

Francesco Santanastasio

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Born: 9 February 1980 — Rome, Italy
Nationality: Italian

Current Position

Assistant Professor

Department of Physics, Sapienza Università di Roma, Rome, Italy

Areas of Specialization

Particle Physics, Data Analysis in High Energy Physics, Physics beyond the Standard Model of Fundamental Interactions, Electromagnetic and Hadronic Calorimetry

Employment History

- Mar 2014 - **Assistant Professor in Physics**
today *Sapienza Università di Roma*, Rome, Italy
- Sep 2011 - Dec 2013 **CERN Research Fellow in Experimental Particle Physics**
SUPERVISOR: Dott. Maurizio Pierini (CERN)
CERN, Geneve, Switzerland
- Dec 2007 - Aug 2011 **Post-Doctoral Research Assistant (Post-Doc) in Particle Physics**
SUPERVISOR: Prof. Sarah Eno (UMD)
University of Maryland, College Park, MD, US
Based at *CERN*, Geneve, Switzerland
- Nov 2004 - Jan 2008 **PhD in Physics**
“*Search for Supersymmetry with Gauge-Mediated Breaking using high energy photons at CMS experiment*” [51]
ADVISORS: Prof. Egidio Longo, Prof. Shahram Rahatlou, Dott. Daniele del Re (Sapienza)
Sapienza Università di Roma, Rome, Italy
- Sep 1998 - May 2004 **Laurea in Physics** (highest honors)
“*Calibration of an electromagnetic calorimeter using the energy flow method*” [52]
ADVISORS: Prof. Egidio Longo (Sapienza), Dott. Riccardo Paramatti (INFN)
Mark: 110/110 “*magna cum laude*”
Sapienza Università di Roma, Rome, Italy

Highlights of Research Activities

- Sep 2014 - Coordination of the “*Dijet Resonance Team*” of the CMS experiment: analysis group working on searches for massive resonances decaying into a pair of jets using the dijet mass spectrum. The group is constituted by more than 20 physicists from about 10 institutions from all the world. The target is to coordinate the activity of students and postdocs to prepare the analysis and publish the results in Summer 2015 with the first LHC proton-proton collisions at $\sqrt{s} = 13$ TeV. Thanks to the increase in the collider energy, the sensitivity to new physics above the TeV scale will be extended after few weeks of data taking compared to the LHC run at $\sqrt{s} = 8$ TeV.
- Jan 2013 - Jan 2015 Coordination of the “*Exotica Lepton+Jets Working Group*” of the CMS experiment: analysis group working on searches for new physics beyond the Standard Model in final states containing leptons and jets. The group, constituted by almost 50 physicists working in universities and research institutions from all the world, performs about 15 physics analyses in this final state. Since the beginning of my mandate, 3 publications and 3 preliminary analysis results have been delivered. The remaining analyses are currently in the final steps of the review within the CMS collaboration. In the first months of 2015, other ~ 10 publications in high impact scientific journals are expected.
- Dec 2011 - Sep 2014 Primary author of searches for heavy $WW / ZZ / WZ / qW / qZ$ resonances in semi-leptonic $\ell\nu q\bar{q}' / \ell\ell q\bar{q}$ [1, 21, 33, 22, 34] and fully hadronic [7, 38, 8, 39] final states at CMS using jet substructure techniques to identify the hadronic decays of boosted vector bosons. The investigation of the di-boson production at high center-of-mass energy is a necessary ingredient for the understanding of the origin of the electroweak symmetry breaking and to disentangle the nature of the Higgs boson.
- Sep 2011 - today Leading author of searches for resonances decaying into a pair of jets using the dijet mass spectrum at $\sqrt{s} = 7$ TeV [5, 37] and 8 TeV [6, 36, 23, 35] with the CMS detector. Leading author of a novel trigger, data acquisition, and analysis strategy to recover sensitivity to new dijet resonances at dijet masses below 1 TeV [24] (*data scouting*).
- Dec 2007 - today Leading author of searches for pair production of first generation scalar Leptoquarks (LQ) in the decay channels $LQ\bar{L}\bar{Q} \rightarrow ee q\bar{q}$ [3, 26, 27, 44, 45] and $LQ\bar{L}\bar{Q} \rightarrow e\nu q\bar{q}$ [2, 43] with the CMS detector using the first 36 pb^{-1} of LHC collisions at $\sqrt{s} = 7$ TeV. Primary author of the LQ analysis updates with full dataset at $\sqrt{s} = 7$ TeV [4, 42] and author of the 8 TeV analysis [25, 41]. These searches are sensitive to signals from Supersymmetry models with R-Parity violation that foresee $\text{stop} \rightarrow e q$ decays.
- Mar 2012 - Mar 2013 Coordination of the “*Dataset Definition Team*” of the CMS experiment: definition of the trigger requirements forming the data streams used for physics analysis and detector calibration. This responsibility consists in the design and implementation of a novel strategy for *data parking* and *data scouting* [28].
- Jun 2011 - Jun 2012 Member of the internal “*Analysis Review Committee*” for the scrutiny of public CMS results: top cross section measurements in all hadronic decay channel [31] and search for Randall-Sundrum gravitons decaying into a jet plus missing transverse energy final state [9, 32] at $\sqrt{s} = 7$ TeV.
- Sep 2008 - Sep 2010 Coordination of the “*Prompt Feedback Group*” of the hadronic calorimeter of the CMS experiment: monitoring and data analysis concerning problems in the detector during cosmic-ray data-taking.

