WH^0, ZH^0, H^0 \rightarrow b\bar{b}$ |
| 5 | AALTONEN | 15B CDF | $p\bar{p} \rightarrow WH^0, ZH^0, H^0 \rightarrow b\bar{b}$ |
| 6 | KHACHATRY... | 15Y CMS | $H^0 \rightarrow 4l, WW^*, \gamma\gamma$ |
| 7 | ABAZOV | 14F D0 | $p\bar{p} \rightarrow WH^0, ZH^0, H^0 \rightarrow b\bar{b}$ |

| | | | |
|----|-----------------|-----------|--|
| 8 | CHATRCHYAN 14AA | CMS | $H^0 \rightarrow ZZ^*$ |
| 9 | CHATRCHYAN 14G | CMS | $H^0 \rightarrow WW^*$ |
| 10 | KHACHATRYAN 14P | CMS | $H^0 \rightarrow \gamma\gamma$ |
| 11 | AAD | 13AJ ATLS | $H^0 \rightarrow \gamma\gamma, ZZ^* \rightarrow 4l, WW^* \rightarrow \ell\nu\ell\nu$ |
| 12 | CHATRCHYAN 13J | CMS | $H^0 \rightarrow ZZ^* \rightarrow 4l$ |

- ¹ AAD 16 study $H^0 \rightarrow \gamma\gamma$ with an effective Lagrangian including CP even and odd terms in 20.3 fb^{-1} of pp collisions at $E_{\text{cm}} = 8 \text{ TeV}$. The data is consistent with the expectations for the Higgs boson of the Standard Model. Limits on anomalous couplings are also given.
- ² AAD 15AX compare the $J^{CP} = 0^+$ Standard Model assignment with other J^{CP} hypotheses in 20.3 fb^{-1} of pp collisions at $E_{\text{cm}} = 8 \text{ TeV}$, using the process $H^0 \rightarrow WW^* \rightarrow e\nu\mu\nu$. 2^+ hypotheses are excluded at 84.5–99.4%CL, 0^- at 96.5%CL, 0^+ (field strength coupling) at 70.8%CL. See their Fig. 19 for limits on possible CP mixture parameters.
- ³ AAD 15CI compare the $J^{CP} = 0^+$ Standard Model assignment with other J^{CP} hypotheses in 4.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 20.3 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$, using the processes $H^0 \rightarrow ZZ^* \rightarrow 4l$, $H^0 \rightarrow \gamma\gamma$ and combine with AAD 15AX data. 0^+ (field strength coupling), 0^- and several 2^+ hypotheses are excluded at more than 99.9% CL. See their Tables 7–9 for limits on possible CP mixture parameters.
- ⁴ AALTONEN 15 combine AALTONEN 15B and ABAZOV 14F data. An upper limit of 0.36 of the Standard Model production rate at 95% CL is obtained both for a 0^- and a 2^+ state. Assuming the SM event rate, the $J^{CP} = 0^-$ (2^+) hypothesis is excluded at the 5.0σ (4.9σ) level.
- ⁵ AALTONEN 15B compare the $J^{CP} = 0^+$ Standard Model assignment with other J^{CP} hypotheses in 9.45 fb^{-1} of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96 \text{ TeV}$, using the processes $ZH^0 \rightarrow \ell\ell b\bar{b}$, $WH^0 \rightarrow \ell\nu b\bar{b}$, and $ZH^0 \rightarrow \nu\nu b\bar{b}$. Bounds on the production rates of 0^- and 2^+ (graviton-like) states are set, see their tables II and III.
- ⁶ KHACHATRYAN 15Y compare the $J^{CP} = 0^+$ Standard Model assignment with other J^{CP} hypotheses in up to 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and up to 19.7 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$, using the processes $H^0 \rightarrow 4l$, $H^0 \rightarrow WW^*$, and $H^0 \rightarrow \gamma\gamma$. 0^- is excluded at 99.98% CL, and several 2^+ hypotheses are excluded at more than 99% CL. Spin 1 models are excluded at more than 99.999% CL in ZZ^* and WW^* modes. Limits on anomalous couplings and several cross section fractions, treating the case of CP -mixed states, are also given.
- ⁷ 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 $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96 \text{ TeV}$. They use kinematic correlations between the decay products of the vector boson and the Higgs boson in the final states $ZH \rightarrow \ell\ell b\bar{b}$, $WH \rightarrow \ell\nu b\bar{b}$, and $ZH \rightarrow \nu\nu b\bar{b}$. 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.

- ⁸ CHATRCHYAN 14AA compare the $J^{CP} = 0^+$ Standard Model assignment with various J^{CP} hypotheses in 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 19.7 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. $J^{CP} = 0^-$ 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.
- ⁹ 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 $E_{\text{cm}} = 7 \text{ TeV}$ and 19.4 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. Varying the fraction of the production of the 2^+ state via gg and $q\bar{q}$, 2^+ hypotheses are disfavored at CL between 83.7 and 99.8%. The 0^- hypothesis is disfavored against 0^+ at the 65.3% CL.
- ¹⁰ 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 $E_{\text{cm}} = 7 \text{ TeV}$ and 19.7 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. Varying the fraction of the production of the 2^+ state via gg and $q\bar{q}$, 2^+ hypotheses are disfavored at CL between 71 and 94%.
- ¹¹ 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%.
- ¹² 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 |
|----------------|-------------------|--------------------------------------|----------|---|
| <1.7 | 95 | ¹ KHACHATRY...15AMCMS | | pp , 7, 8 TeV |
| >3.5 | $\times 10^{-12}$ | 95 ² KHACHATRY...15BA CMS | | pp , 7, 8 TeV, flight distance |
| <5.0 | 95 | ³ AAD | 14W ATLS | pp , 7, 8 TeV, $\gamma\gamma$ |
| <2.6 | 95 | ³ AAD | 14W ATLS | pp , 7, 8 TeV, $ZZ^* \rightarrow 4\ell$ |

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

| | | | | |
|---------|----|---------------------------------|-----------|---|
| <0.0227 | 95 | ⁴ AAD | 15BE ATLS | pp , 8 TeV, $ZZ^{(*)}$, $WW^{(*)}$ |
| <0.046 | 95 | ⁵ KHACHATRYAN...15BA | CMS | pp , 7, 8 TeV, $ZZ^{(*)} \rightarrow 4\ell$ |
| <3.4 | 95 | ⁶ CHATRCHYAN14AA | CMS | pp , 7, 8 TeV, $ZZ^* \rightarrow 4\ell$ |
| <0.022 | 95 | ⁷ KHACHATRYAN...14D | CMS | pp , 7, 8 TeV, $ZZ^{(*)}$ |
| <2.4 | 95 | ⁸ KHACHATRYAN...14P | CMS | pp , 7, 8 TeV, $\gamma\gamma$ |

¹ KHACHATRYAN 15AM combine $\gamma\gamma$ and $ZZ^* \rightarrow 4\ell$ results. The expected limit is 2.3 GeV.

