Observation of Top Quark Production in Proton-Nucleus Collisions

A. M. Sirunyan et al. (CMS Collaboration)
Phys. Rev. Lett. 119, 242001 – Published 14 December 2017

PHYSICS
See Synopsis Top Quark in Nuclear Collisions

ABSTRACT

The first observation of top quark production in proton-nucleus collisions is reported using proton-lead data collected by the CMS experiment at the CERN LHC at a nucleus-nucleus center-of-mass energy of 5.02 TeV. The measurement is performed using events with exactly one isolated electron.
Search for electroweak production of charginos and neutralinos in multilepton final states in proton-proton collisions at $\sqrt{s} = 13$ TeV

The CMS collaboration, A. M. Sandelin, L. N. Woods
Journal of High Energy Physics, 2018, Article number: 146 (2018) | Click this article
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ABSTRACT

Results are presented from a search for the direct electroweak production of charginos and neutralinos in signatures with either two or more leptons (electrons or muons) of the same electric charge, or with three or more leptons, which can include up to two hadronically decaying bottom quarks. The analysis is based on a data sample corresponding to an integrated luminosity of 36.1 fb$^{-1}$ of proton-proton collisions at $\sqrt{s} = 13$ TeV recorded with the CMS detector at the CERN LHC. The results are interpreted in the context of the Minimal Supersymmetric Standard Model (MSSM) and the Simplified Model (SMM). The published paper provides a detailed description of the analysis and the results.
Combination of inclusive and differential $t\bar{t}$ charge asymmetry measurements using ATLAS and CMS data at $\sqrt{s} = 7$ and 8 TeV

The ATLAS collaboration, M. Aboub, L. H. Woods

Journal of High Energy Physics 2018 Article number: 33 (2018) | Cite this article

ABSTRACT

This paper presents combinations of inclusive and differential measurements of the charge asymmetry ($A_C$) in top quark pair ($t\bar{t}$) events with a lepton-jets signature by the ATLAS and CMS Collaborations, using data from LHC proton-proton collisions at centre-of-mass energies
Search for Higgsino pair production in $pp$ collisions at $\sqrt{s} = 13$ TeV in final states with large missing transverse momentum and two Higgs bosons decaying via $H \rightarrow bb$

A. M. Strumia et al. (CMS Collaboration)

Phys. Rev. D 97, 032007 – Published 8 February 2018

Abstract

Results are reported from a search for new physics in 13 TeV proton-proton collisions in the final state.
Search for Evidence of the Type-III Seesaw Mechanism in Multi-lepton Final States in Proton-Proton Collisions at \( \sqrt{s} = 13 \) TeV

A. M. Strumia et al. (CMS Collaboration)
Phys. Rev. Lett. 119, 221802 – Published 1 December 2017

ABSTRACT

A search for a signal consistent with the type-III seesaw mechanism in events with three or more leptons and missing mass is presented. The data sample consists of proton-proton collisions at \( \sqrt{s} = 13 \) TeV.
Principal-component analysis of two-particle azimuthal correlations in PbPb and pPb collisions at CMS

A. M. Sirunyan et al. (CMS Collaboration)

phys. rev. c 96, 064902 – published 9 december 2017

Abstract

For the first time a principal component analysis is used to separate out different orthogonal modes of the two-particle correlation matrix from heavy ion collisions. The analysis uses data from...
Measurement of vector boson scattering and constraints on anomalous quartic couplings from events with four leptons and two jets in proton–proton collisions at $\sqrt{s} = 13\text{TeV}$

The CMS Collaboration

Abstract

Introduction

The CMS detector

Signal and background simulation

Event selection

Background estimation

Systematic uncertainties

Search for WWZ production

Limits on anomalous quartic gauge couplings

Summary

Acknowledgements

Research Data

References

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Search for supersymmetry in events with at least one photon, missing transverse momentum, and large transverse event activity in proton-proton collisions at $\sqrt{s} = 13$ TeV

The CMS collaboration A. M. Greiner, L. N. Woods

Journal of High Energy Physics 2017, Article number: 142 (2017) Cite this article

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ABSTRACT

A search for physics beyond the standard model in final states with at least one photon, large
Measurement of the differential cross sections for the associated production of a $W$ boson and jets in proton-proton collisions at $\sqrt{s} = 13$ TeV

