

# Edgar Fernando Carrera Jarrín

Profesor Investigador de Física

## Información de Contacto:

Oficina H-310

Universidad San Francisco de Quito

Diego de Robles y Vía Interoceánica

Quito-Ecuador

☎(+593) 2 297-1700 ext. 1214

✉ ecarrera@cern.ch

✉ ecarrera@usfq.edu.ec

🌐 <http://physics.bu.edu/~caredg>

## FORMACIÓN ACADÉMICA

- Grado más alto obtenido:  
Ph.D. en Física, Mayo 2009 (Registro SENESCYT 4784R-11-710).  
Florida State University, Tallahassee, FL, US.  
DISERTACIÓN DOCTORAL:  
Tema: *Search for Large Extra Dimensions via Single Photon plus Missing Energy Final States.*  
Director: *Prof. Yuri Gershtein, Ph.D.*
- M.S. en Física, Abril 2006  
Florida State University, Tallahassee, FL, US.
- Físico, Abril 2004.  
Escuela Politécnica Nacional, Quito-Ecuador.

## EXPERIENCIA Y CARGOS LABORALES

- Investigador Titular Principal; Universidad San Francisco de Quito; 2016 – presente.  
Investigación en física de partículas en los experimentos CMS y LAGO. Docencia para las carreras de ingenierías y ciencias.
- Visiting Research Scientist; Boston University; 2011 – presente.  
Colaboración científica dentro del experimento CMS.
- Profesor de Física; Universidad San Francisco de Quito; 2012 – 2016.  
Docencia para carreras de ingeniería y ciencias, investigación en física de partículas en los experimentos CMS y LAGO.
- Investigador “Prometeo”; Universidad San Francisco de Quito, Escuela Politécnica Nacional y SENESCYT; 2011 – 2012.  
Actividades de docencia en dos universidades del país, actividades de investigación en física de partículas con el experimento CMS y diligencias encaminadas a formar grupos de investigación en el área.
- Postdoctoral Research Associate; Boston University; 2009 – 2010.  
Análisis de física de partículas en el experimento CMS. Responsabilidades como experto “on-call” para es subsistema de disparador.

- Graduate Research Assistant; Florida State University; 2005 – 2009.  
Análisis de física de partículas y servicio en los experimentos CMS y DØ.
- Graduate Teaching Assistant; Florida State University, 2004 – 2005.  
Mini-lecciones de laboratorio y demostraciones.

## EXPERIMENTOS E INTERÉS CIENTÍFICO

- Experimento CMS; Búsqueda de física más allá del modelo estándar, física del quark top, estudios de haces de prueba, estudios y operación de disparadores, estudios de monitoreo de haces; 2004 – 2006, 2009 – presente.
- Proyecto LAGO; Búsqueda de ráfagas de rayos gamma, física del clima espacial, desarrollo de detectores de partículas de bajo costo; 2011 – presente.
- Experimento DØ; Búsqueda de física más allá del modelo estándar, identificación de fotones, estudios de calorímetro; 2006 – 2009.

## EXPERIENCIA DOCENTE

- Departamento de Física, Universidad San Francisco de Quito, Quito-Ecuador. Profesor, cursos de Física General I y II, Física II para Ciencias, Óptica y Ondas, Termodinámica y Fluidos, Mecánica Cuántica I y II, Mecánica Estadística, Introducción a la Física Experimental de Altas Energías, Física Moderna.
- Departamento de Física, Escuela Politécnica Nacional, Quito-Ecuador. Profesor Invitado, curso “Física de Partículas”, 2011.
- Departamento de Física, Boston University; University of Geneva; CERN. Seminario en Métodos Computacionales y Análisis Estadístico en Física Experimental para alumnos de pregrado, junior y senior, en el programa de intercambio entre Boston University y University of Geneva. Dictado en el CERN, 2010.
- Departamento de Física, Florida State University. Principios fundamentales para alumnos de pregrado mediante mini-lecciones y demostraciones de laboratorio. 2004-2005.