- Nov 2009 - Sep 2010 Commissioning of missing transverse energy (MET) reconstructed with the first proton-proton (pp) collisions at $\sqrt{s} = 0.9, 2.36$ and 7 TeV collected by the CMS experiment [29, 30, 46, 47].
- Nov 2009 - Sep 2010 Development and implementation of algorithms for the identification of anomalous, beam-induced signals in the CMS hadronic forward calorimeter at $\sqrt{s} = 0.9, 2.36$ and 7 TeV [48].
- Jun 2009 - Jul 2009 Commissioning and calibration of the “*delay wire chambers*” used for beam position measurements during the test beam of the hadronic calorimeter (HCAL) of the CMS experiment in 2009 [10].
- Jan 2008 - Jul 2008 Commissioning of the hadronic calorimeter of the CMS experiment: expert “on-call” for trigger and data acquisition operations during early cosmic-ray data-taking.
- Dec 2006 - Dec 2007 Feasibility study of the search for Gauge Mediated Supersymmetry Breaking models in the prompt photon decay channel $pp \rightarrow \tilde{\chi}_1^0 \tilde{\chi}_1^0 + X \rightarrow \tilde{G} \tilde{G} \gamma \gamma + X$ [51], with simulation of the CMS detector.
- Jul 2006 - Sep 2006 Monitoring of the high voltage system of the CMS electromagnetic calorimeter (ECAL) and data-taking shifts in the combined ECAL+HCAL test beam in 2006 [12].
- Mar 2006 - Nov 2006 Analysis and test of stability of ECAL high voltage system [14].
- Oct 2005 - Oct 2006 Feasibility study of the calibration of the CMS ECAL using $\pi^0 \rightarrow \gamma \gamma$ decays [13, 49, 50].

Invited Talks at Conferences

- 02-09.07.2014 **ICHEP2014** - International Conference on High Energy Physics, Valencia, Spain, “*Search for heavy resonances decaying to bosons with the ATLAS and CMS detectors*”, Proceedings [15]
- 08-10.05.2013 **Workshop LHCpp 2013** - VI Workshop Italiano sulla Fisica p-p a LHC, Genova, Italy, “*Hadronic Resonances at ATLAS and CMS*”, Proceedings [16]
- 12-15.09.2012 **PIC2012** - XXXII Physics in Collision 2012, Strbske Pleso, Slovakia, “*Exotic Phenomena Searches at Hadron Colliders*”, Proceedings [17]
- 13-20.03.2011 **Moriond/EW 2011** - Rencontres de Moriond on “EW Interactions and Unified Theories”, La Thuile, Italy, “*Exotica Searches at CMS*”, Proceedings [18]
- 19-23.04.2010 **DIS2010** - XVIII International Workshop on Deep-Inelastic Scattering and Related Subjects, Firenze, Italy, “*Searches With Early Data At CMS*”, Proceedings [19]
- 15-17.04.2009 **IFAE2009** - Incontri di Fisica delle Alte Energie, VIII Edizione, Bari, Italy, “*Prospects for Exotica Searches at ATLAS and CMS Experiments*”, Proceedings [20]

Student Supervision

- Jun 2014 - today PhD student, Sapienza Università di Roma, Italy
”Searches for Dijet Resonances at CMS with $\sqrt{s} = 13$ TeV data”
- Sep 2011 - Dec 2014 PhD student, Princeton University, USA