A. M. Strumia et al. (CMS Collaboration)
Phys. Rev. D 96, 072005 – Published 27 October 2017

ABSTRACT
A measurement of the differential cross sections for a $W$ boson produced in association with jets in the muon decay channel is presented. The measurement is based on 13 TeV proton-proton collision data.
Search for direct production of supersymmetric partners of the top quark in the all-jets final state in proton-proton collisions at $\sqrt{s} = 13$ TeV

The CMS collaboration, A. M. Sirunyan, L. N. Woods

Journal of High Energy Physics, 2017. Article number: 5 (2017) | Cite this article

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ABSTRACT

A search for direct production of top squark pairs in events with jets and large transverse momentum imbalance is presented. The data are based on proton-proton collisions at a
Search for heavy resonances that decay into a vector boson and a Higgs boson in hadronic final states at $\sqrt{s} = 13$ TeV

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Saha Institute of Nuclear Physics, HBNI, Kolkata, India
Constraints on anomalous Higgs boson couplings using production and decay information in the four-lepton final state

The CMS Collaboration

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Search for electroweak production of charginos and neutralinos in WH events in proton-proton collisions at $\sqrt{s} = 13 \text{ TeV}$

Regular Article - Experimental Physics | Open Access | Published: 08 November 2017

Results are reported from a search for physics beyond the standard model in proton-proton collision events with a charged lepton (electron or muon), two jets identified as originating from a single top quark, and at least one lepton from a Higgs boson decay.
Measurements of properties of the Higgs boson decaying into the four-lepton final state in pp collisions at $\sqrt{s} = 13$ TeV

Abstract

Properties of the Higgs boson are measured in the $H \rightarrow ZZ \rightarrow 4f$ ($f = e^-, \mu^-$) decay channel. A data sample of proton-proton collisions at $\sqrt{s} = 13$ TeV, collected with the CMS detector at

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Saha Institute of Nuclear Physics, HBNI, Kolkata, India
Search for a heavy composite Majorana neutrino in the final state with two leptons and two quarks at $\sqrt{s} = 13$ TeV

The CMS Collaboration

https://doi.org/10.1016/j.physletb.2017.11.001

Abstract

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Search for top squark pair production in pp collisions at $\sqrt{s} = 13$ TeV using single lepton events

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Saha Institute of Nuclear Physics, HBNI, Kolkata, India
Searches for W' bosons decaying to a top quark and a bottom quark in proton-proton collisions at 13 TeV

The CMS collaboration, A. M. Strom, L. N. Woods

Journal of High Energy Physics 2017, Article number: 29 (2017) | Cite this article

ABSTRACT

Searches are presented for heavy gauge bosons decaying into a top and a bottom quark in data collected by the CMS experiment at \(\sqrt{s} = 13\) TeV that correspond to an integrated luminosity of 2.2 and 2.6 fb\(^{-1}\) in the leptonically and hadronically decaying top quark states, respectively. Two final states are considered, where the bottom quark decays semileptonically and the top quark decays hadronically or semileptonically.

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Saha Institute of Nuclear Physics, HBNI, Kolkata, India
Search for pair production of vector-like T and B quarks in single-lepton final states using boosted jet substructure in proton-proton collisions at $\sqrt{s} = 13$ TeV

The CMS collaboration, A. M. Gumyars, and N. Woods


A search for pair production of massive vector-like T and B quarks in proton-proton collisions.
Search for dark matter produced in association with heavy-flavor quark pairs in proton-proton collisions at $\sqrt{s} = 13$ TeV

A. M. Sirunyan, A. Tumasyan, I. CMS Collaboration

The European Physical Journal C 57, Article number: 845 (2017) | Cite this article
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Abstract

A search is presented for an excess of events with heavy-flavor quark pairs (tt and bb) and a large imbalance in transverse momentum in data from proton-proton collisions at a center-of-mass energy of 13 TeV.
Search for top quark partners with charge $5/3$ in proton-proton collisions at $\sqrt{s} = 13$ TeV

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Saha Institute of Nuclear Physics, HBNI, Kolkata, India
Search for Low Mass Vector Resonances Decaying to Quark-Antiquark Pairs in Proton-Proton Collisions at $\sqrt{s} = 13$ TeV

