

Document details

[< Back to results](#) | 1 of 1[Export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Add to List](#) [More...](#)[Full Text](#) [View at Publisher](#)Journal of High Energy Physics [Open Access](#)
Volume 2019, Issue 3, 1 March 2019, Article number 26Search for $t\bar{t}H$ production in the $H \rightarrow b\bar{b}$ decay channel with leptonic $t\bar{t}$ decays in proton-proton collisions at $\sqrt{s}=13$ TeV (Article) [\(Open Access\)](#)Sirunyan, A.M.^a, Tumasyan, A.^a, Adam, W.^b, Ambrogio, F.^b, Asilar, E.^b, Bergauer, T.^b, Brandstetter, J.^b, Dragicevic, M.^b, Erö, J.^b, Escalante Del Valle, A.^b, Flechl, M.^b, Frühwirth, R.^{b,gu}, Ghete, V.M.^b, Hrubec, J.^b, Jeitler, M.^{b,gu}, Krammer, N.^b, Krätschmer, I.^b, Liko, D.^b, Madlener, T.^b, Mikulec, I.^b, Rad, N.^b,[View additional authors](#) ^aYerevan Physics Institute, Yerevan, Armenia^bInstitut für Hochenergiephysik, Wien, Austria^cInstitute for Nuclear Problems, Minsk, Belarus[View additional affiliations](#)

Abstract

[View references \(106\)](#)

A search is presented for the associated production of a standard model Higgs boson with a top quark-antiquark pair ($t\bar{t}H$), in which the Higgs boson decays into a $b\bar{b}$ quark-antiquark pair, in proton-proton collisions at a centre-of-mass energy $\sqrt{s}=13$ TeV. The data correspond to an integrated luminosity of 35.9 fb^{-1} recorded with the CMS detector at the CERN LHC. Candidate $t\bar{t}H$ events are selected that contain either one or two electrons or muons from the $t\bar{t}$ decays and are categorised according to the number of jets. Multivariate techniques are employed to further classify the events and eventually discriminate between signal and background. The results are characterised by an observed $t\bar{t}H$ signal strength relative to the standard model cross section, $\mu = \sigma/\sigma_{SM}$, under the assumption of a Higgs boson mass of 125 GeV. A combined fit of multivariate discriminant distributions in all categories results in an observed (expected) upper limit on μ of 1.5 (0.9) at 95% confidence level, and a best fit value of $0.72 \pm 0.24(\text{stat}) \pm 0.38(\text{syst})$, corresponding to an observed (expected) signal significance of 1.6 (2.2) standard deviations above the background-only hypothesis. [Figure not available: see fulltext.]. © 2019, The Author(s).

SciVal Topic Prominence

Topic: jets | production | parton shower

Prominence percentile: 99.875

Author keywords

[Hadron-Hadron scattering \(experiments\)](#) [Higgs physics](#) [Top physics](#)

Funding details

Funding sponsor Funding number

Fundação de Amparo à
Pesquisa do Estado de
São Paulo
[See opportunities](#)Metrics [View all metrics](#)

1 Citation in Scopus

0 Field-Weighted
Citation Impact

PlumX Metrics

Usage, Captures, Mentions,
Social Media and Citations
beyond Scopus.

Cited by 1 document

MSSM Higgs benchmark
scenarios for Run 2 and beyond:
the low $\tan\beta$ regionBahl, H. , Liebler, S. , Stefaniak, T.
(2019) *European Physical Journal
C*[View details of this citation](#)Inform me when this document
is cited in Scopus:[Set citation alert >](#)[Set citation feed >](#)

Related documents

Measurements of differential
cross sections of top quark pair
production as a function of
kinematic event variables in
proton-proton collisions at $\sqrt{s}=13$
TeVSirunyan, A.M. , Tumasyan, A. ,
Adam, W.
(2018) *Journal of High Energy
Physics*Acronym
Evidence for associated
production of a Higgs boson with
a top quark pair in final states
with electrons, muons, and
hadronically decaying τ leptons at
 $\sqrt{s}=13$ TeVSirunyan, A.M. , Tumasyan, A. ,
Adam, W.

