



Curriculum Vitæ of Shahram Rahatlou

Personal Information

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Education

PhD in Physics, dissertation on “*Observation of Matter—Anti-matter asymmetry in the B0 meson system*”,
October 2002, University of California, San Diego

Laurea in Fisica (110/110 cum laude), February 1998, Sapienza Università di Roma.
thesis title: “*Simulazione della camera a deriva centrale dell’esperimento BaBar*”

Appointments

Associate Professor, Sapienza Università di Roma, 1/3/2008 - present

CERN Scientific Associate, 1/3/2017 - 29/2/2018

CERN-INFN Fellow, 1/3/2011 - 31/7/2011

CERN-INFN Fellow, 1/3.2010 - 30/9/2010

Assistant Professor, Sapienza Università di Roma, 1/1/2005 - 28/2/2008

Professore a contratto with “Rientro dei Cervelli” fellowship

Postdoctoral Research Assistant, University of California, San Diego, 1/12/2002 - 31/12/2004

Graduate Research Assistant, University of California, San Diego, 1998-2002

Abilitazioni

Abilitazione scientifica Nazionale tornata 2013, settore 02/A1, 28.11.2014 (valid until 28/11/2020)

Abilitazione scientifica Nazionale tornata 2012, settore 02/A1, 23/01/2014

Awards

2004 Mitsuyoshi Tanaka award of the American Physical Society for the best dissertation in Experimental Particle Physics in the United States (<http://bit.ly/tanaka2004>)

Funding Information

2017, Finanziamento delle attività base di ricerca, MIUR, **3k euro, Principal Investigator**

2013 Jan-2016 Nov, Rome CMS group and T2, INFN, **250-300k euro annual budget, Principal Investigator**

2015-2017, CMS ECAL Phase II Upgrade, INFN, **52k euro, Principal Investigator**

2011, Fondi di Ateneo Sapienza, “*Discovery of the Higgs boson at the LHC*”, Sapienza, **80k euro, Principal Investigator**

2004, Rientro dei Cervelli, Ministro dell’Università e della Ricerca, **124k euro, Principal Investigator**

2016-2018, CMS Physics Coordination, INFN specific grant, **40k euro**, Investigator

2013-2015, “*Ionization micro-channel plates for fast timing of showers in high rate environments*”, INFN, **20k euro**, Investigator

2014, Progetto di ricerca d’Ateneo, “*Precision timing in high energy physics*”, Sapienza, **50K euro**, Investigator

2011-2012, CMS Exotica Physics Analysis Group Coordination, INFN specific grant, **40k euro**, Investigator



Scientific and society memberships

2005 - present CERN (European Laboratory for Particle Physics), scientific associate

2003 - 2004 Fermilab (Fermi National Accelerator Laboratory), scientific associate

1998 - 2004 SLAC (Stanford Linear Accelerator Center), scientific associate

Commissions of Trust

2018 Referee for Ministero dell'Istruzione dell'Università della Ricerca (MIUR) for PRIN 2017

2015 - 2018 Scientific referee for the Swiss National Science Foundation (SNF)

2018 Referee for fellowships at Swiss Federal Institute of Technology Zurich (ETHZ)

2018 Scientific referee for the Belgium Fund for Scientific Research (FNRS)

2018 Scientific referee for the Netherlands Organisation for Scientific Research (NWO)

2017-2018 Scientific referee for the Australian Research Council (ARC)

2017 Scientific referee for the Hong Kong Research Grants Council (HKGRC)

2016 - 2017 Member of Commissione di Ricerca Sapienza for Faculty of Science Faculty (Macroarea A) in charge of selection and assignment of research grants at Sapienza

2016 Referee for Agenzia Nazionale per la Valutazione del sistema Universitario e della Ricerca (ANVUR) for the VQR 2011-2014 campaign

2015 - 2017 Chair of the *Commissione di Assegni di Ricerca* (Postdoctoral fellowship selection committee) of Laboratori Nazionali di Gran Sasso

2015 Scientific referee for the *Scientific Independence of young Researchers (SIR)* program of Ministero dell'Istruzione, dell'Università e della Ricerca

2014 - 2016 Member of the Collaboration Board Advisory Committee of the CMS experiment at CERN

2014 - 2016 Scientific Referee for the SHIP experiment proposal in Commissione Scientifica Nazionale 1 of INFN. SHIP is a beam-dump experiment for an estimated cost of 60 MCHF for the detector and 100 MCHF for the beam facility to be built at CERN

2010 - present Referee for Physics Letters B Journal (PLB)

2010 - present Referee for Journal of High Energy Physics (JHEP)

Institutional Responsibilities

2015- present Contact person for INFN-DOE summer student exchange program at INFN Rome
Details at <https://web.infn.it/DOE-INFN-SSEP/>

2014 - 2016 Delegate of Department Chair for Undergraduate Affairs Office. Responsibilities included the planning of academic calendar for both bachelor and master programs, organisation of monthly undergraduate defence committees

2012 - present Member of *Collegio dei Docenti* (Scientific Board) of the PhD program in Accelerator Physics



2013	Member of committee to define the procedure and selection criteria for newly established Teaching Awards (Riconoscimenti all'insegnamento) in Faculty of Science
2011-2013	Elected representative of Associate Professors in the Board of the Physics Department (Giunta di Dipartimento)
2010	Member of the PhD Admissions Committee of the Physics Department

Scientific and Research Coordination Responsibilities

<i>Nov 2018 - present</i>	Coordinator of CMS Tier 2 Computing facility at Sapienza
2016 - 2018	Physics coordinator of CMS experiment at CERN
2017 - present	Member of ECoM2x committee of CMS experiment at CERN to devise computing model and needs for High-Luminosity LHC phase
2016-2018	Member of Management Board of CMS experiment at CERN
2016-2018	Member of Executive board of CMS experiment at CERN
2016 - 2018	Chair of the Physics Office of CMS experiment at CERN
2016 - 2018	Member of Phase-II Upgrade Steering Group of CMS experiment at CERN
2014 - 2016	Convener of the "Beyond Standard Model" working group of the "What Next?" effort at INFN. Co-editor of white paper on long-term strategy of Commissione Scientifica Nazionale 1
2013 - 2016	Team leader of CMS group in Rome, with an annual budget of €250-300k euro
2013- present	Chair of several internal CMS review committees, including search for dark matter candidates in events with single lepton and missing transverse energy, and events with single boosted-top and missing transverse energy
2013	Coordinator of SUSY Montecarlo working group in CMS (~20 physicists). Group acting as a liaison between theorists and analysis groups to provide the correctly generated samples (Management Level 3)
2011 - 2012	Convener of Exotica Physics Analysis Group of CMS (~400 physicists). The largest physics group in CMS counting hundreds of members and covering a wide spectrum of searches for direct new physics signatures, excluding supersymmetry. (Management Level 2)
2009-2012	Coordinator of Physics Activities of CMS-Italia Collaboration. Italy represents 12% of the whole CMS collaboration and is extremely active in physics analysis. During my tenure I helped fostering collaborations between the smaller groups and direct some of the efforts towards searches for new physics.
2007-2009	Coordinator of global event reconstruction of the CMS experiment (~100 physicists) during the preparation for the first LHC collisions in 2008 (Management Level 2)
2006	Coordinator of electron and photon reconstruction in CMS (Management Level 3)
2004	Coordinator of the BABAR event reconstruction (Management Level 2)
2000-2001	Operation manager of the BABAR online data acquisition system