² KHACHATRYAN 15BA derive a lower limit on the total width from an upper limit on the decay flight distance $\tau < 1.9 \times 10^{-13}$ s. 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 19.7 fb^{-1} at 8 TeV are used.

³ AAD 14W use 4.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 20.3 fb^{-1} at 8 TeV. The expected limit is 6.2 GeV.

⁴ AAD 15BE derive constraints on the total width from comparing $ZZ^{(*)}$ and $WW^{(*)}$ production via on-shell and off-shell H^0 using 20.3 fb^{-1} of pp collisions at $E_{\text{cm}} = 8$ TeV. The K factor for the background processes is assumed to be equal to that for the signal.

⁵ KHACHATRYAN 15BA derive constraints on the total width from comparing $ZZ^{(*)}$ production via on-shell and off-shell H^0 with an unconstrained anomalous coupling. 4ℓ final states in 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 19.7 fb^{-1} at $E_{\text{cm}} = 8$ TeV are used.

⁶ CHATRCHYAN 14AA use 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 19.7 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The expected limit is 2.8 GeV.

⁷ 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 $E_{\text{cm}} = 7$ TeV and 19.7 fb^{-1} at $E_{\text{cm}} = 8$ TeV are used.

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

H^0 DECAY MODES

| | Mode | Fraction (Γ_i/Γ) | Confidence level |
|---------------|----------------------|--------------------------------|------------------|
| Γ_1 | WW^* | | |
| Γ_2 | ZZ^* | | |
| Γ_3 | $\gamma\gamma$ | | |
| Γ_4 | $b\bar{b}$ | | |
| Γ_5 | e^+e^- | $< 1.9 \times 10^{-3}$ | 95% |
| Γ_6 | $\mu^+\mu^-$ | | |
| Γ_7 | $\tau^+\tau^-$ | | |
| Γ_8 | $Z\gamma$ | | |
| Γ_9 | $J/\psi\gamma$ | $< 1.5 \times 10^{-3}$ | 95% |
| Γ_{10} | $\Upsilon(1S)\gamma$ | $< 1.3 \times 10^{-3}$ | 95% |
| Γ_{11} | $\Upsilon(2S)\gamma$ | $< 1.9 \times 10^{-3}$ | 95% |
| Γ_{12} | $\Upsilon(3S)\gamma$ | $< 1.3 \times 10^{-3}$ | 95% |
| Γ_{13} | $\mu\tau$ | $< 1.51 \%$ | 95% |
| Γ_{14} | invisible | $< 58 \%$ | 95% |

H^0 BRANCHING RATIOS

$\Gamma(e^+e^-)/\Gamma_{\text{total}}$ Γ_5/Γ

| VALUE | CL% | DOCUMENT ID | TECN |
|-----------------------|-----|------------------------------|------|
| $<1.9 \times 10^{-3}$ | 95 | ¹ KHACHATRY...15H | CMS |

¹ KHACHATRYAN 15H use 5.0 fb⁻¹ of pp collisions at $E_{\text{cm}} = 7$ TeV and 19.7 fb⁻¹ at 8 TeV.

$\Gamma(J/\psi\gamma)/\Gamma_{\text{total}}$ Γ_9/Γ

| VALUE | CL% | DOCUMENT ID | TECN | COMMENT |
|-----------------------|-----|------------------------------|------|---------|
| $<1.5 \times 10^{-3}$ | 95 | ¹ KHACHATRY...16B | CMS | 8 TeV |
| $<1.5 \times 10^{-3}$ | 95 | ² AAD 15l | ATLS | 8 TeV |

¹ KHACHATRYAN 16B use 19.7 fb⁻¹ of pp collision data at 8 TeV.

² AAD 15l use 19.7 fb⁻¹ of pp collision data at 8 TeV.

$\Gamma(\Upsilon(1S)\gamma)/\Gamma_{\text{total}}$ Γ_{10}/Γ

| VALUE | CL% | DOCUMENT ID | TECN | COMMENT |
|-----------------------|-----|----------------------|------|---------|
| $<1.3 \times 10^{-3}$ | 95 | ¹ AAD 15l | ATLS | 8 TeV |

¹ AAD 15l use 19.7 fb⁻¹ of pp collision data at 8 TeV.

$\Gamma(\Upsilon(2S)\gamma)/\Gamma_{\text{total}}$ Γ_{11}/Γ

| VALUE | CL% | DOCUMENT ID | TECN | COMMENT |
|-----------------------|-----|----------------------|------|---------|
| $<1.9 \times 10^{-3}$ | 95 | ¹ AAD 15l | ATLS | 8 TeV |

¹ AAD 15l use 19.7 fb⁻¹ of pp collision data at 8 TeV.

$\Gamma(\Upsilon(3S)\gamma)/\Gamma_{\text{total}}$ Γ_{12}/Γ

| VALUE | CL% | DOCUMENT ID | TECN | COMMENT |
|-----------------------|-----|----------------------|------|---------|
| $<1.3 \times 10^{-3}$ | 95 | ¹ AAD 15l | ATLS | 8 TeV |

¹ AAD 15l use 19.7 fb⁻¹ of pp collision data at 8 TeV.

$\Gamma(\mu\tau)/\Gamma_{\text{total}}$ Γ_{13}/Γ

| VALUE | CL% | DOCUMENT ID | TECN |
|------------------------|-----|------------------------------|------|
| $<1.51 \times 10^{-2}$ | 95 | ¹ KHACHATRY...15Q | CMS |

¹ KHACHATRYAN 15Q search for $H^0 \rightarrow \mu\tau$ with τ decaying electronically or hadronically in 19.7 fb⁻¹ of pp collisions at $E_{\text{cm}} = 8$ TeV. The fit gives $B(H^0 \rightarrow \mu\tau) = (0.84^{+0.39}_{-0.37})\%$ with a significance of 2.4 σ .