A. M. Sirunyan et al. (CMS Collaboration)
Phys. Rev. Lett. 119, 111802 – Published 19 September 2017

ABSTRACT

A search is reported for a narrow vector resonance decaying to quark-antiquark pairs in proton-proton collisions at $\sqrt{s} = 13$ TeV, collected with the CMS detector at the LHC. The data sample corresponds to an integrated luminosity of 2.7 fb$^{-1}$. The vector resonance is produced at large transverse momenta, with its decay products merged into a single jet. The resulting signature is a peak over the background determined from data.
Combination of searches for heavy resonances decaying to WW, WZ, ZZ, WH, and ZH boson pairs in proton–proton collisions at √s = 8 and 13 TeV

The CMS Collaboration

A statistical combination of searches is presented for massive resonances decaying to WW, WZ, ZZ, WH, and ZH boson pairs in proton–proton collisions at √s = 8 and 13 TeV. The combination is performed using data corresponding to an integrated luminosity of 35.9 and 36.1 fb−1 at √s = 8 and 13 TeV, respectively, recorded with the CMS detector at the LHC.
Search for new phenomena with the $M_\tau^2$ variable in the all-hadronic final state produced in proton–proton collisions at $\sqrt{s} = 13$ TeV

A. M. Sirunyan, A. Tumasyan, and CMS Collaboration

The European Physical Journal C, 77, Article number: 710 (2017) | Cite this article
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Abstract

A search for new phenomena is performed using events with jets and significant transverse momentum imbalance, as inferred through the $M_\tau^2$ variable. The results are based on a
PHYSICAL REVIEW LETTERS

Measurement of the $B^0$ Meson Nuclear Modification Factor in Pb-Pb Collisions at $\sqrt{s_{NN}} = 5.02$ TeV

A. M. Sirunyan et al. (CMS Collaboration)
Phys. Rev. Lett. 119, 152301 – Published 13 October 2017

Abstract

The differential production cross sections of $B^0$ mesons are measured via the exclusive decay channels $B^0 \rightarrow J/\psi K^0 \rightarrow \mu^+ \mu^- K^0$ as a function of transverse momentum in $pp$ and $Pb-Pb$ collisions at a center-of-mass energy of $\sqrt{s_{NN}}=5.02$ TeV per nucleon pair with the CMS detector at the LHC. The $pp$(Pb-Pb) data set used for this analysis corresponds to an integrated luminosity of...
Physical Review Letters

Search for Supersymmetry in \( pp \) Collisions at \( \sqrt{s} = 13 \) TeV in the Single-Lepton Final State Using the Sum of Masses of Large-Radius Jets

A. M. Sirunyan et al. (CMS Collaboration)

Phys. Rev. Lett. 119, 151802 – Published 13 October 2017

Abstract

Results are reported from a search for supersymmetric particles in proton-proton collisions in the final state with a single lepton, multiple jets, including at least one \( b \)-tagged jet, and large missing transverse momentum. The search uses a sample of proton-proton collision data at \( \sqrt{s} = 13 \) TeV recorded by the CMS experiment at the LHC.
Search for supersymmetry in multijet events with missing transverse momentum in proton-proton collisions at 13 TeV

A. M. Shurynev et al. (CMS Collaboration)
Phys. Rev. D 96, 032003 – Published 25 August 2017

ABSTRACT

A search for supersymmetry is presented based on multijet events with large missing transverse momentum produced in proton-proton collisions at a center-of-mass energy of √s = 13 TeV. The data, corresponding to an integrated luminosity of 35.8 fb⁻¹, were collected with the CMS detector at the CERN LHC in 2016. The analysis utilizes four-dimensional exclusive signal regions defined in terms of the number of jets, the number of tagged bottom-quark jets, the scalar sum of jet transverse momenta, and the magnitude of the vector sum of jet transverse momenta. No evidence for a significant excess of events is observed relative to the expectation from the standard model. Limits on the cross sections for the pair production of gluinos and squarks are derived in the context of simplified models. Assuming the lightest supersymmetric particle to be a weakly interacting neutralino, 95% confidence level lower limits on the gluino mass as large as 1500 to 1600 GeV are derived, and on the squark mass as large as 950 to 1390 GeV, depending on the production and decay scenario.