## PUBLICACIONES MÁS DESTACADAS\*

- A. M. Sirunyan *et al.* (CMS Collaboration), “Search for Higgs boson pair production in the  $bb\tau\tau$  final state in proton-proton collisions at  $\sqrt{s} = 8$  TeV,” **Phys. Rev. D** **96**, no. 7, 072004 (2017).
- V. Khachatryan *et al.* (CMS Collaboration), “Search for Resonant Production of High-Mass Photon Pairs in Proton-Proton Collisions at  $\sqrt{s} = 8$  and 13 TeV,” **Phys. Rev. Lett.** **117**, no. 5, 051802 (2016).
- S. Chatrchyan *et al.* (CMS Collaboration), “A New Boson with a Mass of 125 GeV Observed with the CMS Experiment at the Large Hadron Collider,” **Science** **338**, 1569 (2012).
- S. Chatrchyan *et al.* (CMS Collaboration), “Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC,” **Phys. Lett. B** **716**, 30 (2012).
- Serguei Chatrchyan *et al.* (CMS Collaboration), “Search for a  $W'$  boson decaying to a muon and a neutrino in  $pp$  collisions at  $\sqrt{s} = 7$  TeV,” **Phys. Lett. B** **701**, 160-179 (2011).

- E. Carrera Jarrin (for the CMS Collaboration), “Performance of the CMS high-level trigger”, Preparada para la 35<sup>ta</sup> Conferencia Internacional de Altas Energías: ICHEP 2010, Paris, Francia, 21-28 Jul 2010, **PoS ICHEP2010:008**, 2010.
- G. Brooijmans *et al.*, “New Physics at the LHC”, A Les Houches Report: Physics at TeV Colliders 2009 - New Physics Working Group, May 7, 2010, **arXiv:1005.1229 [hep-ex]**.
- V.M. Abazov *et al.* (DØ Collaboration), “ $Z\gamma \rightarrow \nu\bar{\nu}\gamma$  production and limits on anomalous  $ZZ\gamma$  and  $Z\gamma\gamma$  couplings in  $p\bar{p}$  collisions at  $\sqrt{s} = 1.96$  TeV”, **Phys. Rev. Lett.** 102, 201802 (2009).
- V.M. Abazov *et al.* (DØ Collaboration), “Search for Large Extra Dimensions via Single Photon plus Missing Energy Final States at  $\sqrt{s} = 1.96$  TeV”, **Phys. Rev. Lett.** 101, 011601 (2008).

\*Para una lista completa de publicaciones visitar INSPIRE:

✉ <http://inspirehep.net/search?p=find+a+edgar+carrera+or+a+edgar+carrera+jarrin> o mirar la lista al final.

## PRESENTACIONES EN CONFERENCIAS INTERNACIONALES

- C. Mantilla *et al.*, *Implementing a WCD detector system in Ecuador as part of the LAGO Project*, póster presentado en el X Simposio Latinoamericano de Física de Altas Energías (SILAFEA). Noviembre, 2014. Proceedings en **Nucl. Part. Phys. Proc.** **267-269**, 430 (2015).
- E. Carrera (for the LAGO Collaboration), *Status and Perspectives of the LAGO Project*, presentada en el 5<sup>th</sup> Workshop on Air Shower Detection at High Altitude, Paris, Francia. Mayo 27, 2014.
- E. Carrera (for the CMS Collaboration) *Searching for a New Force of Nature with the CMS Detector*, **AIP Conf. Proc.** 1423, 198 (2012), <http://dx.doi.org/10.1063/1.3688803>. Presentada en el IX Simposio Latinoamericano de Física Nuclear y Aplicaciones, Quito, Ecuador. Julio 20, 2011.
- E. Carrera (for the CMS Collaboration) *Performance of the CMS High-Level Trigger*, **PoS ICHEP2010:008**, 2010. Presentada en la 35<sup>ta</sup> Conferencia Internacional de Altas Energías, Paris, Francia. Julio 22, 2010.
- E. Carrera (for the CMS Collaboration), *Exploring exotic symmetry breaking scenarios in the di-boson (WZ) channel at the LHC*, presentada en la Conferencia de Abril de la APS, Washington, DC. Febrero, 2010.
- E. Carrera (for the DØ Collaboration), *Physics with Single Photons plus Missing Energy Final States at DØ*, FERMILAB-CONF-09-278-PPD. Presentada en el Instituto de Invierno 2009 en Lake Louis, Lake Louise, Alberta, Canada. Febrero 19, 2009.
- E. Carrera (for the DØ Collaboration), *Searching for the elusive graviton*, **arXiv:0810.1331 [hep-ex]**, <http://www.slac.stanford.edu/econf/C080730/>. Póster presentado en la 34<sup>ta</sup> Conferencia Internacional de Altas Energías, Philadelphia, PA, USA. Julio 31, 2008.