$\Gamma(\text{invisible})/\Gamma_{\text{total}}$ Γ_{14}/Γ

Invisible final states.

| VALUE | CL% | DOCUMENT ID | TECN | COMMENT |
|---|-----|-----------------------------|------|------------------------------------|
| <0.75 | 95 | ¹ AAD 14O | ATLS | $pp \rightarrow H^0 ZX$, 7, 8 TeV |
| <0.58 | 95 | ² CHATRCHYAN 14B | CMS | $pp \rightarrow H^0 ZX, qqH^0 X$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| <0.78 | 95 | ³ AAD 15BD | ATLS | $pp \rightarrow H^0 W/ZX$, 8 TeV |
| <0.81 | 95 | ⁴ CHATRCHYAN 14B | CMS | $pp \rightarrow H^0 ZX$, 7, 8 TeV |
| <0.65 | 95 | ⁵ CHATRCHYAN 14B | CMS | $pp \rightarrow qqH^0 X$, 8 TeV |

- ¹ AAD 140 search for $pp \rightarrow H^0 ZX$, $Z \rightarrow \ell\ell$, with H^0 decaying to invisible final states in 4.5 fb^{-1} at $E_{\text{cm}} = 7 \text{ TeV}$ and 20.3 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted limit on the branching ratio is given for $m_{H^0} = 125.5 \text{ GeV}$ and assumes the Standard Model rate for $H^0 Z$ production.
- ² CHATRCHYAN 14B search for $pp \rightarrow H^0 ZX$, $Z \rightarrow \ell\ell$ and $Z \rightarrow b\bar{b}$, and also $pp \rightarrow qqH^0 X$ with H^0 decaying to invisible final states using data at $E_{\text{cm}} = 7$ 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 $m_{H^0} = 125 \text{ GeV}$ and assumes the Standard Model rates for the two production processes.
- ³ AAD 15BD search for $pp \rightarrow H^0 WX$ and $pp \rightarrow H^0 ZX$ with W or Z decaying hadronically and H^0 decaying to invisible final states using data at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted limit is given for $m_{H^0} = 125 \text{ GeV}$, assumes the Standard Model rates for the production processes and is based on a combination of the contributions from $H^0 W$, $H^0 Z$ and the gluon-fusion process.
- ⁴ CHATRCHYAN 14B search for $pp \rightarrow H^0 ZX$ with H^0 decaying to invisible final states and $Z \rightarrow \ell\ell$ in 4.9 fb^{-1} at $E_{\text{cm}} = 7 \text{ TeV}$ and 19.7 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$, and also with $Z \rightarrow b\bar{b}$ in 18.9 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted limit on the branching ratio is given for $m_{H^0} = 125 \text{ GeV}$ and assumes the Standard Model rate for $H^0 Z$ production.
- ⁵ CHATRCHYAN 14B search for $pp \rightarrow qqH^0 X$ (vector boson fusion) with H^0 decaying to invisible final states in 19.5 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted limit on the branching ratio is given for $m_{H^0} = 125 \text{ GeV}$ 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, $\sigma \cdot \text{B}(H^0 \rightarrow xx) / (\sigma \cdot \text{B}(H^0 \rightarrow xx))_{\text{SM}}$, for the specified mass value of H^0 . For the SM predictions, see DITTMAIER 11, DITTMAIER 12, and HEINEMEYER 13A. Results for fiducial and differential cross sections are also listed below.

Combined Final States

| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|---|--------------------|-------------|---|
| 1.10±0.11 OUR AVERAGE | | | |
| $1.09 \pm 0.07 \pm 0.04 \pm 0.03^{+0.07}_{-0.06}$ | 1,2 AAD | 16J LHC | pp , 7, 8 TeV |
| $1.44^{+0.59}_{-0.56}$ | 3 AALTONEN | 13M TEVA | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● | | | |
| $1.20 \pm 0.10 \pm 0.06 \pm 0.04^{+0.08}_{-0.07}$ | 2 AAD | 16J ATLS | pp , 7, 8 TeV |
| $0.97 \pm 0.09 \pm 0.05^{+0.04}_{-0.03}^{+0.07}_{-0.06}$ | 2 AAD | 16J CMS | pp , 7, 8 TeV |
| $1.18 \pm 0.10 \pm 0.07^{+0.08}_{-0.07}$ | 4 AAD | 16K ATLS | pp , 7, 8 TeV |
| $0.75^{+0.28}_{-0.26}^{+0.13}_{-0.11}^{+0.08}_{-0.05}$ | 4 AAD | 16K ATLS | pp , 7 TeV |
| $1.28 \pm 0.11^{+0.08}_{-0.07}^{+0.10}_{-0.08}$ | 4 AAD | 16K ATLS | pp , 8 TeV |
| | 5 AAD | 15P ATLS | pp , 8 TeV, cross section |

| | | |
|--|-----------------------------------|---|
| $1.00 \pm 0.09 \pm 0.07^{+0.08}_{-0.07}$ | ⁶ KHACHATRYAN 15AM CMS | pp , 7, 8 TeV |
| $1.33^{+0.14}_{-0.10} \pm 0.15$ | ⁷ AAD | 13AK ATLS pp , 7 and 8 TeV |
| $1.54^{+0.77}_{-0.73}$ | ⁸ AALTONEN | 13L CDF $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| $1.40^{+0.92}_{-0.88}$ | ⁹ ABAZOV | 13L D0 $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| 1.4 ± 0.3 | ¹⁰ AAD | 12AI ATLS $pp \rightarrow H^0 X$, 7, 8 TeV |
| 1.2 ± 0.4 | ¹⁰ AAD | 12AI ATLS $pp \rightarrow H^0 X$, 7 TeV |
| 1.5 ± 0.4 | ¹⁰ AAD | 12AI ATLS $pp \rightarrow H^0 X$, 8 TeV |
| 0.87 ± 0.23 | ¹¹ CHATRCHYAN 12N CMS | $pp \rightarrow H^0 X$, 7, 8 TeV |

¹ AAD 16J perform fits to the ATLAS and CMS data at $E_{\text{cm}} = 7$ and 8 TeV. The signal strengths for individual production processes are $1.03^{+0.16}_{-0.14}$ for gluon fusion, $1.18^{+0.25}_{-0.23}$ for vector boson fusion, $0.89^{+0.40}_{-0.38}$ for WH^0 production, $0.79^{+0.38}_{-0.36}$ for ZH^0 production, and $2.3^{+0.7}_{-0.6}$ for $t\bar{t}H^0$ production.

² The uncertainties represent statistics, experimental systematics, theory systematics on the background, and theory systematics on the signal. The quoted signal strengths are given for $m_{H^0} = 125.09$ GeV. In the fit, relative branching ratios and relative production cross sections are fixed to those in the Standard Model.

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 $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.