"Searches for First-Generation Leptoquarks at CMS with $\sqrt{s} = 7$ and 8 TeV data"

- Jul 2012 - Feb 2014 PhD student, Peking University, China
"Searches for beyond Standard Model $WW \rightarrow \ell\nu q\bar{q}'$ resonances at CMS"
- Mar 2012 - today PhD student, Cukurova University, Turkey
"Searches for heavy resonances decaying to pair of jets at CMS"
- Jun 2013 - Aug 2013 Undergraduate student ("2013 CERN Summer Project"), University of Canterbury, New Zealand
"Search for dijet resonances using the novel data scouting approach at CMS"
- Jun 2012 - Aug 2012 Undergraduate student ("2012 CERN Summer Project"), IPNL, France
"Statistical tools for dijet searches at CMS"
- Jan 2010 - Mar 2011 PhD student, University of Maryland, USA
"Searches for First-Generation Leptoquarks at CMS with early $\sqrt{s} = 7$ TeV data"
- Jan 2008 - Jul 2009 PhD student, University of Maryland, USA
"Feasibility study of First-Generation Leptoquark searches at CMS"

Teaching

- Starting in Mar 2015 **Sapienza Università di Roma** - Roma, Italy
Professor of "Fisica Generale I" at chemistry majors
- Oct 2005 - Feb 2006 **Sapienza Università di Roma** - Roma, Italy
Teaching assistant of "Fisica Generale I - Esercitazioni di meccanica classica" at mathematics majors

Citation report

Total number of publications:	ISI: 378, Inspire: 393
Total number of publications in the last 10 years:	ISI: 378, Inspire: 393
Total number of citations divided by N (6):	ISI: 8805/7=1257
(N = number of years since the first publication)	
h factor:	ISI: 37

References

PUBLICATIONS (RELATIVE TO RESEARCH ACTIVITIES)

- [1] **“Search for massive resonances decaying into pairs of boosted bosons in semi-leptonic final states at $\sqrt{s} = 8$ TeV”**
V. Khachatryan *et al.* [CMS Collaboration]
JHEP **1408**, 174 (2014), [arXiv:1405.3447 [hep-ex]].
I am one of the two contact people of this CMS analysis based on collision data, and co-editor of this public CMS document.
- [2] **“Search for First Generation Scalar Leptoquarks in the $e\nu jj$ channel in pp collisions at $\sqrt{s} = 7$ TeV”**
S. Chatrchyan *et al.* [CMS Collaboration]
Phys. Lett. B **703**, 246 (2011), [arXiv:1105.5237 [hep-ex]].
I am the contact person and one of the two analysts (from University of Maryland group) of this CMS paper based on collision data.
- [3] **“Search for Pair Production of First-Generation Scalar Leptoquarks in pp Collisions at $\sqrt{s} = 7$ TeV”**
V. Khachatryan *et al.* [CMS Collaboration]
Phys. Rev. Lett. **106**, 201802 (2011), [arXiv:1012.4031 [hep-ex]].
I am one of the four analysts (from University of Maryland group) of this CMS paper based on collision data.
- [4] **“Search for pair production of first- and second-generation scalar leptoquarks in pp collisions at $\sqrt{s} = 7$ TeV”**
S. Chatrchyan *et al.* [CMS Collaboration]
Phys. Rev. D **86**, 052013 (2012) [arXiv:1207.5406 [hep-ex]].
I supervised the main analyst (a PhD student from Princeton University) of the first-generation search included in this CMS paper based on collision data.
- [5] **“Search for narrow resonances and quantum black holes in inclusive and b-tagged dijet mass spectra from pp collisions at $\sqrt{s} = 7$ TeV”**
S. Chatrchyan *et al.* [CMS Collaboration]
JHEP **1301**, 013 (2013) [arXiv:1210.2387 [hep-ex]].
I am one of two analysts of the inclusive dijet search reported in this CMS paper based on collision data.
- [6] **“Search for narrow resonances using the dijet mass spectrum in pp collisions at $\sqrt{s} = 8$ TeV”**
S. Chatrchyan *et al.* [CMS Collaboration]
Phys. Rev. D **87**, no. 11, 114015 (2013), [arXiv:1302.4794 [hep-ex]].
I am the contact person of this CMS paper based on collision data. I supervised one of the two analysts working on this search (a PhD student from Cukurova University, Turkey).
- [7] **“Search for massive resonances in dijet systems containing jets tagged as W or Z boson decays in pp collisions at $\sqrt{s} = 8$ TeV”**
V. Khachatryan *et al.* [CMS Collaboration]
JHEP **1408**, 173 (2014), [arXiv:1405.1994 [hep-ex]].
I’m part of the analysis group involved in this CMS search which is constituted by

almost 10 people from CERN, John Hopkins University, and *L'Institut de Physique Nucleaire de Lyon* (IPNL).