Organisation of Scientific Conferences and Workshops

2018	co-Chair of program committee of LHCP 2019 international conference in Puebla, Mexico May 2019
2017	Program committee of LHCP 2018 international conference in Bologna, Italy in June 2018
2016	Program committee of LHCP 2017 international conference in Shanghai, China in May 2017
2015	Organising committee of TOP2015 conference, Ischia, Italy
2015	Organising committee of "101-esimo Congresso della Società Italiana di Fisica", Rome, Italy
2013	International Advisory committee of Second IPM meeting on LHC Physics, Tehran, Iran
2013	Organising committee of ATLAS/CMS/LHC physics workshop in Genova, Italy
2013	International Advisory committee of "Aspen Higgs Quo Vadis", 10-16 March 2013 Aspen Center for Physics
2012	Organiser of CMS Exotica Workshop in Rome
2011	Organiser of CMS Exotica Workshop in Rome (Both scientific program and local organisation)
2010	Chair of the local organising committee of Incontri Italiani di Fisica di Alte Energie (IFAE) 2010
2005	International organizing committee for the third international workshop on CKM physics

PhD defence committee and referee

2018	Member of jury for final exam of Ph.D. in Physics at Padova University (Ciclo XXX)
2017	Alberto Escalante del Valle, "Measurement of associated Z+charm production and search for W' bosons in the CMS experiment at the LHC", Facultad de Ciencias Físicas, CIEMAT, Madrid, Spain
2017	Riccardo, Manzoni, "Physics with photons with the ATLAS Run 2 data: calibration and identification, measurement of the Higgs boson mass and search for supersymmetry in di-photon final state", Università statale degli studi di Milano and Université Pierre et Marie Curie, Paris
2016	Olof Lundberg, "Searches for Dark Matter and Large Extra Dimensions in Monojet Final States with the ATLAS Experiment", Stockholm University
2015	Valentina Gori, "Search for a high mass Higgs-like boson produced via Vector Boson Fusion, in the decay channel $H \rightarrow ZZ \rightarrow l+l-qq^-$ ($l = e, \mu$) with the CMS detector", Università di Firenze, Florence
2014	Gerrit Va Onsem, "Search for new heavy quarks with the CMS detector at the Large Hadron Collider", Vrije University Bruxelles, Brussels, Belgium
2013	Andrea Massironi, "Search for a Higgs Boson in the $H \rightarrow W+W- \rightarrow l\nu l\nu$ channel at CMS", Università di Milano Bicocca, Milan
2012	Arabella Martelli, "First measurement of the WZ production cross section with the CMS detector at the LHC", Ecole Polytechnique Palaiseau, France
2012	Federico De Guio, "Search for a heavy gauge boson W' in the final state with electron and large missing transverse energy in pp collisions at 7 TeV", Università di Milano Bicocca, Milan



Outreach and third mission

2018-2019 Tutor at Liceo Scientifico Augusto Righi, Roma for the Art & Science project. This project is aimed at scientific outreach at high school level across Italy, using art for scientific communication. Details at <https://web.infn.it/artandscience/>

2018-2019 Tutor at Liceo scientifico Giulia Falletti di Barolo, Roma for the LAB2GO project. This project aims at archiving and documentation of physics experiences at laboratories across high schools in Rome. Details available at <https://web.infn.it/lab2go/>

2015 Invited public lecture on `Search for Dark Matter` at an event for the 100th anniversary of General Relativity at Università di Milano Bicocca, Milan



Timeline of research activities

2016 - 2018	Coordination of physics program of CMS experiment at CERN, comprising more than 2000 physicists
2015	Joined the SABRE experiment aiming at verifying the DAMA/LIBRA result on annual modulation effect due to dark matter candidates
2015	Search for dijet resonances, Dark matter candidates, and di-photon resonances with the 13 TeV data at LHC
2014 - 2016	Coordination of the “Beyond Standard Model” working group of the “What Next?” effort at INFN and of the long-term strategy of Commissione Scientifica Nazionale 1. This is process similar to Snowmass in the US aiming at defining the research priorities for INFN in the next 10 years and the most compelling physics cases to be carried out at the colliders.
2014	Search for heavy Higgs boson candidates in di-photon final state. Co-supervision of my graduate student's PhD thesis on the search of new heavy resonances in di-photon final state and with a mass below 1 TeV
2014 - 2015	R&D project for a radiation-hard compact calorimeter. This is a project to identify a feasible solution for an electromagnetic calorimeter for the forward region of the CMS detector during the Phase II operation of the LHC with increased instantaneous luminosity, starting in 2025.
2013 - 2015	R&D project of new detectors with extreme timing resolution. The project aims at the study and potential use of secondary emission of electrons from the surface of micro-channel plates (MCP) for a precise timing measurement of electromagnetic showers.
2011 - 2012	Convener of Exotica Physics Analysis Group of CMS comprising about 400 physicists
2010 - 2013	Search for long-lived particles with a novel technique using the measurement of time of flight of photons with the CMS electromagnetic calorimeter (ECAL)
2010 - 2012	Discovery of the Higgs boson decaying in two photons. First studies for an exclusive search and the Fermiophobic scenarios. These studies produced several papers and contributed to the discovery of a new boson at 125 GeV, cornerstone of the 2013 Nobel Prize. Collaboration with theorists for the interpretation of the Higgs results
2009 - 2010	Setup of procedure and software for the inter-calibration of the ECAL with a dedicated high-rate stream of neutral pions recorded at the High Level Trigger
2007-2009	Coordinator of global event reconstruction of the CMS experiment. I successfully lead the implementation of the offline reconstruction application and procedure for the first LHC collisions in 2008
2005 - 2007	Coordinator of electron and photon reconstruction in CMS. Commissioning of the ECAL High Voltage system
2004	Coordinator of BABAR event reconstruction
2003 - 2005	Measurement of CP violating parameter $\sin(2\beta+\gamma)$ with neutral B decays to $D^{(*)}0K^{(*)}0$ final states. The first measurement taking advantage of self-tagging in the neutral D and K mesons
2000 - 2002	Measurement of the CP violating parameter $\sin 2\beta$. I was the leading analyzer and graduate student on this flagship analysis, cornerstone of the 2008 Nobel Prize. APS 2004 Tanaka award for best PhD dissertation in particle physics in USA
2000	Measurement of B_0 oscillation with hadronic B decays with the BaBar detector
2000-2001	Operation manager of the BABAR online data acquisition system
1999 - 2001	Commissioning of vertex reconstruction algorithms and development of exclusive B reconstruction tools used for lifetime, mixing, and CP violation measurements
1998	Detailed simulation of the BaBar drift chamber in Geant