- E. Carrera (for the  $D\bar{O}$  Collaboration), *Search for Large Extra Dimensions in the monophoton channel using the  $D\bar{O}$  detector*, presentada en la Simposio Pheno 2008, Madison, WI. Abril 29, 2008
- E. Carrera (for the  $D\bar{O}$  Collaboration), *Search for Large Extra Dimensions in the monophoton final state*, presentada en la Conferencia de Abril de la APS, St. Louis, MO. Abril 14, 2008.

### **BECAS PROFESIONALES**

- “LPC Guest and Visitors Program”, 2012-2015; Fermilab, US; Soporte otorgado semestralmente para viajes de investigación en física de partículas. Adjudicado por 6 ocasiones para mis estudiantes (estancias de 6 meses) y por 4 ocasiones para mi persona (estancias de 3 semanas), en el Centro LPC del Fermilab para el experimento CMS.
- “Programa CECIRA 2012-2013”, CEDIA (Cosorcio para el Internet Avanzado), Quito-Ecuador; Otorgado para la organización y desarrollo de un programa de capacitación en física de astropartículas para estudiantes y científicos ecuatorianos realizado a inicios del 2014.
- “CLAF Complementary Support”, CLAF (Centro Latinoamericano de Física), 2013; Otorgado como fondo complementario para programa de capacitación en física de astropartículas para estudiantes y científicos ecuatorianos.
- “Chancellor Grant 2012-2013”, Universidad San Francisco de Quito, Ecuador; Otorgado para el inicio de un nuevo proyecto de astropartículas denominado LAGO, como investigador principal.

### **PREMIOS Y RECONOCIMIENTOS**

- “Premio Matilde Hidalgo”, al mejor investigador emergente, Febrero 2017; otorgado por la Secretaría Nacional de Educación Superior, Ciencia, Tecnología e Innovación (SENESCYT).
- “Premio Politécnico al Emprendimiento”, Mayo 2016; otorgado por la Universidad San Francisco de Quito y el Colegio de Ciencias e Ingeniería.
- “Primer lugar en el ranking de científicos ecuatorianos en Google Scholar”, Marzo 2016, compilación realizada por Cybermetrics Lab. IPP. Consejo Superior de Investigaciones Científicas, España.

### **POSICIONES DE SERVICIO Y LIDERAZGO**

- “Team Leader” de la Universidad San Francisco de Quito; Experimento CMS; 2015 – presente.
- Representante del Ecuador; Experimento CMS; 2015 – presente.
- Miembro del Comité de Selección de los “Collaboration Grants”; Universidad San Francisco de Quito; 2013 – 2015.

### **EXPERIENCIA EN ORGANIZACIÓN DE EVENTOS CIENTÍFICOS**

- Miembro del Comité Internacional de Organización; “Primera Escuela de Verano COFI de Instrumentación y Técnicas de Análisis”; Julio 2016.

- Director Local; “8<sup>th</sup> CERN Latin American School of High Energy Physics (CLASHEP 2015)”;
- realizada en Ibarra, Ecuador; Marzo, 2015. Escuela de física de partículas con una duración de 13 días, impartida a más de 80 estudiantes de todo el mundo por profesores de gran prestigio internacional.
- Director; Escuela “Astropartículas en LAGO: Rayos Cósmicos, GRBs, y Física Solar”, realizada en Quito, Ecuador; Enero 2014. Escuela de una semana sobre física de astropartículas para 40 estudiantes y científicos de cuatro países sudamericanos, con profesores invitados de latinoamerica, expertos en el área.