Search for physics beyond the standard model in events with two leptons of same sign, missing transverse momentum, and jets in proton–proton collisions at $\sqrt{s} = 13$ TeV


The European Physical Journal C, 77, Article number: 578 (2017) | Cite this article

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Abstract

A data sample of events from proton–proton collisions with two isolated same-sign leptons,
Regular Article - Experimental Physics | Open Access | Published: 03 July 2017

Search for $t\bar{t}$ resonances in highly boosted lepton-jets and fully hadronic final states in proton-proton collisions at $\sqrt{s} = 13$ TeV

The CMS collaboration  A. M. Stranay | J. N. Woods


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ABSTRACT

A search for the production of heavy resonances decaying into top quark-antiquark pairs is presented. The analysis is performed in the lepton+jets and fully hadronic channels using data
Measurement of the mass difference between top quark and antiquark in pp collisions at $\sqrt{s} = 8$ TeV

The CMS Collaboration

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Journal of Instrumentation

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The CMS trigger system
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Published 24 January 2017 • CERN 2017 for the benefit of the CMS collaboration.
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Abstract
This paper describes the CMS trigger system and its performance during Run 1 of the LHC. The trigger system is designed to identify the

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Jet energy scale and resolution in the CMS experiment in pp collisions at 8 TeV
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Abstract

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University of California, San Diego, La Jolla, USA.
Measurement of the transverse momentum spectra of weak vector bosons produced in proton-proton collisions at $\sqrt{s} = 8$ TeV

The CMS collaboration, Y. Khachatryan, J. N. Woods

Abstract: The transverse momentum spectra of weak vector bosons are measured in the CMS experiment at the LHC. The measurement uses a sample of proton-proton collisions at $\sqrt{s} = 8$ TeV. The data are compared to predictions from various theoretical models, and the results are used to constrain the electroweak parameters. The measurements provide valuable insights into the properties of the weak bosons and the electroweak interactions.
Measurements of the $t\bar{t}$ production cross section in lepton+jets final states in pp collisions at 8 TeV and ratio of 8 to 7 TeV cross sections

V. Khachatryan, A. M. Sirunyan, L. ATLAS Collaboration

The European Physical Journal C 77, Article number: 15 (2017) | Cite this article

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Abstract

A measurement of the top quark pair production ($t\bar{t}$) cross section in proton–proton collisions at the centre–of–mass energy of 8 TeV is presented using data collected with the CMS detector.

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Fluorescent biogenic Schiff base compounds of dimethylditin†

Navyot Singh, a Neha Srivastav, a Raghubir Singh, a Varinder Kaur, b Erica Brendler, c Jörg Wagler d and Edwin Kroke d

Author affiliations

Abstract

Herein, biologically crucial amino acids have been explored for the synthesis of fluorescent organotin compounds. One-pot reaction of dimethylditin oxide, 2-hydroxy-4-methoxybenzophenone and α-amino acids, i.e., glycine, L-isoleucine and L-methionine, afforded respective organotin compounds with biogenic Schiff base skeletons 1–3. Although all the compounds were constituted from similar ONO type Schiff base units, only compound 1 (derived from glycine) crystallized as a hexacoordinated organotin compound of the type (ONO)SnMe₂(MeOH) with a tridentate chelating Schiff base ligand. Analogous syntheses with L-isoleucine and L-methionine did not afford the related Schiff base compounds 2 and 3. Instead, some kind of precursors, namely 2′ and 3′, crystallized as solvent mediated Sn₄O₄ ladders and two Schiff base ligand moieties bound to the terminal Sn atoms via carboxylate moiety only. Interestingly, solution NMR spectroscopy (¹H, ¹³C, ¹¹⁹Sn) of 1 unambiguously complied with its solid state structure while for 2′ and 3′ the behaviour was entirely different suggesting their transformation to mononuclear compounds 2 and 3 in solution phase. The distinctive structural aspects of 2′/2 and 3′/3 in solid and solution phase were also supported by solid state ¹¹⁹Sn CP/MAS NMR studies. All the compounds were found to be fluorescent when excited at 365 nm and the solutions of compound 3′ experienced quenching in the presence of paramagnetic metal ions due to chelation enhanced quenching.