Kyungpook National
University

Funding text #1

We congratulate our colleagues in the CERN accelerator departments for the excellent performance of the LHC and thank the technical and administrative staffs at CERN and at other CMS institutes for their contributions to the success of the CMS effort. In addition, we gratefully acknowledge the computing centres and personnel of the Worldwide LHC Computing Grid for delivering so effectively the computing infrastructure essential to our analyses. Finally, we acknowledge the enduring support for the construction and operation of the LHC and the CMS detector provided by the following funding agencies: the Austrian Federal Ministry of Science, Research and Economy and the Austrian Science Fund; the Belgian Fonds de la Recherche Scientifique, and Fonds voor Wetenschappelijk Onderzoek; the Brazilian Funding Agencies (CNPq, CAPES, FAPERJ, and FAPESP); the Bulgarian Ministry of Education and Science; CERN; the Chinese Academy of Sciences, Ministry of Science and Technology, and National Natural...

[View all](#) 

Funding text #2

and the National Science Centre, Poland; the Fundação para a Ciência e a Tecnologia, Portugal; JINR, Dubna; the Ministry of Education and Science of the Russian Federation, the Federal Agency of Atomic Energy of the Russian Federation, Russian Academy of Sciences and the Russian Foundation for Basic Research; the Ministry of Education, Science and Technological Development of Serbia; the Secretaría de Estado de Investigación, Desarrollo e Innovación, Programa Consolider-Ingenio 2010, Plan Estatal de Investigación Científica y Técnica y de Innovación 2013-2016, Plan de Ciencia, Tecnología e Innovación 2013-2017 del Principado de Asturias and Fondo Europeo de Desarrollo Regional, Spain; the Swiss Funding Agencies (ETH Board, ETH Zurich, PSI, SNF, UniZH, Canton Zurich, and SER); the Ministry of Science and Technology, Taipei; the Thailand Center of Excellence in Physics, the Institute for the Promotion of Teaching Science and Technology of Thailand, Special Task Force for Activating Resea... [View all](#) 

Funding text #3

Individuals have received support from the Marie-Curie programme and the European Research Council and Horizon 2020 Grant, contract No. 675440 (European Union); the Leventis Foundation; the A. P. Sloan Foundation; the Alexander von Humboldt Foundation; the Belgian Federal Science Policy Office; the Fonds pour la Formation à la Recherche dans l'Industrie et dans l'Agriculture (FRIA-Belgium); the Agentschap voor Innovatie door Wetenschap en Technologie (IWT-Belgium); the F.R.S.-FNRS and FWO (Belgium) under the "Excellence of Science — EOS" — be.h project n. 30820817; the Ministry of Education, Youth and Sports (MEYS) of the Czech Republic; the Lendület ("Momentum") Programme and the János Bolyai Research Scholarship of the Hungarian Academy of Sciences, the New National Excellence Program ÚNKP, the NKFI research grants 123842, 123959, 124845, 124850 and 125105 (Hungary); the Council of Scientific and Industrial Research, India; the HOMING PLUS programme of the Foundation for Polish Scie... [View all](#) 

Funding text #4

†: Deceased 1: Also at Vienna University of Technology, Vienna, Austria 2: Also at IRFU; CEA; UniversitéParis-Saclay, Gif-sur-Yvette, France 3: Also at Universidade Estadual de Campinas, Campinas, Brazil 4: Also at Federal University of Rio Grande do Sul, Porto Alegre, Brazil 5: Also at UniversitéLibre de Bruxelles, Bruxelles, Belgium 6: Also at University of Chinese Academy of Sciences, Beijing, China 7: Also at Institute for Theoretical and Experimental Physics, Moscow, Russia 8: Also at Joint Institute for Nuclear Research, Dubna, Russia 9: Also at Cairo University, Cairo, Egypt 10: Also at Helwan University, Cairo, Egypt 11: Now at Zewail City of Science and Technology, Zewail, Egypt 12: Also at Department of Physics; King Abdulaziz University, Jeddah, Saudi Arabia 13: Also at Universitéde Haute Alsace, Mulhouse, France 14: Also at Skobeltsyn Institute of Nuclear Physics; Lomonosov Moscow State University, Moscow, Russia 15: Also at CERN; European Organization for Nuclear Research,... [View all](#) 

