

Search for standard model production of four top quarks with same-sign and multilepton final states in proton-proton collisions at root s=13TeV

By: Sirunyan, AM (Sirunyan, A. M.)^[2]; Tumasyan, A (Tumasyan, A.)^[2]; Adam, W (Adam, W.)^[3]; Ambrogio, F (Ambrogio, F.)^[3]; Asilar, E (Asilar, E.)^[3]; Bergauer, T (Bergauer, T.)^[3]; Brandstetter, J (Brandstetter, J.)^[3]; Brondolin, E (Brondolin, E.)^[3]; Dragicevic, M (Dragicevic, M.)^[3]; Ero, J (Eroe, J.)^[3]...More

Group Author(s): CMS Collaboration
View ResearcherID and ORCID

EUROPEAN PHYSICAL JOURNAL C
Volume: 78 Issue: 2
Article Number: 140
DOI: 10.1140/epjc/s10052-018-5607-5
Published: FEB 19 2018
Document Type: Article
View Journal Impact

Abstract

A search for standard model production of four top quarks ($t\bar{t}$) over $t\bar{t}$ is reported using events containing at least three leptons (e, mu) or a same-sign lepton pair. The events are produced in proton-proton collisions at a center-of-mass energy of 13 TeV at the LHC, and the data sample, recorded in 2016, corresponds to an integrated luminosity of 35.9 fb⁻¹. Jet multiplicity and flavor are used to enhance signal sensitivity, and dedicated control regions are used to constrain the dominant backgrounds. The observed and expected signal significances are, respectively, 1.6 and 1.0 standard deviations, and the $t\bar{t}$ cross section is measured to be 16.9(-11.4)(+13.8) fb, in agreement with next-to-leading-order standard model predictions. These results are also used to constrain the Yukawa coupling between the top quark and the Higgs boson to be less than 2.1 times its expected standard model value at 95% confidence level.

Keywords

Keywords Plus: SUPERGAUGE TRANSFORMATIONS; SUPERSYMMETRY; EXTENSION; INVARIANT; NEUTRINO; DECAY

Author Information

Reprint Address: Sirunyan, AM (reprint author)

+ Yerevan Phys Inst, Yerevan, Armenia.

Addresses:

- + [1] CERN, CH-1211 Geneva 23, Switzerland
- + [2] Yerevan Phys Inst, Yerevan, Armenia
- [3] Inst Hochenergiephys, Vienna, Austria
- [4] Inst Nucl Problems, Minsk, BELARUS
- + [5] Univ Antwerp, Antwerp, Belgium
- + [6] Vrije Univ Brussel, Brussels, Belgium
- + [7] Univ Libre Bruxelles, Brussels, Belgium
- + [8] Univ Ghent, Ghent, Belgium
- + [9] Catholic Univ Louvain, Louvain La Neuve, Belgium
- + [10] Ctr Brasileiro Pesquisas Fis, Rio De Janeiro, Brazil
- + [11] Univ Estado Rio de Janeiro, Rio De Janeiro, Brazil
- + [12] Univ Estadual Paulista, Sao Paulo, Brazil
- + [13] Univ Fed ABC, Sao Paulo, Brazil
- + [14] Bulgarian Acad Sci, Inst Nucl Res & Nucl Energy, Sofia, Bulgaria
- + [15] Univ Sofia, Sofia, Bulgaria

Citation Network

In Web of Science Core Collection

2

Times Cited

Create Citation Alert

All Times Cited Counts

2 in All Databases

See more counts

54

Cited References

View Related Records

Most recently cited by:

- Hou, Wei-Shu; Kohda, Masaya; Modak, Tannoy.
Constraining a lighter exotic scalar via same-sign top.
PHYSICS LETTERS B (2018)
- Haisch, Ulrich; Polesello, Giacomo.
Searching for heavy Higgs bosons in the $t\bar{t}$ over $t\bar{t}$ and $t\bar{t}$ final states.
JOURNAL OF HIGH ENERGY PHYSICS (2018)

View All

Use in Web of Science

Web of Science Usage Count

7

31

Last 180 Days

Since 2013

Learn more

This record is from:

Web of Science Core Collection
- Science Citation Index Expanded

Suggest a correction

If you would like to improve the quality of the data in this record, please suggest a correction.