Invited Plenary Talks and Convenship

ICHEP 2018, Seoul, Korea, July 2018	Highlights from CMS and LHCb experiments
RDMS 2018, Tashkent, Uzbekistan, Sep 2018	Highlights and prospects of physics at CMS experiment
SUSY 2016, Melbourne, Australia, July 2016	Overview of BSM searches ATLAS and CMS detectors at LHC
What Next?, Angelicum, Roma, Italia, 2014	Report of the Beyond Standard Model Working Group
EPS High Energy Conference 2013, Stockholm, Sweden	Convener of the “Higgs & New Physics” session. Selection of submitted contributions and chairing of three days of parallel sessions
ICHEP 2012, Melbourne, Australia, July 2012	Convener of the “Beyond Standard Model” session. Selection of submitted contributions and chairing of three days of parallel sessions
Physics in Collision, Vancouver, August 2011	Status of exotic searches at LHC and Tevatron
Hadron Collider Physics Symposium, La Biodola, Italy, May 2007	Perspectives for New Physics Searches at 14 TeV
FPCP 2002, Philadelphia, PA, May 2002	Measurement of $\sin 2\beta$ from BABAR

Parallel talks Talks at conferences and workshops

<i>LHC Experiments Committee (LHCC)</i> 2016-2018	Two presentations per year of status and progress of CMS physics program to international referees
<i>Gearing up for LHC 13, Galileo Galilei Institute, Florence, October 2015</i>	Search for long-lived particles at LHC
<i>100 Congresso Nazionale Società Italiana Fisica, Pisa, September 2014</i>	Ricerca di Nuovi Fenomeni alla Frontiera di Energia
<i>ZPW 2013: Zurich Phenomenology Workshop, 2013, Zurich</i>	Overview on searches for new physics and exotica with the CMS experiment
<i>Perimeter Institute, Waterloo, Ontario, August 2012</i>	Status and plans of exotic searches at CMS
<i>Commissione Scientifica Nazionale I, Torino, May 2010</i>	Status of CMS and First results with collisions at 7 TeV
<i>Europhysics Conference on High Energy Physics, Krakow, Poland, July 2009</i>	Generic Search for Deviations from Standard Model Predictions in CMS
<i>Incontri di Fisica di Alte Energie, Catania, Italy, March 2005</i>	Measurements of CKM angle γ with the BABAR detector
<i>DPF 2004, Riverside, CA, August 2004</i>	Measurement of branching fractions and time dependent CP-asymmetries related to $\sin(2\beta + \gamma)$



<i>DPF 2004, Riverside, CA, August 2004</i>	BABAR Event Reconstruction
<i>Weak Interactions and Neutrinos Workshop, Lake Geneva, WI, October 2003</i>	Measurements of CKM angle γ
<i>DPF 2002, Williamsburg, VA, May 2002</i>	Time-dependent analysis of $B^0 \rightarrow J/\psi K_S^0$ decays with the BaBar detector
<i>DPF 2000, Columbus, OH, August 2000</i>	A study of the B^0 oscillation with fully reconstructed B mesons at BABAR

Selected seminars and colloquia

University of Belgrade, Belgrade, Serbia, December 2017	Trigger needs for CMS experiment in Run2 and beyond
Piacenza, CMS Italia, November 2017	Physics status and outlook with CMS detector
Ghent University, Belgium April 2017	Status and prospects of physics with CMS detector
University of Zurich, December 2016	Physics prospects with CMS detector with Run2 data
University of Melbourne, Australia December 2015	Search for New Phenomena at the Energy Frontier
100 years of General Relativity, Università di Milano Bicocca, Milan, November 2015	Search for Dark Matter
Università di Padova, April 2013	Physics at the Large Hadron Collider
DESY, Hamburg, May 2012	Status of exotic searches at LHC
University of Barcelona, May 2012	Status of exotic searches at LHC
Sapienza, Rome, September 2011	Status of exotic searches at LHC
CERN, Geneva, 2005	Measurements of CKM angle γ at BaBar
MIT, Boston, October 2004	Measurement of CP-violating asymmetry $\sin 2\beta$
Iowa State University, Ames, October 2004	Measurement of CP-violating asymmetry $\sin 2\beta$
Caltech, Pasadena, April 2002	Measurement of CP-violating asymmetry $\sin 2\beta$
UC San Diego, September 2001	Measurement of CP-violating asymmetry $\sin 2\beta$



Teaching Experience

Undergraduate

Activities and syllabus available at <http://www.roma1.infn.it/people/rahatlou/didattica.php>

2018-2019	Fisica Nucleare and Subnucleare I (III anno, Laurea Triennale Fisica) Average 80 students (6 CFU)
2018-2019	Computing Methods for Physics (I anno, Laurea Magistrale) Average 80 students (6 CFU)
2015 - 2016	Elettromagnetismo (II anno, Laurea Triennale Fisica). Average 70 students (12 CFU)
2010 - 2016	Elementary Particle Physics (II anno, Laurea Magistrale). average 10 students (6 CFU)
2009 - 2016	Laboratorio di Calcolo (I anno, Laurea Triennale). average 80 students (6 CFU + 3 CFU for Abilità Informatiche)
2008 - 2009	Fisica Generale per Biologia(I anno, Laurea Triennale). 100 students (9 CFU)
2006 - 2009	Programmazione++ (III anno, Laurea Triennale). 10 students (6 CFU)
2005 - 2009	co-instructor of course of "Laboratorio di Fisica Nucleare e Subnucleare" (I anno, Laurea Magistrale). 30 students
1999	Teaching assistant at UC San Diego for course of Electromagnetism for undergraduate majors in Physics. 100 students

Lectures at graduate and summer schools

2019 Jan	Physics at CMS and prospects for High Luminosity LHC CMS Data Analysis School, Pisa
2019 Jan	Challenges and prospects for physics at High Luminosity LHC CMS Data Analysis School, Fermilab
2016 Aug	Search for exotic and new phenomena at Large Hadron Collider PSI Summer school on "Exothiggs", Zuoz Lyceum Alpinum, Switzerland
2014 June	Search for exotic phenomena at Large Hadron Collider Scuola di Fisica di Otranto, Italy



Undergraduate Teaching Timeline

Since 2008 I have thought courses at all levels of Bachelor (Laurea Triennale) and Masters (Laura Magistrale) at Physics and Biology departments.

2018-19 Computing Methods for Physics (6 CFU), I anno, Magistrale
Laboratorio di Calcolo (1 CFU), I anno, Triennale
Fisica Nucleare e Subnucleare I (6 CFU), III anno, Triennale

2016-17 Sabbatical leave due to research responsibilities at CERN
2017-18

2015-16 Laboratorio di Calcolo (6 CFU), I anno, Triennale
Elementary Particle Physics (6 CFU), II anno, Magistrale
Elettromagnetismo (12 CFU), II anno, Triennale

2014-15 Laboratorio di Calcolo (6 CFU), I anno, Triennale
2013-14 Elementary Particle Physics (6 CFU), II anno, Magistrale
2012-13
2011-12
2010-11

2009-10 Laboratorio di Calcolo (6 CFU), I anno, Triennale
Fisica Generale per Biologia (9 CFU), I anno, Triennale

2008-09 Fisica Generale per Biologia (9 CFU), I anno, Triennale
Programmazione++ (6 CFU), III anno, Triennale

2007-08 Programmazione++ (6 CFU), III anno, Triennale
2006-07
2005-06



Teaching evaluation by students (OPIS)

Data from OPIS modules of Faculty of Science (SMFN). Online data available only since 2012-13.

