



Measurement of the top quark Yukawa coupling from t(t)over-bar kinematic distributions in the lepton plus jets final state in proton-proton collisions at root s=13 TeV

By: [Sirunyan, AM](#) (Sirunyan, A. M.)^[1]; [Tumasyan, A](#) (Tumasyan, A.)^[1]; [Adam, W](#) (Adam, W.)^[2]; [Ambroggi, F](#) (Ambroggi, F.)^[2]; [Asilar, E](#) (Asilar, E.)^[2]; [Bergauer, T](#) (Bergauer, T.)^[2]; [Brandstetter, J](#) (Brandstetter, J.)^[2]; [Dragicevic, M](#) (Dragicevic, M.)^[2]; [Ero, J](#) (Ero, J.)^[2]; [Del Valle, AE](#) (Del Valle, A. Escalante)^[2] ...[More](#)

Group Author(s): CMS Collaboration

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Abstract

Results are presented for an extraction of the top quark Yukawa coupling from top quark-antiquark (t (t) over bar) kinematic distributions in the lepton plus jets final state in proton-proton collisions, based on data collected by the CMS experiment at the LHC at root s = 13 TeV, corresponding to an integrated luminosity of 35.8 fb(-1). Corrections from weak boson exchange, including Higgs bosons, between the top quarks can produce large distortions of differential distributions near the energy threshold of t (t) over bar production. Therefore, precise measurements of these distributions are sensitive to the Yukawa coupling. Top quark events are reconstructed with at least three jets in the final state, and a novel technique is introduced to reconstruct the t (t) over bar system for events with one missing jet. This technique enhances the experimental sensitivity in the low invariant mass region, M-t (t) over bar. The data yields in M-t (t) over bar, the rapidity difference vertical bar y(t) - y((t) over bar)vertical bar, and the number of reconstructed jets are compared with distributions representing different Yukawa couplings. These comparisons are used to measure the ratio of the top quark Yukawa coupling to its standard model predicted value to be 1.07(-0.43)(+0.34) with an upper limit of 1.67 at the 95% confidence level.

Keywords

KeyWords Plus: [PAIR](#); [THRESHOLD](#)

Author Information

Reprint Address: Sirunyan, AM (reprint author)

[+](#) Yerevan Phys Inst, Yerevan, Armenia.

Addresses:

- [+](#) [1] Yerevan Phys Inst, Yerevan, Armenia
- [2] Inst Hochenergiephys, Vienna, Austria
- [+](#) [3] Inst Nucl Problems, Minsk, BELARUS
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Mobility Plus program of the Ministry of Science and Higher Education (Poland)	Harmonia 2014/14/M/ST2/00428 Opus 2014/13/B/ST2/02543 2014/15/B/ST2/03998 2015/19/B/ST2/02861 Sonata-bis 2012/07/E/ST2/01406
National Science Center (Poland)	Harmonia 2014/14/M/ST2/00428 Opus 2014/13/B/ST2/02543 2014/15/B/ST2/03998 2015/19/B/ST2/02861 Sonata-bis 2012/07/E/ST2/01406
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