- [8] **“Search for heavy resonances in the W/Z-tagged dijet mass spectrum in pp collisions at 7 TeV”**
S. Chatrchyan *et al.* [CMS Collaboration]
Phys. Lett. B **723**, 280 (2013), [arXiv:1212.1910 [hep-ex]].
I’m part of the analysis group involved in this CMS search which is constituted by almost 10 people from CERN, John Hopkins University, and *L'Institut de Physique Nucleaire de Lyon* (IPNL).
- [9] **“Search for exotic resonances decaying into WZ/ZZ in pp collisions at $\sqrt{s} = 7$ TeV”**
S. Chatrchyan *et al.* [CMS Collaboration],
JHEP **1302**, 036 (2013) [arXiv:1211.5779 [hep-ex]]
I was member of the “*Analysis Review Committee*” for the scrutiny of the ZZ search in jet plus missing transverse energy final state within the CMS collaboration.
This analysis with 7 TeV data is closely related with the searches for WW/ZZ resonances at 8 TeV which I’m currently involved in.
- [10] **“Study of various photomultiplier tubes with muon beams and Cherenkov light produced in electron showers”**
S. Chatrchyan *et al.* [CMS HCAL Collaboration]
JINST **5**, P06002 (2010)
The data were collected during the HCAL Test Beam 2009. I contributed to commissioning and calibration of the “*delay wire chambers*” installed along the H2 beam line (CERN, Preveessin site) for beam position measurements.
- [11] **“Identification and Filtering of Uncharacteristic Noise in the CMS Hadron Calorimeter”**
S. Chatrchyan *et al.* [CMS Collaboration]
JINST **5**, T03014 (2010) [arXiv:0911.4881 [physics.ins-det]]
- [12] **“The CMS Barrel Calorimeter Response To Particle Beams From 2-GeV/C To 350-GeV/C”**
S. Abdullin *et al.* [USCMS Collaboration and ECAL/HCAL Collaboration]
Eur. Phys. J. C **60**, 359 (2009) [Erratum-ibid. C **61**, 353 (2009)]
- [13] **“Intercalibration of the barrel electromagnetic calorimeter of the CMS experiment at start-up”**
P. Adzic *et al.* [CMS Electromagnetic Calorimeter Group]
JINST **3**, P10007 (2008)
I performed a feasibility study of using $\pi^0 \rightarrow \gamma\gamma$ decays for the calibration of the ECAL crystals, with full detector simulation.
- [14] **“High voltage system for the CMS electromagnetic calorimeter”**
A. Bartoloni *et al.*
Nucl. Instrum. Meth. A **582**, 462 (2007)
I performed part of the stability tests on the high voltage boards at CERN laboratory and most of the data analysis

CONFERENCE PROCEEDINGS

- [15] **“Search for heavy resonances decaying to bosons with the ATLAS and CMS detectors”**
 F. Santanastasio
 Proceedings will be published in Nuclear Physics B - Proceedings Supplements
Prepared for the XXXVII International Conference on High Energy Physics, Valencia, Spain, 2-9 July 2014
- [16] **“Searches for Heavy Hadronic Resonances with the ATLAS and CMS detectors at the LHC”**
 F. Santanastasio, C. Doglioni
 PoS **LHCPP2013**, 015 (2013)
Prepared for the Workshop LHCpp 2013 - VI Workshop Italiano sulla Fisica p-p a LHC, INFN - Sezione di Genova, Genova, Italy, 8-10 May 2013
- [17] **“Exotic Phenomena Searches at Hadron Colliders”**
 F. Santanastasio
 arXiv:1301.2521 [hep-ex] (2013)
Prepared for the XXXII Physics in Collision 2012 conference (PIC2012), Strbske Pleso, Slovakia, 12-15 September 2012
- [18] **“Exotica searches at the CMS experiment”**
 F. Santanastasio
 Proceedings of the XLVIth Rencontres de Moriond 2011 Electroweak Interactions and Unified Theories, 125-132 (2011), edited by Etienne Auge, Jacques Dumarchez, and Jean Tran Thanh Van © The Gioi Publishers
Prepared for XLVIth Rencontres de Moriond 2011 Electroweak Interactions and Unified Theories, La Thuile, Aosta Valley, Italy, 13-20 March 2011
- [19] **“Searches With Early Data At CMS”**
 F. Santanastasio
 PoS **DIS2010**, 206 (2010)
Prepared for 18th International Workshop on Deep Inelastic Scattering and Related Subjects (DIS 2010), Florence, Italy, 19-23 Apr 2010
- [20] **“Prospects for Exotica Searches at ATLAS and CMS Experiments”**
 F. Santanastasio
 Il Nuovo Cimento Vol.32 C, N.3-4 ncc9484 (2009)
Prepared for Incontri di Fisica delle Alte Energie (IFAE 2009), Bari, Italy, Apr 2009