## **ALUMNOS DE PREGRADO SUPERVISADOS Y DESTINO PROFESIONAL**

- Jorge Martínez (graduación 2017, Universidad San Francisco de Quito). Destino: Diplomado de Posgrado ICTP, Trieste, Italia (2017).
- Cristina Mantilla (graduación 2016, Escuela Politécnica Nacional). Destino: programa Ph.D. en física de partículas en Johns Hopkins University, Baltimore, EE.UU. (2016).
- Raquel Quishpe (graduación 2015, Universidad San Francisco de Quito). Destino: Ph.D program in particle physics en University of Houston, Houston, EE.UU. (2016).
- Santiago Paredes (graduación 2015, Universidad San Francisco de Quito). Destino: programa Ph.D. en física de partículas en Oxford University, Oxford, Inglaterra (2016).
- Daniel Guerrero (graduación 2015, Escuela Politécnica Nacional). Destino: programa Ph.D. en física de partículas en University of Florida, Gainesville, EE.UU. (2016).
- Alejandro Gómez (graduación 2012, Escuela Politécnica Nacional). Destino: obtained Ph.D. in particle physics from Rutgers University, New Jersey, EE.UU. (2018); posición posdoctoral aceptada en ETH, Zurich, Suiza (2018).

## **EXTENSIÓN Y VINCULACIÓN CON LA COMUNIDAD**

- Coordinador Nacional de la Red Quarknet. Organización y coordinación de un grupo de profesores de colegios ecuatorianos para el trabajo con detectores caseros de rayos cósmicos, con el objetivo de incrementar el interés local en física de partículas y motivar a los estudiantes hacia el área y ciencias afines; 2011-presente.
- Coordinador Nacional del Masterclass CMS. Organización y coordinación de actividades con profesores y alumnos de colegios ecuatorianos para el estudio pedagógico de datos reales publicados por la Colaboración CMS del CERN, con el objetivo de incrementar el interés local en el campo de física de partículas y las ciencias en general. 2013-presente.
- Profesor colaborador de la “Casa Abierta de Física” de la Universidad San Francisco de Quito, ofrecida anualmente para el beneficio de toda la comunidad. 2012-presente.

## **HABILIDADES COMPUTACIONALES**

Lenguajes de programación (C++, Python); scripting (Python, shell, Latex, CGI/HTML, CSS, AWK, PERL); sistemas operativos (Unix/Linux y Windows); paquetes matemáticos y de análisis físico (ROOT, Matlab/Octave, Maple, FLUKA).

## **IDIOMAS**

- Castellano: nativo
- Francés: básico
- Inglés: experto

## **ACTIVIDADES EXTRA-CURRICULARES**

- “Blogger” oficial para la bitácora “Quantum Diaries” <http://www.quantumdiaries.org/bio/?user=EdgarCarrera>, Oct 2009 - Mar 2010.
- Vicepresidente de la Asociación de Estudiantes de Física, Escuela Politécnica Nacional. Quito-Ecuador, 2003-2004.
- Deportes y Música