Funding text #5

33: Also at Warsaw University of Technology; Institute of Electronic Systems, Warsaw, Poland 34: Also at Institute for Nuclear Research, Moscow, Russia 35: Now at National Research Nuclear University 'Moscow Engineering Physics Insti-tute' (MEPhI), Moscow, Russia 36: Also at St. Petersburg State Polytechnical University, St. Petersburg, Russia 37: Also at University of Florida, Gainesville, U.S.A. 38: Also at P.N. Lebedev Physical Institute, Moscow, Russia 39: Also at California Institute of Technology, Pasadena, U.S.A. 40: Also at Budker Institute of Nuclear Physics, Novosibirsk, Russia 41: Also at Faculty of Physics; University of Belgrade, Belgrade, Serbia 42: Also at INFN Sezione di Pavia (a; Università di Pavia, Pavia, Italy 43: Also at University of Belgrade; Faculty of Physics and Vinca Institute of Nuclear Sciences, Belgrade, Serbia 44: Also at Scuola Normale e Sezione dell'INFN, Pisa, Italy 45: Also at National and Kapodistrian University of Athens, Athens, Greece 46: Also at ... [View all](#) 

References (106)

[View in search results format >](#)

All Export Print E-mail Save to PDF Create bibliography

[View all 106 references](#)

- 1 Aad, G., Abajyan, T., Abbott, B., Abdallah, J., Abdel Khalek, S., Abdelalim, A.A., Abdinov, O., (...), Zwalinski, L.
Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC ([Open Access](#))

(2012) *Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics*, 716 (1), pp. 1-29. Cited 4892 times.

<http://www.sciencedirect.com/science/journal/03702693>

doi: 10.1016/j.physletb.2012.08.020

[View at Publisher](#)

- 2 Chatrchyan, S., Khachatryan, V., Sirunyan, A.M., Tumasyan, A., Adam, W., Aguilo, E., Bergauer, T., (...), Wenman, D.
Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC ([Open Access](#))

(2012) *Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics*, 716 (1), pp. 30-61. Cited 4965 times.

<http://www.sciencedirect.com/science/journal/03702693>

doi: 10.1016/j.physletb.2012.08.021

[View at Publisher](#)

- 3 Chatrchyan, S., Khachatryan, V., Sirunyan, A.M., Tumasyan, A., Adam, W., Aguilo, E., Bergauer, T., (...), Wenman, D.
A new Boson with a mass of 125 GeV observed with the CMS experiment at the large hadron collider ([Open Access](#))

(2012) *Science*, 338 (6114), pp. 1569-1575. Cited 52 times.

<http://www.sciencemag.org/content/338/6114/1569.full.pdf>

doi: 10.1126/science.1230816

[View at Publisher](#)

- 4 Aad, G., Abbott, B., Abdallah, J., Abdinov, O., Aben, R., Abolins, M., Abouzeid, O.S., (...), Woods, N.
Combined Measurement of the Higgs Boson Mass in pp Collisions at $s = 7$ and 8 TeV with the ATLAS and CMS Experiments ([Open Access](#))

(2015) *Physical Review Letters*, 114 (19), art. no. 191803. Cited 645 times.

<http://harvest.aps.org/bagit/articles/10.1103/PhysRevLett.114.191803/apsxml>

doi: 10.1103/PhysRevLett.114.191803

[View at Publisher](#)

- 5 Measurements of properties of the Higgs boson decaying into the four-lepton final state in pp collisions at $\sqrt{s} = 13$ TeV
(2017) *JHEP*, 11. Cited 14 times.
INSPIRE