Constraints on models of scalar and vector leptoquarks decaying to a quark and a neutrino at root s=13 TeV

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PHYSICAL REVIEW D
Volume: 98 Issue: 3
Article Number: 032005
DOI: 10.1103/PhysRevD.98.032005
Published: AUG 10 2018
Document Type: Article
View Journal Impact

Abstract

The results of a previous search by the CMS Collaboration for squarks and gluinos are reinterpreted to constrain models of leptoquark (LQ) production. The search considers jets in association with a transverse momentum imbalance, using the M-T2 variable. The analysis uses proton-proton collision data at root s = 13 TeV, recorded with the CMS detector at the LHC in 2016 and corresponding to an integrated luminosity of 35.9 fb(-1). Leptoquark pair production is considered with LQ decays to a neutrino and a top, bottom, or light quark. This reinterpretation considers higher mass values than the original CMS search to constrain both scalar and vector LQs. Limits on the cross section for LQ pair production are derived at the 95% confidence level depending on the LQ decay mode. A vector LQ decaying with a 50% branching fraction to t nu, and 50% to b tau, has been proposed as part of an explanation of anomalous flavor physics results. In such a model, using only the decays to t nu, LQ masses below 1530 GeV are excluded assuming the Yang-Mills case with coupling kappa = 1, or 1115 GeV in the minimal coupling case kappa = 0, placing the most stringent constraint to date from pair production of vector LQs.

Keywords

KeyWords Plus: P(P)OVER-BAR COLLISIONS; PAIR PRODUCTION; SUPERGAUGE TRANSFORMATIONS; HADRON COLLIDERS; SEARCH; SUPERSYMMETRY; LEPTON; SIGNATURES; INVARIANT; EXTENSION

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Funding

Funding Agency	Grant Number
BMWFW (Austria)	
FWF (Austria)	
FNRS (Belgium)	
FWO (Belgium)	
CNPq (Brazil)	
CAPES (Brazil)	
FAPERJ (Brazil)	
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Marie-Curie program (European Union)	
Horizon 2020 Grant (European Union)	675440
European Research Council (European Union)	
Leventis Foundation	
A. P. Sloan Foundation	
Alexander von Humboldt Foundation	
Belgian Federal Science Policy Office	
Fonds pour la Formation a la Recherche dans l'Industrie et dans l'Agriculture (FRIA-Belgium)	
Agentschap voor Innovatie door Wetenschap en Technologie (IWT-Belgium)	
F. R. S.-FNRS (Belgium)	
FWO (Belgium) under the "Excellence of Science-EOS"-be.h Project	30820817
Ministry of Education, Youth and Sports (MEYS) of the Czech Republic	
Hungarian Academy of Sciences (Hungary)	
New National Excellence Program UNKP (Hungary)	
NKFIA (Hungary)	123842 123959 124845 124850 125105
Council of Science and Industrial Research, India	
HOMING PLUS program of the Foundation for Polish Science (Poland)	
European Union, Regional Development Fund (Poland)	
Mobility Plus program of the Ministry of Science and Higher Education (Poland)	
National Science Center (Poland)	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 Priorities Research Program by Qatar National Research Fund	
Programa Estatal de Fomento de la Investigacion Cientifica y Tecnica de Excelencia Maria de Maeztu	MDM-2015-0509
Programa Severo Ochoa del Principado de Asturias	
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Greek NSRF	
Rachadapisek Sompot Fund for Postdoctoral Fellowship, Chulalongkorn University (Thailand)	
Chulalongkorn Academic into Its 2nd Century Project Advancement Project (Thailand)	
Welch Foundation	C-1845
Weston Havens Foundation (USA)	

View funding text

Publisher

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Categories / Classification

Research Areas: Astronomy & Astrophysics; Physics

Web of Science Categories: Astronomy & Astrophysics; Physics, Particles & Fields

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