PRELIMINARY RESULTS OF THE CMS COLLABORATION (RELATIVE TO RESEARCH ACTIVITIES)

- [21] **“Search for new resonances decaying to WW to l ν q \bar{q} in the final state with a lepton, missing transverse energy, and single reconstructed jet”**
 [CMS Collaboration]
 CMS PAS EXO-12-021 (2013), <http://cds.cern.ch/record/1590301/files/EXO-12-021-pas.pdf>
 I am the contact person of this CMS analysis based on collision data, one of the four main analysts, and the main editor of this public CMS document. I supervised one of the two main analysts working on this search (a PhD student from Peking University, China). The analysis has been published in 2014 in combination with a complementary search for ZZ resonances (EXO-12-022).

- [22] **“Search for a narrow spin-2 resonance decaying to Z bosons in the semileptonic final state”**
 [CMS Collaboration]
 CMS PAS EXO-12-022 (2013), <https://cds.cern.ch/record/1596494/files/EXO-12-022-pas.pdf>
 I’m part of the analysis group involved in this CMS search which is constituted by about 10 people from CERN, KIT, Peking University, SPRACE, and University of Perugia. The analysis has been published in 2014 in combination with a complementary search for WW resonances (EXO-12-021).
- [23] **“Search for Narrow Resonances using the Dijet Mass Spectrum with 19.6 fb⁻¹ of pp Collisions at sqrt(s)=8 TeV”**
 [CMS Collaboration]
 CMS PAS EXO-12-059 (2013), <http://cds.cern.ch/record/1519066/files/EXO-12-059-pas.pdf>
 I’m the contact person and the main editor of this public CMS document. I supervised the main analyst working on this search (a PhD student from Cukurova University, Turkey). The analysis is aiming for publication in 2015 in combination with a search for high mass resonances decaying to pairs of b-quarks.
- [24] **“Search for Narrow Resonances using the Dijet Mass Spectrum in pp Collisions at sqrt(s)=7 TeV”**
 [CMS Collaboration]
 CMS PAS EXO-11-094 (2012), <http://cds.cern.ch/record/1461223/files/EXO-11-094-pas.pdf>
 I am the main developer of the novel trigger, data acquisition, and analysis strategy employed in this search to recover sensitivity to new physics at dijet masses below 1 TeV.
- [25] **“Search for Pair-production of First Generation Scalar Leptoquarks in pp Collisions at sqrt(s) = 8 TeV”**
 [CMS Collaboration]
 CMS PAS EXO-12-041 (2014), <http://cds.cern.ch/record/1742179/files/EXO-12-041-pas.pdf>
- [26] **“Search for Pair Production of First Generation Leptoquarks Using Events Containing Two Electrons and Two Jets Produced in pp Collisions at sqrt(s) = 7 TeV”**
 [CMS Collaboration]
 CMS PAS EXO-10-005 (2010), <http://cdsweb.cern.ch/record/1289514/files/EXO-10-005-pas.pdf>
 I am co-author and one of the four analysts (from University of Maryland group) of this public CMS Physics Analysis Summary based on collision data.
- [27] **“Search for Pair Production of First Generation Scalar Leptoquarks at the CMS Experiment”**
 [CMS Collaboration]
 CMS PAS EXO-08-010 (2009), <http://cdsweb.cern.ch/record/1196076/files/EXO-08-010-pas.pdf>
 I am co-author and one of the four analysts (from University of Maryland group) of this public CMS Physics Analysis Summary based on MC simulation.
- [28] **“Data Parking and Data Scouting at the CMS Experiment”**
 [CMS Collaboration]

CMS DP-2012/022 (2012), http://cds.cern.ch/record/1480607/files/DP2012_022.pdf
I'm the main editor of this public CMS document.

