Measurement of differential cross sections for the production of top quark pairs and of additional jets in lepton plus jets events from pp collisions at root s=13 TeV

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Abstract

Differential and double-differential cross sections for the production of top quark pairs in proton-proton collisions at root s = 13 TeV are measured as a function of kinematic variables of the top quarks and the top quark-antiquark (t (t) over bar) system. In addition, kinematic variables and multiplicities of jets associated with the t (t) over bar production are measured. This analysis is based on data collected by the CMS experiment at the LHC in 2016 corresponding to an integrated luminosity of 35.8 fb(-1). The measurements are performed in the lepton + jets decay channels with a single muon or electron and jets in the final state. The differential cross sections are presented at the particle level, within a phase space close to the experimental acceptance, and at the parton level in the full phase space. The results are compared to several standard model predictions that use different methods and approximations. The kinematic variables of the top quarks and the t (t) over bar system are reasonably described in general, though none predict all the measured distributions. In particular, the transverse momentum distribution of the top quarks is more steeply falling than predicted. The kinematic distributions and multiplicities of jets are adequately modeled by certain combinations of next-to-leading-order calculations and parton shower models.

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Cited References: 61

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1. **Search for dark matter at root s=13 TeV in final states containing an energetic photon and large missing transverse momentum with the ATLAS detector** Times Cited: 29
   By: Aaboud, M.; Aad, G.; Abbott, B.; et al.
   Group Author(s): ATLAS Collaboration
   EUROPEAN PHYSICAL JOURNAL C Volume: 77 Issue: 6 Article Number: 393 Published: JUN 14 2017

2. **Inclusive analysis of the b quark fragmentation function in Z decays at LEP** Times Cited: 74
   By: Abbiendi, G; Ainsley, C; Akesson, PF; et al.
   Group Author(s): OPAL Collaboration
   EUROPEAN PHYSICAL JOURNAL C Volume: 29 Issue: 4 Pages: 463-478 Published: AUG 2003

3. **A study of the b-quark fragmentation function with the DELPHI detector at LEP I and an averaged distribution obtained at the Z Pole** Times Cited: 24
   By: Abdallah, J.; Abreu, P.; Adam, W.; et al.
   EUROPEAN PHYSICAL JOURNAL C Volume: 71 Issue: 2 Article Number: 1557 Published: FEB 2011

4. **Measurement of the b-quark fragmentation function in Z(0) decays** Times Cited: 83
   By: Abe, K; Abe, K; Abe, T; et al.
   Group Author(s): SLD Collaboration
   PHYSICAL REVIEW D Volume: 65 Issue: 9 Article Number: 092006 Part: A Published: MAY 1 2002

5. **GEANT4-a simulation toolkit** Times Cited: 10,211
   By: Agostinelli, S; Allison, J; Amako, K; et al.
   NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT Volume: 506 Issue: 3 Pages: 250-303 Published: JUL 1 2003

6. **A general framework for implementing NLO calculations in shower Monte Carlo programs: the POWHEG BOX** Times Cited: 836
   By: Alioli, Simone; Nason, Paolo; Oleari, Carlo; et al.
   JOURNAL OF HIGH ENERGY PHYSICS Issue: 6 Article Number: 043 Published: JUN 2010

7. **The automated computation of tree-level and next-to-leading order differential cross sections, and their matching to parton shower simulations** Times Cited: 1,798
   By: Alwall, J.; Frederix, R.; Frixione, S.; et al.
   JOURNAL OF HIGH ENERGY PHYSICS Issue: 7 Article Number: 079 Published: JUL 17 2014

8. **CMS and D0 Collaborations, First combination of Tevatron and LHC measurements of the top-quark mass** Times Cited: 30
   Group Author(s): ATLAS, CDF
   arXiv:1403. 4427

9. **Measurements of top- quark pair differential cross- sections in the eμ channel in pp collisions at v s = 13TeV using the ATLAS** Times Cited: 8

detector
Group Author(s): ATLAS collaboration
Eur. Phys. J. Volume: C77 Pages: 292 Published: 2017

10. **Measurements of top-quark pair differential cross-sections in the lepton + jets channel in pp collisions at p s = 8 TeV using the ATLAS detector** Times Cited: 22
Group Author(s): ATLAS collaboration
Eur. Phys. J Volume: C 76 Pages: 538 Published: 2016
IN SPIRE

11. **Differential top-antitop cross-section &RADIC;s = 7 TeV** Times Cited: 1
Group Author(s): ATLAS Collaboration
Eur. Phys. J. C Volume: 73 Pages: 2339 Published: 2013

12. **Measurement of jet activity in top quark events using the eμ final state with two b-tagged jets in pp collisions at &RADIC;s = 8 TeV with the ATLAS detector** Times Cited: 1
Group Author(s): ATLAS Collaboration
J. High Energy Phys. Volume: 09 Article Number: 074 Published: 2016