⁴ AAD 16K use up to 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and up to 20.3 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The third uncertainty in the measurement is theory systematics. The signal strengths for individual production modes are $1.23 \pm 0.14^{+0.09+0.16}_{-0.08-0.12}$ for gluon fusion, $1.23^{+0.28+0.13+0.11}_{-0.27-0.12-0.09}$ for vector boson fusion, $0.80^{+0.31+0.10}_{-0.30-0.05}$ for W/ZH^0 production, and $1.81^{+0.52+0.58+0.31}_{-0.50-0.55-0.12}$ for $t\bar{t}H^0$ production. The quoted signal strengths are given for $m_{H^0} = 125.36$ GeV.

⁵ AAD 15P measure total and differential cross sections of the process $pp \rightarrow H^0 X$ at $E_{\text{cm}} = 8$ TeV with 20.3 fb^{-1} . $\gamma\gamma$ and 4ℓ final states are used. $\sigma(pp \rightarrow H^0 X) = 33.0 \pm 5.3 \pm 1.6 \text{ pb}$ is given. See their Figs. 2 and 3 for data on differential cross sections.

⁶ KHACHATRYAN 15AM use up to 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and up to 19.7 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The third uncertainty in the measurement is theory systematics. Fits to each production mode give the value of $0.85^{+0.19}_{-0.16}$ for gluon fusion, $1.16^{+0.37}_{-0.34}$ for vector boson fusion, $0.92^{+0.38}_{-0.36}$ for WH^0 , ZH^0 production, and $2.90^{+1.08}_{-0.94}$ for $t\bar{t}H^0$ production.

⁷ AAD 13AK use 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 20.7 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The combined signal strength is based on the $\gamma\gamma$, $ZZ^* \rightarrow 4\ell$, and $WW^* \rightarrow \ell\nu\ell\nu$ 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.

⁸ AALTONEN 13L combine all CDF results with $9.45\text{--}10.0 \text{ fb}^{-1}$ of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.

⁹ ABAZOV 13L combine all D0 results with up to 9.7 fb^{-1} of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.

¹⁰ AAD 12AI obtain results based on $4.6\text{--}4.8 \text{ fb}^{-1}$ of pp collisions at $E_{\text{cm}} = 7$ TeV and $5.8\text{--}5.9 \text{ fb}^{-1}$ at $E_{\text{cm}} = 8$ TeV. An excess of events over background with a local

significance of 5.9σ is observed at $m_{H^0} = 126$ GeV. The quoted signal strengths are given for $m_{H^0} = 126$ GeV. See also AAD 12DA.

¹¹ CHATRCHYAN 12N obtain results based on $4.9\text{--}5.1\text{ fb}^{-1}$ of pp collisions at $E_{\text{cm}} = 7$ TeV and $5.1\text{--}5.3\text{ fb}^{-1}$ at $E_{\text{cm}} = 8$ TeV. An excess of events over background with a local significance of 5.0σ is observed at about $m_{H^0} = 125$ GeV. The combined signal strength is based on the $\gamma\gamma$, ZZ^* , WW^* , $\tau^+\tau^-$, and $b\bar{b}$ channels. The quoted signal strength is given for $m_{H^0} = 125.5$ GeV. See also CHATRCHYAN 13Y.

WW^* Final State

| <u>VALUE</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|---|--------------------|-------------|---|
| $1.08^{+0.18}_{-0.16}$ OUR AVERAGE | | | |
| $1.09^{+0.18}_{-0.16}$ | 1,2 AAD | 16J LHC | pp , 7, 8 TeV |
| $0.94^{+0.85}_{-0.83}$ | 3 AALTONEN | 13M TEVA | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● | | | |
| $1.22^{+0.23}_{-0.21}$ | 2 AAD | 16J ATLS | pp , 7, 8 TeV |
| $0.90^{+0.23}_{-0.21}$ | 2 AAD | 16J CMS | pp , 7, 8 TeV |
| $1.18 \pm 0.16^{+0.17}_{-0.14}$ | 4 AAD | 16K ATLS | pp , 7, 8 TeV |
| $1.09^{+0.16+0.17}_{-0.15-0.14}$ | 5 AAD | 15AA ATLS | pp , 7, 8 TeV |
| $3.0^{+1.3+1.0}_{-1.1-0.7}$ | 6 AAD | 15AQ ATLS | $pp \rightarrow H^0 W/Z X$, 7, 8 TeV |
| $1.16^{+0.16+0.18}_{-0.15-0.15}$ | 7 AAD | 15AQ ATLS | pp , 7, 8 TeV |
| $0.72 \pm 0.12 \pm 0.10^{+0.12}_{-0.10}$ | 8 CHATRCHYAN 14G | CMS | pp , 7, 8 TeV |
| $0.99^{+0.31}_{-0.28}$ | 9 AAD | 13AK ATLS | pp , 7 and 8 TeV |
| $0.00^{+1.78}_{-0.00}$ | 10 AALTONEN | 13L CDF | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| $1.90^{+1.63}_{-1.52}$ | 11 ABAZOV | 13L D0 | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| 1.3 ± 0.5 | 12 AAD | 12AI ATLS | $pp \rightarrow H^0 X$, 7, 8 TeV |
| 0.5 ± 0.6 | 12 AAD | 12AI ATLS | $pp \rightarrow H^0 X$, 7 TeV |
| 1.9 ± 0.7 | 12 AAD | 12AI ATLS | $pp \rightarrow H^0 X$, 8 TeV |
| $0.60^{+0.42}_{-0.37}$ | 13 CHATRCHYAN 12N | CMS | $pp \rightarrow H^0 X$, 7, 8 TeV |

¹ AAD 16J perform fits to the ATLAS and CMS data at $E_{\text{cm}} = 7$ and 8 TeV. The signal strengths for individual production processes are $0.84^{+0.17}_{-0.17}$ for gluon fusion, $1.2^{+0.4}_{-0.4}$ for vector boson fusion, $1.6^{+1.2}_{-1.0}$ for WH^0 production, $5.9^{+2.6}_{-2.2}$ for ZH^0 production, and $5.0^{+1.8}_{-1.7}$ for $t\bar{t}H^0$ production.

² In the fit, relative production cross sections are fixed to those in the Standard Model. The quoted signal strength is given for $m_{H^0} = 125.09$ 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 $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.