OPIS modules include 12 questions concerning quality of the course and the instructor. Only questions concerning quality of the instructor and teaching are reported here. For full details of all answers contact Faculty of Science.

Course	Questions about instructor											
	Il docente stimola / motiva l'interesse verso la disciplina?				Il docente espone gli argomenti in modo chiaro?				Sono complessivamente soddisfatto di come è svolto questo insegnamento?			
	Decisamente sì	Più sì che no	Più no che sì	Decisamente no	Decisamente sì	Più sì che no	Più no che sì	Decisamente no	Decisamente sì	Più sì che no	Più no che sì	Decisamente no
Elementary Particle Physics 2015-16	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
media Magistrale Fisica	50.3%	37.3%	9.0%	3.4%	45.0%	38.5%	12.3%	4.1%	42.9%	39.4%	13.0%	4.7%
Elettromagnetismo 2015-16	63.9%	33.3%	2.8%	0.0%	47.2%	41.7%	11.1%	0.0%	61.1%	33.3%	5.6%	0.0%
Laboratorio di Calcolo 2015-16	38.3%	51.9%	9.9%	0.0%	49.4%	42.0%	7.4%	1.2%	40.7%	53.1%	4.9%	1.2%
media Triennale Fisica	41.3%	39.3%	14.5%	4.9%	39.5%	39.1%	15.7%	5.7%	37.5%	43.5%	13.7%	5.3%
Particelle Elementari 2014-15	66.7%	33.3%	0.0%	0.0%	66.7%	33.3%	0.0%	0.0%	66.7%	33.3%	0.0%	0.0%
media Magistrale Fisica	52.9%	34.0%	9.2%	3.9%	42.3%	39.4%	13.1%	5.2%	45.1%	37.9%	12.3%	4.8%
Laboratorio di Calcolo 2014-15	72.2%	27.8%	0.0%	0.0%	61.1%	37.0%	1.9%	0.0%	66.7%	33.3%	0.0%	0.0%
media Triennale Fisica	39.4%	38.9%	16.0%	5.7%	36.1%	39.3%	17.0%	7.6%	34.0%	44.5%	15.0%	6.4%
Particelle Elementari 2013-14	100.0%	0.0%	0.0%	0.0%	66.7%	33.3%	0.0%	0.0%	66.7%	33.3%	0.0%	0.0%
media Magistrale Fisica	47.8%	37.7%	10.0%	4.6%	45.4%	38.6%	13.2%	2.9%	41.2%	43.5%	11.6%	3.7%
Laboratorio di Calcolo 2013-14	52.0%	44.0%	4.0%	0.0%	62.0%	34.0%	4.0%	0.0%	66.0%	34.0%	0.0%	0.0%
media Triennale Fisica	38.1%	40.1%	15.8%	5.9%	36.2%	39.0%	17.2%	7.6%	33.1%	46.6%	14.5%	5.9%
Fisica Nucleare e Subnucleare III 2012-13	100.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	Question not in the survey			
media Magistrale Fisica	46.8%	N/A	N/A	N/A	39.1%	N/A	N/A	N/A				
Laboratorio di Calcolo 2012-13	58.5%	32.3%	9.2%	0.0%	55.4%	35.4%	9.2%	0.0%				
media Triennale Fisica	40.3%	37.4%	14.9%	7.4%	37.1%	37.9%	15.4%	9.6%				



Summary of Scientific Achievements (updated 14 December 2018)

Full list of more than 1100 publications in peer-reviewed international journals available at

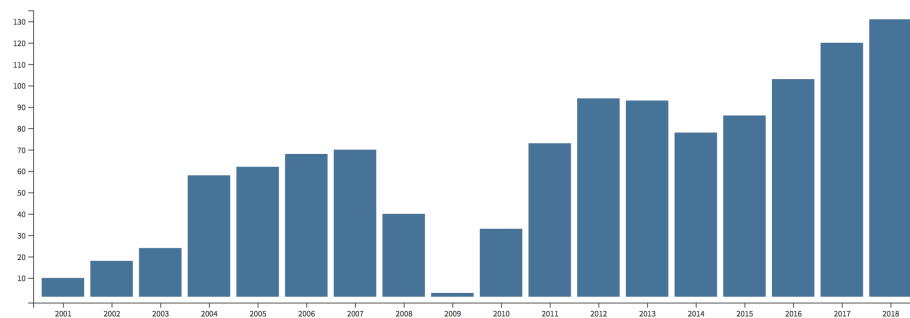
<http://bit.ly/rahatlou-pubs-dec2018>

First publication	2001	
PhD in Physics	2002	
Academic years	18	
Total number of peer-reviewed publications	ISI: 1164	Inspire: 1145
Total citations	ISI: 47535	Inspire: 112191
average citation per publication	ISI: 40.8	Inspire: 98.0
total citations divided by academic years	ISI: 2641	Inspire: 6233
H index	ISI: 107	Inspire: 151
Normalized H index (divided by academic years)	ISI: 5.9	Inspire: 8.4
total impact factor of all publications	ISI: 6429	
average impact factor of all publications	ISI: 5.53	
Total number of publications in last 15 years	ISI: 1140	Inspire: 1118
total citations in last 15 years	ISI: 44987	Inspire: 106545
average citation per product in last 15 years	ISI: 39.5	Inspire: 95.3
H index in last 15 years	ISI: 104	Inspire: 149
total impact factor of publications in last 15 years	ISI: 6262	
average impact factor of publications in last 15 years	ISI: 5.52	

Total Publications

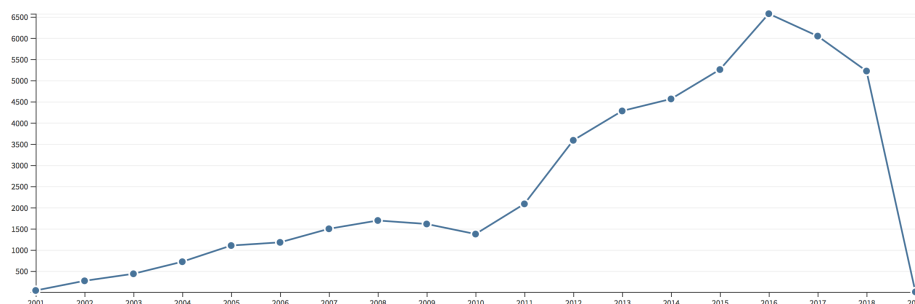
1,164 Analyze

source: ISI Web of knowledge



Sum of Times Cited per Year

source: ISI Web of knowledge





Supervision of research activities

Postdocs

2016-2017, Paolo Montini (assegnio di ricerca), working on the SABRE experiment

2013-2015, Piotr Traczyk (assegnio di ricerca), working on the upgrade of the CMS detector and projections for the Higgs coupling measurement at high luminosity LHC with an upgraded CMS detector

2013-2015, Clara Jorda Lope (INFN fellowship for foreigners), working on measurement of Higgs coupling constant to top quark in the single-top + Higgs final state