## Lista Completa de Publicaciones

1. “Measurement of vector boson scattering and constraints on anomalous quartic couplings from events with four leptons and two jets in proton–proton collisions at  $\sqrt{s} = 13$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1708.02812 [hep-ex]  
DOI:10.1016/j.physletb.2017.10.020  
Phys. Lett. B **774**, 682 (2017)  
CMS-SMP-17-006, CERN-EP-2017-177
2. “Search for a light pseudoscalar Higgs boson produced in association with bottom quarks in pp collisions at  $\sqrt{s} = 8$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1707.07283 [hep-ex]  
DOI:10.1007/JHEP11(2017)010  
JHEP **1711**, 010 (2017)  
CMS-HIG-15-009, CERN-EP-2017-159
3. “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. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1707.05979 [hep-ex]  
DOI:10.1103/PhysRevD.96.072005  
Phys. Rev. D **96**, no. 7, 072005 (2017)  
CMS-SMP-16-005, CERN-EP-2017-142
4. “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”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1707.03316 [hep-ex]  
DOI:10.1007/JHEP10(2017)005  
JHEP **1710**, 005 (2017)  
CMS-SUS-16-049, CERN-EP-2017-129
5. “Search for heavy resonances that decay into a vector boson and a Higgs boson in hadronic final states at  $\sqrt{s} = 13$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1707.01303 [hep-ex]  
DOI:10.1140/epjc/s10052-017-5192-z  
Eur. Phys. J. C **77**, no. 9, 636 (2017)  
CMS-B2G-17-002, CERN-EP-2017-128
6. “Constraints on anomalous Higgs boson couplings using production and decay information in the four-lepton final state”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1707.00541 [hep-ex]  
DOI:10.1016/j.physletb.2017.10.021  
Phys. Lett. B **775**, 1 (2017)  
CMS-HIG-17-011, CERN-EP-2017-143
7. “Search for Higgs boson pair production in the  $b\bar{b}\tau\tau$  final state in proton–proton collisions at  $\sqrt{s} = 8$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1707.00350 [hep-ex]  
DOI:10.1103/PhysRevD.96.072004  
Phys. Rev. D **96**, no. 7, 072004 (2017)  
CMS-HIG-215-013, CERN-EP-2017-104
8. “Measurements of properties of the Higgs boson decaying into the four-lepton final state in pp collisions at  $\sqrt{s} = 13$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1706.09936 [hep-ex]  
DOI:10.1007/JHEP11(2017)047  
JHEP **1711**, 047 (2017)  
CMS-HIG-16-041, CERN-EP-2017-123
9. “Measurement of the semileptonic  $t\bar{t} + \bar{t}s$  production cross section in pp collisions at  $\sqrt{s} = 8$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1706.08128 [hep-ex]  
DOI:10.1007/JHEP10(2017)006  
JHEP **1710**, 006 (2017)  
CMS-TOP-14-008, CERN-EP-2017-112
10. “Measurements of jet charge with dijet events in pp collisions at  $\sqrt{s} = 8$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1706.05868 [hep-ex]  
DOI:10.1007/JHEP10(2017)131  
JHEP **1710**, 131 (2017)  
CMS-SMP-15-003, CERN-EP-2017-085
11. “Particle-flow reconstruction and global event description with the CMS detector”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1706.04965 [physics.ins-det]  
DOI:10.1088/1748-0221/12/10/P10003  
JINST **12**, no. 10, P10003 (2017)  
CMS-PRF-14-001, CERN-EP-2017-110
12. “Search for top squark pair production in pp collisions at  $\sqrt{s} = 13$  TeV using single lepton events”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1706.04402 [hep-ex]  
DOI:10.1007/JHEP10(2017)019  
JHEP **1710**, 019 (2017)  
CMS-SUS-16-051, CERN-EP-2017-109
13. “Searches for  $W\bar{A}\bar{s}$  bosons decaying to a top quark and a bottom quark in proton–proton collisions at 13 TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1706.04260 [hep-ex]  
DOI:10.1007/JHEP08(2017)029  
JHEP **1708**, 029 (2017)  
CMS-B2G-16-016, CERN-EP-2017-090
14. “Search for new physics in the monophoton final state in proton–proton collisions at  $\sqrt{s} = 13$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1706.03794 [hep-ex]  
DOI:10.1007/JHEP10(2017)073  
JHEP **1710**, 073 (2017)  
CMS-EXO-16-039, CERN-EP-2017-097
15. “Search for top quark partners with charge 5/3 in proton–proton collisions at  $\sqrt{s} = 13$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1705.10967 [hep-ex]  
DOI:10.1007/JHEP08(2017)073  
JHEP **1708**, 073 (2017)  
CMS-B2G-15-006, CERN-EP-2017-102
16. “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].  
arXiv:1705.10532 [hep-ex]  
DOI:10.1103/PhysRevLett.119.111802  
Phys. Rev. Lett. **119**, no. 11, 111802 (2017)  
CMS-EXO-16-030, CERN-EP-2017-098
17. “Combination of searches for heavy resonances decaying to  $WW$ ,  $WZ$ ,  $ZZ$ ,  $WH$ , and  $ZH$  boson pairs in proton–proton collisions at  $\sqrt{s} = 8$  and 13 TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1705.09171 [hep-ex]  
DOI:10.1016/j.physletb.2017.09.083  
Phys. Lett. B **774**, 533 (2017)  
CMS-B2G-16-007, CERN-EP-2017-077
18. “Calibration of a large water–Cherenkov detector at the Sierra Negra site of LAGO”  
A. Galindo *et al.* [LAGO Collaboration].  
DOI:10.1016/j.nima.2017.03.055  
Nucl. Instrum. Meth. A **861**, 28 (2017).
19. “Measurement of the  $B^\pm$  Meson Nuclear Modification Factor in Pb–Pb Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1705.04727 [hep-ex]  
DOI:10.1103/PhysRevLett.119.152301  
Phys. Rev. Lett. **119**, no. 15, 152301 (2017)  
CMS-HIN-16-011, CERN-EP-2017-076
20. “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].  
arXiv:1705.04673 [hep-ex]  
DOI:10.1103/PhysRevLett.119.151802  
Phys. Rev. Lett. **119**, no. 15, 151802 (2017)  
CMS-SUS-16-037, CERN-EP-2017-088
21. “Search for new phenomena with the  $M_{T2}$  variable in the all-hadronic final state produced in proton–proton collisions at  $\sqrt{s} = 13$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1705.04650 [hep-ex]  
DOI:10.1140/epjc/s10052-017-5267-x  
Eur. Phys. J. C **77**, no. 10, 710 (2017)  
CMS-SUS-16-036, CERN-EP-2017-084
22. “Search for Charged Higgs Bosons Produced via Vector Boson Fusion and Decaying into a Pair of  $W$  and  $Z$  Bosons Using pp Collisions at  $\sqrt{s} = 13$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1705.02942 [hep-ex]  
DOI:10.1103/PhysRevLett.119.141802  
Phys. Rev. Lett. **119**, no. 14, 141802 (2017)  
CMS-HIG-16-027, CERN-EP-2017-068