- ⁴ AAD 16K use up to 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and up to 20.3 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125.36 \text{ GeV}$.
- ⁵ AAD 15AA use 4.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 20.3 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The signal strength for the gluon fusion and vector boson fusion mode is $1.02 \pm 0.19^{+0.22}_{-0.18}$ and $1.27^{+0.44+0.30}_{-0.40-0.21}$, respectively. The quoted signal strengths are given for $m_{H^0} = 125.36 \text{ GeV}$.
- ⁶ AAD 15AQ use 4.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 20.3 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125.36 \text{ GeV}$.
- ⁷ AAD 15AQ combine their result on W/ZH^0 production with the results of AAD 15AA (gluon fusion and vector boson fusion, slightly updated). The quoted signal strength is given for $m_{H^0} = 125.36 \text{ GeV}$.
- ⁸ CHATRCHYAN 14G use 4.9 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 19.4 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The last uncertainty in the measurement is theory systematics. The quoted signal strength is given for $m_{H^0} = 125.6 \text{ GeV}$.
- ⁹ AAD 13AK use 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 20.7 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125.5 \text{ GeV}$. Superseded by AAD 15AA.
- ¹⁰ AALTONEN 13L combine all CDF results with $9.45\text{--}10.0 \text{ fb}^{-1}$ of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125 \text{ GeV}$.
- ¹¹ ABAZOV 13L combine all D0 results with up to 9.7 fb^{-1} of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125 \text{ GeV}$.
- ¹² AAD 12AI obtain results based on 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 5.8 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted signal strengths are given for $m_{H^0} = 126 \text{ GeV}$. See also AAD 12DA.
- ¹³ CHATRCHYAN 12N obtain results based on 4.9 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 5.1 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125.5 \text{ GeV}$. See also CHATRCHYAN 13Y.

ZZ* Final State

| VALUE | DOCUMENT ID | TECN | COMMENT |
|----------------------------------|-------------------|-----------|---|
| $1.29^{+0.26}_{-0.23}$ | 1,2 AAD | 16J LHC | pp , 7, 8 TeV |
| • • • | | | We do not use the following data for averages, fits, limits, etc. • • • |
| $1.52^{+0.40}_{-0.34}$ | 2 AAD | 16J ATLS | pp , 7, 8 TeV |
| $1.04^{+0.32}_{-0.26}$ | 2 AAD | 16J CMS | pp , 7, 8 TeV |
| $1.46^{+0.35+0.19}_{-0.31-0.13}$ | 3 AAD | 16K ATLS | pp , 7, 8 TeV |
| $1.44^{+0.34+0.21}_{-0.31-0.11}$ | 4 AAD | 15F ATLS | $pp \rightarrow H^0 X$, 7, 8 TeV |
| | 5 AAD | 14AR ATLS | pp , 8 TeV, differential cross section |
| $0.93^{+0.26+0.13}_{-0.23-0.09}$ | 6 CHATRCHYAN 14AA | CMS | pp , 7, 8 TeV |
| $1.43^{+0.40}_{-0.35}$ | 7 AAD | 13AK ATLS | pp , 7 and 8 TeV |
| $0.80^{+0.35}_{-0.28}$ | 8 CHATRCHYAN 13J | CMS | $pp \rightarrow H^0 X$, 7, 8 TeV |
| 1.2 ± 0.6 | 9 AAD | 12AI ATLS | $pp \rightarrow H^0 X$, 7, 8 TeV |
| 1.4 ± 1.1 | 9 AAD | 12AI ATLS | $pp \rightarrow H^0 X$, 7 TeV |
| 1.1 ± 0.8 | 9 AAD | 12AI ATLS | $pp \rightarrow H^0 X$, 8 TeV |
| $0.73^{+0.45}_{-0.33}$ | 10 CHATRCHYAN 12N | CMS | $pp \rightarrow H^0 X$, 7, 8 TeV |

- ¹ AAD 16J perform fits to the ATLAS and CMS data at $E_{\text{cm}} = 7$ and 8 TeV. The signal strengths for individual production processes are $1.13^{+0.34}_{-0.31}$ for gluon fusion and $0.1^{+1.1}_{-0.6}$ for vector boson fusion.
- ² In the fit, relative production cross sections are fixed to those in the Standard Model. The quoted signal strength is given for $m_{H^0} = 125.09$ GeV.
- ³ AAD 16K use up to 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and up to 20.3 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The quoted signal strength is given for $m_{H^0} = 125.36$ GeV.
- ⁴ AAD 15F use 4.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 20.3 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The quoted signal strength is given for $m_{H^0} = 125.36$ GeV. The signal strength for the gluon fusion production mode is $1.66^{+0.45+0.25}_{-0.41-0.15}$, while the signal strength for the vector boson fusion production mode is $0.26^{+1.60+0.36}_{-0.91-0.23}$.
- ⁵ AAD 14AR measure the cross section for $pp \rightarrow H^0 X$, $H^0 \rightarrow ZZ^*$ using 20.3 fb^{-1} at $E_{\text{cm}} = 8$ TeV. They give $\sigma \cdot B = 2.11^{+0.53}_{-0.47} \pm 0.08 \text{ fb}$ in their fiducial region, where $1.30 \pm 0.13 \text{ fb}$ 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.
- ⁶ CHATRCHYAN 14AA use 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 19.7 fb^{-1} at $E_{\text{cm}} = 8$ 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 $1.7^{+2.2}_{-2.1}$.
- ⁷ AAD 13AK use 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 20.7 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The quoted signal strength is given for $m_{H^0} = 125.5$ GeV.
- ⁸ CHATRCHYAN 13J obtain results based on $ZZ \rightarrow 4\ell$ final states in 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 12.2 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The quoted signal strength is given for $m_{H^0} = 125.8$ GeV. Superseded by CHATRCHYAN 14AA.
- ⁹ AAD 12AI obtain results based on $4.7\text{--}4.8 \text{ fb}^{-1}$ of pp collisions at $E_{\text{cm}} = 7$ TeV and 5.8 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The quoted signal strengths are given for $m_{H^0} = 126$ GeV. See also AAD 12DA.
- ¹⁰ CHATRCHYAN 12N obtain results based on $4.9\text{--}5.1 \text{ fb}^{-1}$ of pp collisions at $E_{\text{cm}} = 7$ TeV and $5.1\text{--}5.3 \text{ fb}^{-1}$ at $E_{\text{cm}} = 8$ TeV. An excess of events over background with a local significance of 5.0σ 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 |
|---|-------------------|-----------|--|
| 1.16 ± 0.18 OUR AVERAGE | | | |
| $1.14^{+0.19}_{-0.18}$ | 1,2 AAD | 16J LHC | pp , 7, 8 TeV |
| $5.97^{+3.39}_{-3.12}$ | 3 AALTONEN | 13M TEVA | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | |
| $1.14^{+0.27}_{-0.25}$ | 2 AAD | 16J ATLS | pp , 7, 8 TeV |
| $1.11^{+0.25}_{-0.23}$ | 2 AAD | 16J CMS | pp , 7, 8 TeV |
| | 4 KHACHATRY...16B | CMS | $H^0 \rightarrow \gamma^* \gamma \rightarrow \ell^+ \ell^- \gamma$ |
| | 5 KHACHATRY...16G | CMS | differential cross section |
| $1.17 \pm 0.23^{+0.10+0.12}_{-0.08-0.08}$ | 6 AAD | 14BC ATLS | $pp \rightarrow H^0 X$, 7, 8 TeV |
| | 7 AAD | 14BJ ATLS | pp , 8 TeV, differential cross section |