2010-2012, Michael Sigamani (INFN fellowship for foreigner), Search for supersymmetry with high energy photons and missing transverse energy in CMS

2009-2011, Emanuele di Marco (assegnio di ricerca), Search for new heavy resonances with electrons and calibration of electromagnetic calorimeter of the CMS detector

Graduate Students

2015-2018 : Marco Cipriani, Measurement of the helicity of the W boson at the LHC (supervisor)

2012-2015: Giulia D'Imperio (now INFN postdoc in Rome), Search for exotic resonances decaying to dijet at 13 TeV (co-supervisor)

2011-2014, Livia Soffi (now postdoc at Cornell University and winner of RTD-A position at Sapienza), Search for new heavy resonances in di-photon final state, awarded Premio Conversi 2015 from INFN for best dissertation in elementary particle physics (co-supervisor)

2010-2012, Marco Grassi (now CNRS-IN2P3, Paris), Measurement of the Standard Model Higgs couplings by means of an exclusive analysis of its diphoton decay channel (co-supervisor)

2008-2010, Daniele Franci (now staff at regional institute for environmental protection), Search for SUSY events with off-time photons (co-supervisor)

2005-2007, Francesco Santanastasio (now associate professor at Sapienza), Search for Supersymmetry with Gauge-Mediated Breaking using high energy photons at CMS experiment (co-supervisor)

Master Students (Laurea Magistrale)

2017, Serena Mancini, Monte Carlo simulation of optical photons in the active veto of the SABRE experiment

2017, Massimo Mastrodicasa, Sensitivity of the SABRE detector for the direct detection of dark matter

2017, Ambra Mariani, Simulation of the flux of environmental gamma radiation for the SABRE experiment

2014, Marco Cipriani, Search for dark matter candidates at LHC with mono-jet events

2012, Giulia D'Imperio, Exclusive analysis of the $H \rightarrow gg$ decay

2012, Silvia Minosse, Exclusive search of axiguons at LHC

2011, Livia Soffi, Search for supersymmetry with events with large missing transverse energy and high energy photons (co-supervision)

2011, Cristiano Fanelli, Exclusive search for a Fermiophobic Higgs at CMS (co-supervision)

2009, Marco Grassi, Study of Missing Energy with Cosmic Rays in the Compact Muon Solenoid detector

Bachelor Students (Laurea Triennale)

more than 10 dissertations covering Higgs discovery, CP Violation and matter-anti-matter asymmetry, Oscillation of neutral B and K mesons



Highlights of research activities

I am an experimental physicist and my primary interest in physics has been the origin of the mass of elementary particles. Since 2005, I have been performing my research activities in the CMS experiment¹ at CERN, focusing on the electroweak symmetry breaking and the Higgs mechanism and the search for exotic new particles. Since 2015, I have also joined the effort for the construction and operation of a new SABRE detector aiming at direct detection of dark matter and verification of the DAMA/Libra signal at Laboratori Nazionali del Gran Sasso. Previously I was a member of the BaBar experiment² at the Stanford Linear Accelerator Center (SLAC) at Stanford, California from 1999 to 2006, where I made significant contributions (my PhD thesis) to the discovery of the CP violation with neutral B mesons. In the following I will briefly detail my primary contributions and areas of interest.

2016-2018: Physics coordinator of CMS experiment

My primary responsibility as the physics coordinator of CMS was ensuring smooth production of physics results and their timely publication with the copious data sample delivered by the LHC during my tenure. CMS recorded more than 100 fb⁻¹ of data, 3 times more than the data collected in 2016. My most important achievement has been an overhaul of the CMS physics strategy by focusing on publication of high quality-results instead of presenting preliminary results at conferences followed by a publication a year later. This change resulted in CMS publishing 132 papers in peer-reviewed journals in 2017 and 126 (as of December 4) in 2018. As a comparison, the ATLAS experiment, with the same data and a slightly larger collaboration, has published 105 papers in 2017 and 93 in 2018 (source: inspirehep.net). In 2016, CMS and ATLAS collaborations published 107 and 105 papers, respectively. Among the most significant results I steered to delivery are the observation of the Higgs boson decay to b quarks³ [**s1** in selected publications], observation of the top-Higgs coupling⁴ [**s2**] (published 3 months ahead of ATLAS), and observation of Higgs decay to tau leptons⁵ [**s3**]. I was in charge of nomination of the internal review committee, the final review of the results and their approval, publication strategy, and coordination with the ATLAS collaboration for the coordinated submission of the H → bb observation paper.

My other key activity was the coordination and oversight of the 17 physics analysis and object groups covering analyses efforts in QCD, electroweak, Higgs, top, and heavy ion physics as well as supersymmetry and exotic searches. It was my responsibility to select the conveners for these groups that constituted the physics office of CMS. In my capacity I worked closely with the computing and data quality coordinators, and devised the plan for the usage of CMS computing resources for production of Monte Carlo samples and re-processing of the data through the end of 2020, to address both short- and long-term needs of the CMS physics program.

As the head of the CMS physics office, I was a member of the CMS management and executive board making decisions for the daily operation of the experiment as well as making the long-term plan. I also had to present the status of the CMS physics program to international referees of the LHCC committee reviewing the operation and output of the LHC experiments.

I served as a member of the program committee for the LHCP conference series, dedicated to physics at LHC, in 2017 and 2018. I am currently the co-chair of the program committee for the 2019 edition in Mexico (<http://lhcp2019.buap.mx>). In this role, I was in charge of defining program of plenary sessions, propose and invite conveners for the parallel sessions, oversight of the parallel session program, and member of the steering committee for the overall organisation of the event.

2017 - present: Precision measurements at LHC

The biggest gain in sensitivity in searches for new phenomena occurred in 2016 with the increase of the center-of-mass energy from 8 TeV to 13 TeV and a two-fold increase of the data sample compared to Run1. During my mandate as the physics coordinator, I initiated a transition from a search-driven program at the frontier of energy to a precision-measurement-driven program probing further the Standard Model. The mass of the W boson represents an important but challenging measurement due to the experimental systematic uncertainty. The W mass is closely



related to the top quark and Higgs mass, both measured very precisely. A first measurement of the W mass at the LHC was performed by ATLAS in 2016 emphasising the limiting experimental and theoretical uncertainties. Since 2017, my graduate student has been working on the measurement of the helicity of the W boson which is a cornerstone for a novel technique for the measurement of the W mass, by constraining some of the dominant systematic uncertainties with data. This result is in the final stage of approval within CMS and will be published by spring of 2019. The PhD dissertation has received very positive comments from external referees and will be defended in February 2019⁶ (M. Cipriani, PhD dissertation).

2015 - present: Direct detection of dark matter with SABRE experiment

One of the most important open questions in particle physics today is the nature of Dark Matter. In line with my interest in the origin of matter, in 2015 I joined the SABRE experiment with the ambitious goal of confirming or invalidating the only hint of Dark Matter provided by the DAMA experiment at Gran Sasso. The SABRE detector will have two twin detectors operating at Gran Sasso and in a new underground laboratory in Australia with an improved detector, composed of purer NaI(Tl) crystals and an active veto for background rejection. While the production of the crystals is still in the R&D phase, through my students and postdoc I have provided the first detailed simulation of the detector to account for environmental and physics backgrounds for both the final detector as well as the single-crystal prototype (Proof-of-principle or PoP). The results of these studies have been recently published in the *Astroparticle Journal*⁷.