- [29] **“Missing Transverse Energy Performance in Minimum-Bias and Jet Events from Proton-Proton Collisions at $\sqrt{s}=7$ TeV”**
[CMS Collaboration]
CMS PAS JME-10-004 (2010), <http://cdsweb.cern.ch/record/1279142/files/JME-10-004-pas.pdf>
- [30] **“Performance of Missing Transverse Energy Reconstruction in $\sqrt{s}=900$ and 2360 GeV pp Collision Data”**
[CMS Collaboration]
CMS PAS JME-10-002 (2010), <http://cdsweb.cern.ch/record/1247385/files/JME-10-002-pas.pdf>
I worked mostly on the section related to calorimeter MET cleaning algorithms and performances.
- [31] **“Measurement of the $t\bar{t}$ production cross section in the fully hadronic decay channel in pp collisions at 7 TeV”**
[CMS Collaboration]
CMS PAS TOP-11-007 (2011), <http://cdsweb.cern.ch/record/1371755/files/TOP-11-007-pas.pdf>
I was member of the “*Analysis Review Committee*” for the scrutiny of this public CMS result within the collaboration.
- [32] **“Search for Randall-Sundrum Gravitons Decaying into a Jet plus Missing ET at CMS”**
[CMS Collaboration]
CMS PAS EXO-11-061 (2012), <http://cdsweb.cern.ch/record/1426654/files/EXO-11-061-pas.pdf>
I was member of the “*Analysis Review Committee*” for the scrutiny of this public CMS result within the collaboration.

INTERNAL NOTES OF THE CMS COLLABORATION (RELATIVE TO RESEARCH
ACTIVITIES)

- [33] **“Search for a BSM resonance decaying to W vector bosons in the semileptonic final state”**
F. Santanastasio *et al.*
CMS AN-2013/045 (2013)
I am the contact person of this CMS analysis based on collision data and one of the four main analysts. I supervised one of the two main analysts working on this search (a PhD student from Peking University, China). The analysis is has been published in 2014 in combination with a complementary search for ZZ resonances (EXO-12-022).
- [34] **“Search for a BSM resonance decaying to Z vector bosons in the semileptonic final state”**
F. Santanastasio *et al.*
CMS AN-2013/040 (2013)
I'm part of the analysis group involved in this CMS search which is constituted by about 10 people from CERN, KIT, Peking University, SPRACE, and University of Perugia. The analysis has been published in 2014 in combination with a complementary search for WW resonances (EXO-12-021).

- [35] **“Search for Narrow Resonances using the Dijet Mass Spectrum in pp Collisions at $\sqrt{s}=8$ TeV with full 2012 dataset”**
 F. Santanastasio *et al.*
 CMS AN-2012/455 (2012)
 I am the contact person of this CMS analysis based on collision data. I supervised the main analyst working on this search (a PhD student from Cukurova University, Turkey). A public preliminary result has been released by the CMS collaboration on February 2013 in view of the Moriond/EW conference. The analysis is aiming for publication in 2015 in combination with a search for high mass resonances decaying to pairs of b-quarks.
- [36] **“Search for Narrow Resonances using the Dijet Mass Spectrum in pp Collisions at $\sqrt{s}=8$ TeV”**
 F. Santanastasio *et al.*
 CMS AN-2012/229 (2012)
 I am the contact person of this CMS analysis based on collision data. I supervised one of the two analysts working on this search (a PhD student from Cukurova University, Turkey). This analysis has been published in 2013.
- [37] **“Search for Dijet Resonances in the Dijet Mass Spectrum in pp Collisions at $\sqrt{s}=7$ TeV”**
 F. Santanastasio *et al.*
 CMS AN-2012/012 (2012)
 I am one of the two analysts (from a group of about 10 people from various institutions including CERN) of this CMS analysis based on 4.7 fb^{-1} of pp collision data collected in 2011. I am the main developer of the novel trigger, data acquisition, and analysis strategy employed in this search to recover sensitivity to new physics at dijet masses below 1 TeV. This analysis has been published in 2012 in combination with a complementary search for heavy resonances decaying in pairs of b-quarks.
- [38] **“Search for heavy resonances in the W/Z-tagged dijet mass spectrum in pp collisions at 8 TeV”**
 F. Santanastasio *et al.*
 CMS AN-2012/393 (2013)
 I’m part of the analysis group involved in this CMS search which is constituted by almost 10 people from CERN, John Hopkins University, and *L’Institut de Physique Nucleaire de Lyon* (IPNL). This analysis has been published in 2014.
- [39] **“Search for qW/qZ/WW/WZ/ZZ Resonances in the W/Z-tagged Dijet Mass Spectrum from 7 TeV pp Collisions at CMS”**
 F. Santanastasio *et al.*
 CMS AN-2011/524 (2011)
 I’m part of the analysis group involved in this CMS search which is constituted by almost 10 people from CERN, John Hopkins University, and *L’Institut de Physique Nucleaire de Lyon* (IPNL). This analysis has been published in 2013.
- [40] **“Significance estimation for the dijet resonance search using 8 TeV pp collision data”**
 F. Santanastasio, C. Guichardant *et al.*
 CMS AN-2012/325 (2012)
 I am the supervisor of this “2012 CERN summer student” project realized by an undergraduate student from *L’Institut de Physique Nucleaire de Lyon* (INPL).