| | | | |
|---|------------------------------|-----------|---|
| $1.14 \pm 0.21^{+0.09+0.13}_{-0.05-0.09}$ | ⁸ KHACHATRYAN 14P | CMS | pp , 7, 8 TeV |
| $1.55^{+0.33}_{-0.28}$ | ⁹ AAD | 13AK ATLS | pp , 7 and 8 TeV |
| $7.81^{+4.61}_{-4.42}$ | ¹⁰ AALTONEN | 13L CDF | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| $4.20^{+4.60}_{-4.20}$ | ¹¹ ABAZOV | 13L D0 | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| 1.8 ± 0.5 | ¹² AAD | 12AI ATLS | $pp \rightarrow H^0 X$, 7, 8 TeV |
| 2.2 ± 0.7 | ¹² AAD | 12AI ATLS | $pp \rightarrow H^0 X$, 7 TeV |
| 1.5 ± 0.6 | ¹² AAD | 12AI ATLS | $pp \rightarrow H^0 X$, 8 TeV |
| $1.54^{+0.46}_{-0.42}$ | ¹³ CHATRCHYAN 12N | CMS | $pp \rightarrow H^0 X$, 7, 8 TeV |

¹ AAD 16J perform fits to the ATLAS and CMS data at $E_{\text{cm}} = 7$ and 8 TeV. The signal strengths for individual production processes are $1.10^{+0.23}_{-0.22}$ for gluon fusion, $1.3^{+0.5}_{-0.5}$ for vector boson fusion, $0.5^{+1.3}_{-1.2}$ for WH^0 production, $0.5^{+3.0}_{-2.5}$ for ZH^0 production, and $2.2^{+1.6}_{-1.3}$ for $t\bar{t}H^0$ production.

² In the fit, relative production cross sections are fixed to those in the Standard Model. The quoted signal strength is given for $m_{H^0} = 125.09$ 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 $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.

⁴ KHACHATRYAN 16B search for $H^0 \rightarrow \gamma^* \gamma \rightarrow e^+ e^- \gamma$ and $\mu^+ \mu^- \gamma$ (with $m(\ell^+ \ell^-) < 20$ GeV) in 19.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 8$ TeV. An upper limit of 6.7 times the Standard Model expectation is obtained at 95% CL. See their Fig. 6 for limits on individual channels.

⁵ KHACHATRYAN 16G measure fiducial and differential cross sections of the process $pp \rightarrow H^0 X$, $H^0 \rightarrow \gamma\gamma$ at $E_{\text{cm}} = 8$ TeV with 19.7 fb^{-1} . See their Figs. 4–6 and Table 1 for data.

⁶ AAD 14BC use 4.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 20.3 fb^{-1} at $E_{\text{cm}} = 8$ 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 $t\bar{t}H^0$ production.

⁷ AAD 14BJ measure fiducial and differential cross sections of the process $pp \rightarrow H^0 X$, $H^0 \rightarrow \gamma\gamma$ at $E_{\text{cm}} = 8$ TeV with 20.3 fb^{-1} . See their Table 3 and Figs. 3–12 for data.

⁸ KHACHATRYAN 14P use 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 19.7 fb^{-1} at $E_{\text{cm}} = 8$ 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 $t\bar{t}H$ 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 $1.16^{+0.63}_{-0.58}$.

⁹ AAD 13AK use 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 20.7 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The quoted signal strength is given for $m_{H^0} = 125.5$ GeV.

¹⁰ AALTONEN 13L combine all CDF results with 9.45 – 10.0 fb^{-1} of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.

¹¹ ABAZOV 13L combine all D0 results with up to 9.7 fb^{-1} of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.

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

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

$b\bar{b}$ Final State

| VALUE | DOCUMENT ID | TECN | COMMENT |
|---|-------------------------------------|-----------|---|
| 0.82 ± 0.30 OUR AVERAGE | Error includes scale factor of 1.1. | | |
| $0.70^{+0.29}_{-0.27}$ | 1,2 AAD | 16J LHC | pp , 7, 8 TeV |
| $1.59^{+0.69}_{-0.72}$ | 3 AALTONEN | 13M TEVA | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● | | | |
| 0.62 ± 0.37 | 2 AAD | 16J ATLS | pp , 7, 8 TeV |
| $0.81^{+0.45}_{-0.43}$ | 2 AAD | 16J CMS | pp , 7, 8 TeV |
| $0.63^{+0.31+0.24}_{-0.30-0.23}$ | 4 AAD | 16K ATLS | pp , 7, 8 TeV |
| $0.52 \pm 0.32 \pm 0.24$ | 5 AAD | 15G ATLS | $pp \rightarrow H^0 W/Z X$, 7, 8 TeV |
| $2.8^{+1.6}_{-1.4}$ | 6 KHACHATRY...15Z | CMS | $pp \rightarrow H^0 X$, VBF, 8 TeV |
| $1.03^{+0.44}_{-0.42}$ | 7 KHACHATRY...15Z | CMS | pp , 8 TeV, combined |
| 1.0 ± 0.5 | 8 CHATRCHYAN 14AI | CMS | $pp \rightarrow H^0 W/Z X$, 7, 8 TeV |
| $1.72^{+0.92}_{-0.87}$ | 9 AALTONEN | 13L CDF | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| $1.23^{+1.24}_{-1.17}$ | 10 ABAZOV | 13L D0 | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| 0.5 ± 2.2 | 11 AAD | 12AI ATLS | $pp \rightarrow H^0 W/Z X$, 7 TeV |
| | 12 AALTONEN | 12T TEVA | $p\bar{p} \rightarrow H^0 W/Z X$, 1.96 TeV |
| $0.48^{+0.81}_{-0.70}$ | 13 CHATRCHYAN 12N | CMS | $pp \rightarrow H^0 W/Z X$, 7, 8 TeV |

¹ AAD 16J perform fits to the ATLAS and CMS data at $E_{\text{cm}} = 7$ and 8 TeV . The signal strengths for individual production processes are $1.0^{+0.5}_{-0.5}$ for WH^0 production, $0.4^{+0.4}_{-0.4}$ for ZH^0 production, and $1.1^{+1.0}_{-1.0}$ for $t\bar{t}H^0$ production.