23. “Measurement of the triple-differential dijet cross section in proton-proton collisions at  $\sqrt{s} = 8$  TeV and constraints on parton distribution functions”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1705.02628 [hep-ex]  
DOI:10.1140/epjc/s10052-017-5286-7  
Eur. Phys. J. C **77**, no. 11, 746 (2017)  
CMS-SMP-16-011, CERN-EP-2017-061
24. “Search for black holes in high-multiplicity final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1705.01403 [hep-ex]  
DOI:10.1016/j.physletb.2017.09.053  
Phys. Lett. B **774**, 279 (2017)  
CMS-EXO-15-007, CERN-EP-2017-074
25. “Search for supersymmetry in multijet events with missing transverse momentum in proton-proton collisions at 13 TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1704.07781 [hep-ex]  
DOI:10.1103/PhysRevD.96.032003  
Phys. Rev. D **96**, no. 3, 032003 (2017)  
CMS-SUS-16-033, CERN-EP-2017-072
26. “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”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1704.07323 [hep-ex]  
DOI:10.1140/epjc/s10052-017-5079-z  
Eur. Phys. J. C **77**, no. 9, 578 (2017)  
CMS-SUS-16-035, CERN-EP-2017-071
27. “Measurement of the top quark mass in the dileptonic  $t\bar{t}$  decay channel using the mass observables  $M_{b\ell}$ ,  $M_{T2}$ , and  $M_{b\ell\nu}$  in pp collisions at  $\sqrt{s} = 8$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1704.06142 [hep-ex]  
DOI:10.1103/PhysRevD.96.032002  
Phys. Rev. D **96**, no. 3, 032002 (2017)  
CMS-TOP-15-008, CERN-EP-2017-050
28. “Search for  $t\bar{t}$  resonances in highly boosted lepton+jet and fully hadronic final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1704.03366 [hep-ex]  
DOI:10.1007/JHEP07(2017)001  
JHEP **1707**, 001 (2017)  
CMS-B2G-16-015, CERN-EP-2017-049
29. “Measurements of the  $pp \rightarrow W\gamma\gamma$  and  $pp \rightarrow Z\gamma\gamma$  cross sections and limits on anomalous quartic gauge couplings at  $\sqrt{s} = 8$  TeV”  
A. M. Sirunyan *et al.* [CMS Collaboration].  
arXiv:1704.00366 [hep-ex]  
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