- [41] **“Search for Pair-production of First Generation Scalar Leptoquarks in pp Collisions at $\sqrt{s}=8$ TeV”**
F. Santanastasio *et al.*
CMS AN-2013/109 (2013)
- [42] **“Search for First-Generation Scalar Leptoquarks in pp Collisions at $\sqrt{s}=7$ TeV using the CMS Detector”**
F. Santanastasio *et al.*
CMS AN-2011/492 (2011)
I am one of the two analysts (supervising a PhD student from Princeton University) of this CMS analysis based on 4.7 fb^{-1} of pp collision data collected in 2011. This analysis has been published in 2012 in combination with a complementary second-generation leptoquark search.
- [43] **“Search for Pair Production of First-Generation Scalar Leptoquarks Using Events Produced in pp Collisions at $\sqrt{s}=7$ TeV Containing One Electron, Two Jets and Large Missing Transverse Energy”**
F. Santanastasio *et al.*
CMS AN-2010/361 (2010)
- [44] **“Search for Pair Production of First Generation Leptoquarks Using Events Containing Two Electrons and Two Jets Produced in pp Collisions at $\sqrt{s}=7$ TeV”**
F. Santanastasio *et al.*
CMS AN-2010/230 (2010)
- [45] **“Search for Pair Production of First Generation Scalar Leptoquarks at the CMS Experiment”**
F. Santanastasio *et al.*
CMS AN-2008/070 (2009)
- [46] **“Results of a visual scan of high MET events in 7 TeV pp collision data”**
F. Santanastasio *et al.*
CMS AN-2010/219 (2010)
- [47] **“Commissioning of Uncorrected Missing Transverse Energy in Zero Bias and Minimum Bias Events at $\sqrt{s}=900$ GeV and 2360 GeV”**
F. Santanastasio *et al.*
CMS AN-2010/029 (2010)
- [48] **“Optimization and Performance of HF PMT Hit Cleaning Algorithms Developed Using pp Collision Data at $\sqrt{s}=0.9, 2.36$ and 7 TeV”**
F. Santanastasio *et al.*
CMS DN-2010/008 (2010)
- [49] **“InterCalibration of the CMS Barrel Electromagnetic Calorimeter Using Neutral Pion Decays”**
F. Santanastasio *et al.*
CMS DN-2007/013 (2007)
- [50] **“Study of ECAL calibration with $\pi^0 \rightarrow \gamma\gamma$ decays”**
F. Santanastasio, D. del Re, S. Rahatlou
CMS IN-2006/050 (2006)

- [51] **“Search for Supersymmetry with Gauge-Mediated Breaking using high energy photons at CMS experiment”**
F. Santanastasio
PhD thesis at *Sapienza Università di Roma* (2007)
<http://www.roma1.infn.it/cms/tesiPHD/santanastasio.pdf>

- [52] **“Calibrazione di un calorimetro elettromagnetico tramite il flusso totale di energia”**
F. Santanastasio
Laurea thesis at *Sapienza Università di Roma* (2004)
<http://www.roma1.infn.it/cms/tesi/santanastasio.pdf>