² In the fit, relative production cross sections are fixed to those in the Standard Model. The quoted signal strength is given for $m_{H^0} = 125.09 \text{ GeV}$.

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 $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125 \text{ GeV}$.

⁴ AAD 16K use up to 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and up to 20.3 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125.36 \text{ GeV}$.

⁵ AAD 15G use 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 20.3 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125.36 \text{ GeV}$.

⁶ KHACHATRYAN 15Z search for vector-boson fusion production of H^0 decaying to $b\bar{b}$ in up to 19.8 fb^{-1} of pp collisions at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125 \text{ GeV}$.

⁷ KHACHATRYAN 15Z combined vector boson fusion, WH^0 , ZH^0 production, and $t\bar{t}H^0$ production results. The quoted signal strength is given for $m_{H^0} = 125 \text{ GeV}$.

- ⁸ CHATRCHYAN 14AI use up to 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and up to 18.9 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125 \text{ GeV}$. See also CHATRCHYAN 14AJ.
- ⁹ AALTONEN 13L combine all CDF results with $9.45\text{--}10.0 \text{ fb}^{-1}$ of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125 \text{ GeV}$.
- ¹⁰ ABAZOV 13L combine all D0 results with up to 9.7 fb^{-1} of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125 \text{ GeV}$.
- ¹¹ AAD 12AI obtain results based on $4.6\text{--}4.8 \text{ fb}^{-1}$ of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$. The quoted signal strengths are given in their Fig. 10 for $m_{H^0} = 126 \text{ GeV}$. See also Fig. 13 of AAD 12DA.
- ¹² 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 $m_{H^0} = 120\text{--}135 \text{ GeV}$, with a local significance of up to 3.3σ . The local significance at $m_{H^0} = 125 \text{ GeV}$ is 2.8σ , which corresponds to $(\sigma(H^0 W) + \sigma(H^0 Z)) \cdot \text{B}(H^0 \rightarrow b\bar{b}) = (0.23^{+0.09}_{-0.08}) \text{ pb}$, compared to the Standard Model expectation at $m_{H^0} = 125 \text{ GeV}$ of $0.12 \pm 0.01 \text{ pb}$. Superseded by AALTONEN 13M.
- ¹³ CHATRCHYAN 12N obtain results based on 5.0 fb^{-1} of pp collisions at $E_{\text{cm}}=7 \text{ TeV}$ and 5.1 fb^{-1} at $E_{\text{cm}}=8 \text{ TeV}$. The quoted signal strength is given for $m_{H^0}=125.5 \text{ GeV}$. See also CHATRCHYAN 13Y.

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

| VALUE | CL% | DOCUMENT ID | TECN | COMMENT |
|----------------|-----|------------------------------|-----------|-----------------------------------|
| <7.4 | 95 | ¹ KHACHATRY...15H | CMS | $pp \rightarrow H^0 X$, 7, 8 TeV |
| <7.0 | 95 | ² AAD | 14AS ATLS | $pp \rightarrow H^0 X$, 7, 8 TeV |

¹ KHACHATRYAN 15H use 5.0 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 19.7 fb^{-1} at 8 TeV . The quoted signal strength is given for $m_{H^0} = 125 \text{ GeV}$.

² AAD 14AS search for $H^0 \rightarrow \mu^+ \mu^-$ in 4.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 7 \text{ TeV}$ and 20.3 fb^{-1} at $E_{\text{cm}} = 8 \text{ TeV}$. The quoted signal strength is given for $m_{H^0} = 125.5 \text{ GeV}$.

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

| VALUE | DOCUMENT ID | TECN | COMMENT |
|---|------------------------------|-----------|---|
| 1.12 ± 0.23 OUR AVERAGE | | | |
| $1.11^{+0.24}_{-0.22}$ | ^{1,2} AAD | 16J LHC | pp , 7, 8 TeV |
| $1.68^{+2.28}_{-1.68}$ | ³ AALTONEN | 13M TEVA | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | |
| $1.41^{+0.40}_{-0.36}$ | ² AAD | 16J ATLS | pp , 7, 8 TeV |
| $0.88^{+0.30}_{-0.28}$ | ² AAD | 16J CMS | pp , 7, 8 TeV |
| $1.44^{+0.30+0.29}_{-0.29-0.23}$ | ⁴ AAD | 16K ATLS | pp , 7, 8 TeV |
| $1.43^{+0.27+0.32}_{-0.26-0.25} \pm 0.09$ | ⁵ AAD | 15AH ATLS | $pp \rightarrow H^0 X$, 7, 8 TeV |
| 0.78 ± 0.27 | ⁶ CHATRCHYAN 14K | CMS | $pp \rightarrow H^0 X$, 7, 8 TeV |
| $0.00^{+8.44}_{-0.00}$ | ⁷ AALTONEN | 13L CDF | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| $3.96^{+4.11}_{-3.38}$ | ⁸ ABAZOV | 13L D0 | $p\bar{p} \rightarrow H^0 X$, 1.96 TeV |
| $0.4^{+1.6}_{-2.0}$ | ⁹ AAD | 12AI ATLS | $pp \rightarrow H^0 X$, 7 TeV |
| $0.09^{+0.76}_{-0.74}$ | ¹⁰ CHATRCHYAN 12N | CMS | $pp \rightarrow H^0 X$, 7, 8 TeV |