2010-2016: Exotic searches (Exotica) in CMS

I was the convener of the exotic searches analysis group (Exotica) of the CMS experiment in 2011 and 2012 during the two years of Run 1 LHC operation at 7 and 8 TeV center-of-mass energy. This is the largest physics group in CMS. During my tenure, I coordinated the activities of more than 50 analysis groups, almost 400 people, from the early stage of the analysis through the approval process for public presentation and publication. In total, I oversaw the publication of almost 60 peer-reviewed papers in PRL, PRD, PLB, JHEP and EPJC since the beginning of 2011, out of the 91 published papers until the end of 2013. It was my responsibility to make sure that tens of searches were delivered to publication in a timely manner and ready for presentation at major conferences, in fierce and strong competition with ATLAS. I had to make sure that simulated samples were provided and it was ultimately my responsibility to review and approve the result for public release. I organised two editions of the CMS exotica workshop in Rome (2011 and 2012), attended by 50-100 collaborators. Because of my leadership and knowledge of the field, I was appointed as the convener of the Beyond Standard Model session at the ICHEP 2012 conference in Melbourne, the largest international HEP conference. I was also appointed as the convener of the *Higgs and New Physics Searches* session at the EPS HEP 2013 Conference in Stockholm, the 2nd largest international conference in HEP. Among the many results covering a wide spectrum of topics some provided the most stringent constraints on models of new physics: generic searches with multijets and missing transverse energy^{8,9,10}[s14], search for supersymmetry with multi-lepton events¹¹, hadronic di-jet resonances^{12,13} [s16], di-lepton resonances^{14,15}, extra dimensions in di-photon spectrum¹⁶, heavy neutrinos¹⁷, new vector-like quarks^{18,19}, long-lived particles²⁰, and dark matter candidates in mono-jet^{21,22} and mono-photon events²³[s15].

I co-led the search for long-lived neutralinos²⁴[s10] (L. Soffi, undergraduate master thesis) with a multi-variate analysis, using, for the first time at a hadron collider, the time of arrival of the photons in the electromagnetic calorimeter and the missing transverse energy, and an exclusive search for axiguons (S. Minosse, undergraduate master thesis). The use of time measurement with the electromagnetic calorimeter for high energy photons²⁵, with a resolution of about 150 ps, is unprecedented in searches at hadron colliders. Studies are underway, in the context of the Phase II CMS Upgrade, to achieve a resolution of tens of ps in order to mitigate the large number of simultaneous collisions after 2025 during the High-Luminosity LHC operation.

In 2014, I participated in the search for a heavy Higgs-like boson decaying to photons with a mass up to 1 TeV as co-supervisor of a PhD dissertation (Livia Soffi, PhD thesis). The dissertation was awarded the prestigious



Premio Conversi award by Commissione Scientifica Nazionale 1 of INFN as the best dissertation in collider physics in Italy in 2015. Although no signal was found, this search had the best sensitivity and exclusion power for this mass range thanks to a dedicated multivariate analysis and optimised fitting technique, instead of the traditional cut-and-count approach used in most exotic searches²⁶[s6]. This search was the foundation for the search with the data collected in 2015 at a center-of-mass-energy of 13 TeV, where both CMS and ATLAS experiments observed a modest excess of events at the di-photon mass of about 750 GeV²⁷. This excess unfortunately turned out to be a statistical fluctuation when the analysis of the 2016 data was performed²⁸.

In 2007, prior to the start of the LHC operation, I coordinated a small analysis team working on the the feasibility study with simulated events (F. Santanastasio, PhD dissertation) for the discovery of supersymmetry with two high-energy photons and large missing transverse energy which was then published with the data recorded with CMS²⁹.

Since 2013, I have participated to and chaired several internal review committees for the approval of new Standard Model measurements, supersymmetry, exotic searches at CMS, projections of Dark Matter searches with the CMS detector at high luminosity LHC, search for dark matter candidates in events with single lepton and missing transverse energy, and the search for dark matter candidates in events with single boosted top jets and missing transverse energy.

At the beginning of LHC Run2 I was involved in three key analyses with the early data at 13 TeV. My graduate student was the leading analyser in the search for new hadronic resonances in di-jet events at with the 2015 data (PhD thesis of Giulia D'Imperio) which was presented at the LHCP 2015 conference in Fall 2015³⁰. I am also involved in the search for dark matter candidates in events with one energetic jet and missing transverse energy, focusing on the estimate of the Standard Model backgrounds with data driven methods in the large W and Z leptonic samples. In the past this has been done with just the muons, but taking advantage of my expertise with electrons and photons, the W and Z decays to electrons have been added to reduced the uncertainties (master thesis of Marco Cipriani)^{31,32}[s4].

2014 - 2015: R&D of a radiation-hard sampling calorimeter

One of the primary challenges for the Phase II operation of the LHC after 2025 will be the large number of simultaneous collisions and the radiation impacting the forward region. During the Long Shutdown 1 since 2013, I have participated to the R&D of a radiation-hard compact calorimeter made of cerium fluoride (CeF₃) scintillating crystals, interleaved with tungsten plates, and read out with radiation-hard wavelength-shifting fibres. Cerium fluoride can be made extremely resistant to ionizing radiation and its scintillation light has a spectrum which is suitable for wavelength shifting and is fast enough for the high-repetition frequencies of modern colliders. We have performed two test beams, one at the Beam Test Facility of Laboratori Nazionali di Frascati with electrons and positrons of 491 MeV³³, and a second test with electrons of 20 and 150 GeV at CERN, and the results have been published on NIM-A³⁴. I was in charge of developing the DAQ interface and conditions database as well as preparation of the mechanical setup.

2013 - 2015: R&D of new fast-timing detectors

I participated in a R&D project funded by Commissione Scientifica Nazionale 5 of INFN (<http://virgilio.mib.infn.it/~ttf/IMCP/documents.html>) to study the micro-channel plates (MCP) as a possible detector with extreme time resolution. The time resolution of MCPs exceeds anything that has been previously used in calorimeters and, if exploited effectively, could aid in the event reconstruction at high luminosity colliders. A first test beam was performed at the Beam Test Facility of Frascati with 491 MeV electrons and positrons, and the results have been published on NIM-A³⁵. I was in charge of developing the DAQ interface and conditions database as well as preparation of the mechanical setup. A second test beam has been performed at CERN with protons and the results were also published in NIM-A³⁶.



2010-2014: Discovery of the Higgs boson in di-photon final state

I performed the first dedicated and optimised feasibility study for the discovery of a fermiophobic Higgs boson³⁷ (C. Fanelli, undergraduate master thesis) decaying to two photons and contributed to the $H \rightarrow gg$ analysis^{38,39} [s13,s7], focusing on the exclusive analysis of the Higgs decays accompanied with the presence of jets (Vector-Boson-Fusion mode), leptons and missing transverse energy (associated production mode). The exclusive analysis proved to be crucial for the discovery of a new boson^{40,41,42,43} [s11,s9] and later for the precise measurement of its mass⁴⁴. After the discovery, I worked on the determination of the Higgs coupling constants and their interpretation together with theorists through the exclusive analysis of the Higgs production mechanisms⁴⁵ [s16] (G. D'Imperio, Undergraduate master thesis; M. Grassi, PhD dissertation).