13. **Measurement of top quark pair differential cross-sections in the dilepton channel in pp collisions at &RADIC;s = 7 and 8 TeV with ATLAS** Times Cited: 1
Group Author(s): ATLAS Collaboration
Phys. Rev. D Volume: 94 Article Number: 092003 Published: 2016

14. Title: [not available] Times Cited: 4
Group Author(s): ATLAS Collaboration
Phys. Rev. D Volume: 93 Article Number: 032009 Published: 2016

15. **Measurement of the Inelastic Proton-Proton Cross Section at &RADIC;s = 13 TeV with the ATLAS Detector at the LHC** Times Cited: 4
Group Author(s): ATLAS Collaboration
Phys. Rev. Lett. Volume: 117 Article Number: 182002 Published: 2016

16. **Herwig plus plus physics and manual** Times Cited: 888
By: Baehr, Manuel; Gieseke, Stefan; Gigg, Martyn A.; et al.
EUROPEAN PHYSICAL JOURNAL C Volume: 58 Issue: 4 Pages: 639-707 Published: DEC 2008

17. **Parton distributions for the LHC run II** Times Cited: 581
By: Ball, Richard D.; Bertone, Valerio; Carrazza, Stefano; et al.
Group Author(s): NNPDF Collaboration
JOURNAL OF HIGH ENERGY PHYSICS Issue: 4 Article Number: 040 Published: APR 8 2015

18. **Analytic solutions for neutrino momenta in decay of top quarks** Times Cited: 10
By: Betchart, Burton A.; Demina, Regina; Harel, Amnon
NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT Volume: 736 Pages: 169-178 Published: FEB 1 2014

19. Title: [not available] Times Cited: 330
By: CACCIARI M
J HIGH ENERGY PHYS Published: 2008

20. **FastJet user manual** Times Cited: 1,560
By: Cacciari, Matteo; Salam, Gavin P.; Soyez, Gregory
EUROPEAN PHYSICAL JOURNAL C Volume: 72 Issue: 3 Article Number: 1896 Published: MAR 2012

21. **Top-pair production and decay at NLO matched with parton showers** Times Cited: 52
By: Campbell, John M.; Ellis, R. Keith; Nason, Paolo; et al.
JOURNAL OF HIGH ENERGY PHYSICS Issue: 4 Article Number: 114 Published: APR 21 2015

22. **Scattering Amplitudes with Open Loops** Times Cited: 327
By: Cascioli, F.; Maierhoefer, P.; Pozzorini, S.
PHYSICAL REVIEW LETTERS Volume: 108 Issue: 11 Article Number: 111601 Published: MAR 12 2012

23. **Measurement of differential top-quark-pair production cross sections in pp collisions at root s=7 TeV** — Times Cited: 78
By: Chatrchyan, S.; Khachatryan, V.; Sirunyan, A. M.; et al.
Group Author(s): CMS Collaboration
EUROPEAN PHYSICAL JOURNAL C Volume: 73 Issue: 3 Article Number: 2339 Published: MAR 2013

24. **Performance of CMS muon reconstruction in pp collision events at root s=7Tev** — Times Cited: 337
By: Chatrchyan, S.; Khachatryan, V.; Sirunyan, A. M.; et al.
Group Author(s): CMS Collaboration
JOURNAL OF INSTRUMENTATION Volume: 7 Article Number: P10002 Published: OCT 2012

25. **The CMS experiment at the CERN LHC** — Times Cited: 1,505
By: Chatrchyan, S.; Hmayakyan, G.; Khachatryan, V.; et al.
Group Author(s): CMS Collaboration
JOURNAL OF INSTRUMENTATION Volume: 3 Article Number: S08004 Published: AUG 2008

26. Title: [not available] — Times Cited: 30
Group Author(s): CMS Collab
Tech. rep. CMS-PAS-BTV-15-001 Published: 2016
Publisher: CERN, Geneva

27. **Object definitions for top quark analyses at the particle level** — Times Cited: 1
Group Author(s): CMS Collaboration
CMS Note Report No. CERN-CMS-NOTE-2017-004 Published: 2017

28. **Investigations of the impact of the parton shower tuning in PYTHIA 8 in the modelling of tt at p s = 8 and 13 TeV** — Times Cited: 7
Group Author(s): CMS collaboration
CMS- PAS- TOP- 16- 021 Published: 2016

29. **CMS Luminosity measurement for the 2016 data taking period** — Times Cited: 3
Group Author(s): CMS Collaboration
CMS Physics Analysis Summary Report No. CMS-PAS-LUM-17-001 Published: 2017

30. **Measurement of the tt production cross section in the all-jets final state in pp collisions at p s = 8 TeV** — Times Cited: 21
Group Author(s): CMS collaboration
Eur. Phys. J. Volume: C 76 Pages: 128 Published: 2016

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