- ¹ AAD 16J perform fits to the ATLAS and CMS data at $E_{\text{cm}} = 7$ and 8 TeV. The signal strengths for individual production processes are $1.0^{+0.6}_{-0.6}$ for gluon fusion, $1.3^{+0.4}_{-0.4}$ for vector boson fusion, $-1.4^{+1.4}_{-1.4}$ for WH^0 production, $2.2^{+2.2}_{-1.8}$ for ZH^0 production, and $-1.9^{+3.7}_{-3.3}$ for $t\bar{t}H^0$ production.
- ² In the fit, relative production cross sections are fixed to those in the Standard Model. The quoted signal strength is given for $m_{H^0} = 125.09$ 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 $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.
- ⁴ AAD 16K use up to 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and up to 20.3 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The quoted signal strength is given for $m_{H^0} = 125.36$ GeV.
- ⁵ AAD 15AH use 4.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 20.3 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The third uncertainty in the measurement is theory systematics. The signal strength for the gluon fusion mode is $2.0 \pm 0.8^{+1.2}_{-0.8} \pm 0.3$ and that for vector boson fusion and W/ZH^0 production modes is $1.24^{+0.49+0.31}_{-0.45-0.29} \pm 0.08$. The quoted signal strength is given for $m_{H^0} = 125.36$ GeV.
- ⁶ CHATRCHYAN 14K use 4.9 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 19.7 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV. See also CHATRCHYAN 14AJ.
- ⁷ AALTONEN 13L combine all CDF results with $9.45\text{--}10.0 \text{ fb}^{-1}$ of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.
- ⁸ ABAZOV 13L combine all D0 results with up to 9.7 fb^{-1} of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.
- ⁹ AAD 12AI obtain results based on 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV. The quoted signal strengths are given in their Fig. 10 for $m_{H^0} = 126$ GeV. See also Fig. 13 of AAD 12DA.
- ¹⁰ CHATRCHYAN 12N obtain results based on 4.9 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 5.1 fb^{-1} at $E_{\text{cm}} = 8$ 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 | $pp \rightarrow H^0 X$, 7, 8 TeV |
| < 9.5 | 95 | ² CHATRCHYAN 13BK | CMS | $pp \rightarrow H^0 X$, 7, 8 TeV |

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

² CHATRCHYAN 13BK search for $H^0 \rightarrow Z\gamma \rightarrow \ell\ell\gamma$ in 5.0 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 19.6 fb^{-1} at $E_{\text{cm}} = 8$ 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 $m_{H^0} = 120\text{--}160$ GeV at 95% CL. The quoted limit is given for $m_{H^0} = 125$ GeV, where 10 is expected for no signal.

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

Signal strength relative to the Standard Model cross section.

| VALUE | CL% | DOCUMENT ID | TECN | COMMENT |
|-----------------------------|-----|------------------------|------|-----------------|
| 2.3 $^{+0.7}_{-0.6}$ | | ^{1,2} AAD 16J | LHC | pp , 7, 8 TeV |

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

| | | | | | |
|------|--|---------------------------------|------|------|--------------------------------|
| 1.9 | $+0.8$ -0.7 | ² AAD | 16J | ATLS | pp , 7, 8 TeV |
| 2.9 | $+1.0$ -0.9 | ² AAD | 16J | CMS | pp , 7, 8 TeV |
| 1.81 | $+0.52 +0.58 +0.31$ $-0.50 -0.55 -0.12$ | ³ AAD | 16K | ATLS | pp , 7, 8 TeV |
| 1.4 | $+2.1 +0.6$ $-1.4 -0.3$ | ⁴ AAD | 15 | ATLS | pp , 7, 8 TeV |
| 1.5 | ± 1.1 | ⁵ AAD | 15BC | ATLS | pp , 8 TeV |
| 2.1 | $+1.4$ -1.2 | ⁶ AAD | 15T | ATLS | pp , 8 TeV |
| 1.2 | $+1.6$ -1.5 | ⁷ KHACHATRYAN...15AN | CMS | | pp , 8 TeV |
| 2.8 | $+1.0$ -0.9 | ⁸ KHACHATRYAN...14H | CMS | | pp , 7, 8 TeV |
| 9.49 | $+6.60$ -6.28 | ⁹ AALTONEN | 13L | CDF | $p\bar{p}$, 1.96 TeV |
| <5.8 | 95 | ¹⁰ CHATRCHYAN | 13X | CMS | $pp \rightarrow H^0 t\bar{t}X$ |

¹ AAD 16J perform fits to the ATLAS and CMS data at $E_{\text{cm}} = 7$ and 8 TeV.

² In the fit, relative branching ratios are fixed to those in the Standard Model. The quoted signal strength is given for $m_{H^0} = 125.09$ GeV.

³ AAD 16K use up to 4.7 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and up to 20.3 fb^{-1} at $E_{\text{cm}} = 8$ TeV. The third uncertainty in the measurement is theory systematics. The quoted signal strength is given for $m_{H^0} = 125.36$ GeV.

⁴ AAD 15 search for $t\bar{t}H^0$ production with H^0 decaying to $\gamma\gamma$ in 4.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ TeV and 20.3 fb^{-1} at $E_{\text{cm}} = 8$ 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.

⁵ AAD 15BC search for $t\bar{t}H^0$ production with H^0 decaying to $b\bar{b}$ in 20.3 fb^{-1} of pp collisions at $E_{\text{cm}} = 8$ TeV. The corresponding upper limit is 3.4 at 95% CL. The quoted signal strength is given for $m_{H^0} = 125$ GeV.

⁶ AAD 15T search for $t\bar{t}H^0$ production with H^0 resulting in multilepton final states (mainly from WW^* , $\tau\tau$, ZZ^*) in 20.3 fb^{-1} of pp collisions at $E_{\text{cm}} = 8$ TeV. The quoted result on the signal strength is given for $m_{H^0} = 125$ GeV and corresponds to an upper limit of 4.7 at 95% CL. The data sample is independent from AAD 15 and AAD 15BC.

⁷ KHACHATRYAN 15AN search for $t\bar{t}H^0$ production with H^0 decaying to $b\bar{b}$ in 19.5 fb^{-1} of pp collisions at $E_{\text{cm}} = 8$ TeV. The quoted result on the signal strength is equivalent to an upper limit of 4.2 at 95% CL and is given for $m_{H^0} = 125$ GeV.

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

⁹ AALTONEN 13L combine all CDF results with $9.45\text{--}10.0 \text{ fb}^{-1}$ of $p\bar{p}$ collisions at $E_{\text{cm}} = 1.96$ TeV. The quoted signal strength is given for $m_{H^0} = 125$ GeV.

¹⁰ CHATRCHYAN 13X search for $t\bar{t}H^0$ production followed by $H^0 \rightarrow b\bar{b}$, one top decaying to $\ell\nu$ and the other to either $\ell\nu$ or $q\bar{q}$ in 5.0 fb^{-1} and 5.1 fb^{-1} of pp collisions at $E_{\text{cm}} = 7$ and 8 TeV. A limit on cross section times branching ratio which corresponds to $(4.0\text{--}8.6)$ times the expected Standard Model cross section is given for $m_{H^0} = 110\text{--}140$ GeV at 95% CL. The quoted limit is given for $m_{H^0} = 125$ GeV, where 5.2 is expected for no signal.

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