2008-2011: Inter-calibration of CMS Electromagnetic calorimeter

Prior to the start of the data taking at the LHC, I worked on the commissioning of the high voltage system of the CMS electromagnetic calorimeter (ECAL). Starting in 2009, with the first collisions available, I worked on the inter-calibration of the ECAL^{46,47} using decays of neutral pions to two photons and wrote an optimised standalone application to perform the inter-calibration in situ at CERN using the dedicated calibration stream data. This application was used to improve the inter-calibration in the forward region of the ECAL by including the information from the pre-shower detector, and was the basis of the standard calibration for the barrel region also in Run 2 of the LHC. I also provided some of the early measurements of the ECAL energy and angular resolution using the decays of the neutral pions⁴⁸. Because of my knowledge of the ECAL and photon identification I served on the review committee of the measurement of the isolated photon production cross section⁴⁹, one of the early physics results with the ECAL in 2010. In 2009, I worked on the use of time information from the hadronic and electromagnetic calorimeters in CMS to significantly reduce the instrumental noise in the measurement of the missing transverse energy (M. Grassi, undergraduate master thesis) using the cosmic-ray data collected by CMS.

2007-2009: CMS global event reconstruction

Just 2 years after joining the CMS collaboration, I was selected to coordinate the event reconstruction and development activities within the five subsystems of CMS in the context of the global CMS event reconstruction. In this role, I coordinated the work of about hundred developers from the tracker, the muon system, the electromagnetic and hadronic calorimeters. I successfully led the commissioning with the cosmic-ray data leading to the prompt reconstruction of the first collision data in September 2008. I also led a task force to successfully reduce the size of the persistent reconstructed data below 500 kB per event; this was a mandatory requirement in order to be able to handle the large volume of collision data delivered by the LHC.

2005-2007: CMS Photon and electron reconstruction software

I was in charge of the design and implementation of the ECAL offline reconstruction algorithms and contributed also to the design and implementation of the ECAL offline condition database.

2004: BaBar event reconstruction

Coordination of the BaBar event reconstruction activities, including improving the performance of the prompt reconstruction application. In 2004, BaBar was in smooth data taking mode and my mandate was to improve the reconstruction performance by addressing uncommon problems that would stop the prompt reconstruction and hence delaying the availability of data for the analysers. During my tenure, all such problems were addressed by making the individual detector algorithms robust against rare problematic events, e.g. with pathologic tracks, and we achieved almost 100% processing rate over extended periods of time.

2003-2005: Measurement of CKM angle γ

I was the author of the measurement of the CKM angle γ with the rare decays of neutral B mesons to neutral K and D mesons⁵⁰. The measurement was limited by the statistics accumulated by BaBar at that point because of the very small branching fractions involved. This was the first analysis exploiting the self-flavor-tagging of the $D^{(*)0}$ mesons for the measurement of the $\sin(2\beta+\gamma)$ parameter.



2000-2002: Measurement of CP violating asymmetry $\sin 2\beta$

I was one of the primary authors and contributors to all aspects of the flagship analysis of BaBar to measure and establish the CP violation through the measurement of the CP-violating asymmetry $\sin 2\beta$. I was in charge of data processing and reconstruction of the hadronic CP and flavor samples for the first measurement of $\sin 2\beta$ ⁵¹ and the observation of the CP violation in 2001⁵². I then improved and extended the CP fitting program to measure the direct CP-violation parameter $|\lambda|$ for the following measurement⁵³ and was in charge of the end-to-end analysis and the editing for the final publication⁵⁴ which was also the topic of my PhD dissertation. I was awarded the 2004 Tanaka award for my contributions to measurements of CP violation.

1999-2001: B reconstruction and vertex reconstruction algorithm

I developed the analysis software packages for the reconstruction of high-statistic samples of B mesons in hadronic and semi-leptonic final states. I also worked on the commissioning of the vertex reconstruction algorithm which was a critical ingredient for the time-dependent CP violation measurements. The large B samples and the vertex studies were an important contribution to the first measurement of the flavor oscillation in B₀ meson decays to hadronic final states⁵⁵, and to the measurement of the lifetime of the neutral and charged B mesons⁵⁶.

¹ The CMS Collaboration, *The CMS experiment at the CERN LHC*, JINST 3, S08004 (2008), [doi:10.1088/1748-0221/3/08/S08004](https://doi.org/10.1088/1748-0221/3/08/S08004)

² The BaBar Collaboration, *The BABAR detector*, Nucl. Instrum. Meth. A 479, 1 (2002), [doi: 10.1016/S0168-9002\(01\)02012-5](https://doi.org/10.1016/S0168-9002(01)02012-5)

³ The CMS Collaboration, *Observation of Higgs boson decay to bottom quarks*, Phys. Rev. Lett. 121 (2018) no.12, 121801, [doi: 10.1103/PhysRevLett.121.121801](https://doi.org/10.1103/PhysRevLett.121.121801) [selected publication s1]

⁴ The CMS Collaboration, *Observation of ttH production*, Phys. Rev. Lett. 121 (2018) no.23, 231801, [doi: 10.1103/PhysRevLett.120.231801](https://doi.org/10.1103/PhysRevLett.120.231801) [selected publication s2]

⁵ The CMS Collaboration, *Observation of the Higgs boson decay to a pair of τ leptons with the CMS detector*, Phys. Lett. B 779 (2018) 283, [doi: 10.1016/j.physletb.2018.02.004](https://doi.org/10.1016/j.physletb.2018.02.004) [selected publication s3]

⁶ Marco Cipriani, *Measurement of the helicity of the W boson with the CMS detector*, PhD dissertation in preparation to be defended in February 2019

⁷ The SABRE Collaboration, Monte Carlo simulation of the SABRE PoP background, Astropart. Phys. 106 (2019) 1, [doi: 10.1016/j.astropartphys.2018.10.005](https://doi.org/10.1016/j.astropartphys.2018.10.005)

⁸ The CMS Collaboration, *Search for Supersymmetry in pp Collisions at 7 TeV in Events with Jets and Missing Transverse Energy*, Phys. Lett. B 698, 196 (2011), [doi: 10.1016/j.physletb.2011.03.021](https://doi.org/10.1016/j.physletb.2011.03.021)

⁹ The CMS Collaboration, *Search for gluino mediated bottom- and top-squark production in multijet final states in pp collisions at 8 TeV*, Phys. Lett. B 725, 243 (2013), doi: <http://dx.doi.org/10.1016/j.physletb.2013.06.058>

¹⁰ The CMS Collaboration, *Search for new physics in the multijet and missing transverse momentum final state in proton-proton collisions at $\sqrt{s} = 7$ TeV*, Phys. Rev. Lett. 109, 171803 (2012), doi: <http://dx.doi.org/10.1103/PhysRevLett.109.171803> [selected publication s14]