- + [16] Beihang Univ, Beijing, Peoples R China
- + [17] Inst High Energy Phys, Beijing, Peoples R China
- + [18] Peking Univ, State Key Lab Nucl Phys & Technol, Beijing, Peoples R China
- + [19] Tsinghua Univ, Beijing, Peoples R China
- + [20] Univ Los Andes, Bogota, Colombia
- + [21] Univ Split, Fac Elect Engrn Mech Engrn & Naval Architecture, Split, Croatia
- + [22] Univ Split, Fac Sci, Split, Croatia
- + [23] Rudjer Boskovic Inst, Zagreb, Croatia
- + [24] Univ Cyprus, Nicosia, Cyprus
- + [25] Charles Univ Prague, Prague, Czech Republic
- [26] Univ San Francisco Quito, Quito, Ecuador
- + [27] Arab Republ Egypt, Acad Sci Res & Technol, Egyptian Network High Energy Phys, Cairo, Egypt
- + [28] NICPB, Tallinn, Estonia
- + [29] Univ Helsinki, Dept Phys, Helsinki, Finland
- + [30] Helsinki Inst Phys, Helsinki, Finland
- + [31] Lappeenranta Univ Technol, Lappeenranta, Finland
- + [32] Univ Paris Saclay, IRFU, CEA, Gif Sur Yvette, France
- + [33] Univ Paris Saclay, CNRS IN2P3, Lab Leprince Ringuet, Ecole Polytech, Palaiseau, France
- + [34] Univ Strasbourg, CNRS, IPHC UMR 7178, F-67000 Strasbourg, France
- + [35] Inst Natl Phys Nucl & Phys Particules, Ctr Calcul, CNRS IN2P3, Villeurbanne, France
- + [36] Univ Claude Bernard Lyon 1, Univ Lyon, CNRS IN2P3, Inst Phys Nucl Lyon, Villeurbanne, France
- + [37] Georgian Tech Univ, Tbilisi, Rep of Georgia
- + [38] Tbilisi State Univ, Tbilisi, Rep of Georgia
- + [39] Rhein Westfal TH Aachen, Phys Inst 1, Aachen, Germany
- + [40] Rhein Westfal TH Aachen, Phys Inst A 3, Aachen, Germany
- + [41] Rhein Westfal TH Aachen, Phys Inst B 3, Aachen, Germany
- + [42] DESY, Hamburg, Germany
- + [43] Univ Hamburg, Hamburg, Germany
- [44] Inst Expt Kernphys, Karlsruhe, Germany
- + [45] NCSR Demokritos, INPP, Aghia Paraskevi, Greece
- + [46] Univ Athens, Athens, Greece
- + [47] Natl Tech Univ Athens, Athens, Greece
- + [48] Univ Ioannina, Ioannina, Greece
- + [49] Eotvos Lorand Univ, MTA ELTE Lendulet CMS Particle & Nucl Phys Grp, Budapest, Hungary
- + [50] Wigner Res Ctr Phys, Budapest, Hungary
- + [51] Inst Nucl Res ATOMKI, Debrecen, Hungary
- + [52] Univ Debrecen, Inst Phys, Debrecen, Hungary
- + [53] Indian Inst Sci IISc, Bangalore, Karnataka, India
- + [54] Natl Inst Sci Educ & Res, Bhubaneswar, Orissa, India
- + [55] Panjab Univ, Chandigarh, India
- [56] Univ Delhi, Delhi, India
- + [57] Saha Inst Nucl Phys, HBNL, Kolkata, India
- + [58] Indian Inst Technol Madras, Madras, Tamil Nadu, India
- + [59] Bhabha Atom Res Ctr, Bombay, Maharashtra, India
- + [60] Tata Inst Fundamental Res A, Bombay, Maharashtra, India
- + [61] Tata Inst Fundamental Res B, Bombay, Maharashtra, India
- + [62] IISER, Pune, Maharashtra, India
- [63] Inst Res Fundamental Sci IPM, Tehran, Iran
- + [64] Univ Coll Dublin, Dublin, Ireland