¹¹ The CMS Collaboration, *Search for physics beyond the standard model using multilepton signatures in pp collisions at root s=7 TeV*, Phys. Lett. B 704, 411 (2011), [doi: 10.1016/j.physletb.2011.09.047](https://doi.org/10.1016/j.physletb.2011.09.047)

¹² The CMS Collaboration, *Search for Dijet Resonances in 7 TeV pp Collisions at CMS*, Phys. Rev. Lett. 105, 211801 (2010), doi: <http://dx.doi.org/10.1103/PhysRevLett.105.211801>



13 The CMS Collaboration, Search for Resonances in the Dijet Mass Spectrum from 7 TeV pp Collisions at CMS, Phys. Lett. B 704, 123 (2011), doi: <http://dx.doi.org/10.1016/j.physletb.2011.09.015> [selected publication s16]

14 The CMS Collaboration, Search for narrow resonances in dilepton mass spectra in pp collisions at $\sqrt{s} = 7$ TeV, Phys. Lett. B 714, 158 (2012), doi: <http://dx.doi.org/10.1016/j.physletb.2012.06.051>

15 The CMS Collaboration, Search for heavy narrow dilepton resonances in pp collisions at $\sqrt{s} = 7$ TeV and $\sqrt{s} = 8$ TeV, Phys. Lett. B 720, 63 (2013), doi: <http://dx.doi.org/10.1016/j.physletb.2013.02.003> [selected publication s8]

16 The CMS Collaboration, Search for signatures of extra dimensions in the diphoton mass spectrum at the Large Hadron Collider, Phys. Rev. Lett. 108, 111801 (2012), doi: <http://dx.doi.org/10.1103/PhysRevLett.108.111801>

17 The CMS Collaboration, Search for heavy neutrinos and W bosons with right-handed couplings in proton-proton collisions at $\sqrt{s} = 8$ TeV, Eur. Phys. J. C 74, no. 11, 3149 (2014), doi: <http://dx.doi.org/10.1140/epjc/s10052-014-3149-z>

18 The CMS Collaboration, Inclusive search for a vector-like T quark with charge 2/3 in pp collisions at $\sqrt{s} = 8$ TeV, Phys. Lett. B 729, 149 (2014), doi: [10.1016/j.physletb.2014.01.006](http://dx.doi.org/10.1016/j.physletb.2014.01.006)

19 The CMS Collaboration, Search for a Vector-like Quark with Charge 2/3 in t + Z Events from pp Collisions at $\sqrt{s} = 7$ TeV, Phys. Rev. Lett. 107, 271802 (2011), doi: <http://dx.doi.org/10.1103/PhysRevLett.107.271802>

20 The CMS Collaboration, Search for heavy long-lived charged particles in pp collisions at $\sqrt{s} = 7$ TeV, Phys. Lett. B 713, 408 (2012), doi: <http://dx.doi.org/10.1016/j.physletb.2012.06.023>

21 The CMS Collaboration, Search for New Physics with a Mono-Jet and Missing Transverse Energy in pp Collisions at $\sqrt{s} = 7$ TeV, Phys. Rev. Lett. 107, 201804 (2011), doi: <http://dx.doi.org/10.1103/PhysRevLett.107.201804>

22 The CMS Collaboration, Search for dark matter and large extra dimensions in monojet events in pp collisions at $\sqrt{s} = 7$ TeV, JHEP 1209, 094 (2012), doi: [http://dx.doi.org/10.1007/JHEP09\(2012\)094](http://dx.doi.org/10.1007/JHEP09(2012)094)

23 The CMS Collaboration, Search for Dark Matter and Large Extra Dimensions in pp Collisions Yielding a Photon and Missing Transverse Energy, Phys. Rev. Lett. 108, 261803 (2012), doi: <http://dx.doi.org/10.1103/PhysRevLett.108.261803> [selected publication s15]

24 The CMS Collaboration, Search for long-lived particles decaying to photons and missing energy in proton-proton collisions at $\sqrt{s} = 7$ TeV, Phys. Lett. B 722, 273 (2013), doi: <http://dx.doi.org/10.1016/j.physletb.2013.04.027> [selected publication s10]

25 The CMS Collaboration, Time Reconstruction and Performance of the CMS Electromagnetic Calorimeter, JINST 5, T03011 (2010), doi: <http://dx.doi.org/10.1088/1748-0221/5/03/T03011>

26 The CMS Collaboration, Search for diphoton resonances in the mass range from 150 to 850 GeV in pp collisions at 8 TeV, Phys. Lett. B 750, 494 (2015), doi: <http://dx.doi.org/10.1016/j.physletb.2015.09.062> [selected publication s6]

27 The CMS Collaboration, Search for new physics in high mass diphoton events in proton-proton collisions at $\sqrt{s} = 13$ TeV, <http://cds.cern.ch/record/2114808>

28 The CMS Collaboration, Search for high-mass diphoton resonances in proton-proton collisions at 13 TeV and combination with 8 TeV search, Phys. Lett. B 767 (2017) 147, doi: [10.1016/j.physletb.2017.01.027](http://dx.doi.org/10.1016/j.physletb.2017.01.027)

29 The CMS Collaboration, Search for Supersymmetry in pp Collisions at $\sqrt{s} = 7$ TeV in Events with Two Photons and Missing Transverse Energy, Phys. Rev. Lett. 106, 211802 (2011), doi: <http://dx.doi.org/10.1103/PhysRevLett.106.211802>



- ³⁰ The CMS Collaboration, *Search for narrow resonances decaying to dijets in proton-proton collisions at $\sqrt{s} = 13$ TeV*, Phys. Rev. Lett. 116, 071801 (2016), doi: [10.1103/PhysRevLett.116.071801](https://doi.org/10.1103/PhysRevLett.116.071801)
- ³¹ The CMS Collaboration, *Search for dark matter with jets and missing transverse energy at 13 TeV*, preliminary result <http://cds.cern.ch/record/2114807>
- ³² **The CMS Collaboration, *Search for new physics in final states with an energetic jet or a hadronically decaying W or Z boson and transverse momentum imbalance at 13 TeV*, Phys. Rev. D 97 (2018) no.9, 092005, doi: [10.1103/PhysRevD.97.092005](https://doi.org/10.1103/PhysRevD.97.092005) [selected publication s4]**
- ³³ R. Becker et al., *Beam test results for a tungsten-cerium fluoride sampling calorimeter with wavelength-shifting fiber readout*, Journal of Instrumentation 10 (2015) P07002, doi: <http://dx.doi.org/10.1088/1748-0221/10/07/P07002>
- ³⁴ R. Becker, *Performance of a Tungsten-Cerium Fluoride Sampling Calorimeter in High-Energy Electron Beam Tests*, Nucl. Instrum. Meth. A804 (2015) 79-83, doi: <http://dx.doi.org/10.1016/j.nima.2015.09.055>
- ³⁵ L. Brianza et al., *Response of microchannel plates to single particles and to electromagnetic showers*. Nuclear Inst. and Methods in Physics Research, A (2015), pp. 216-221, doi: <http://dx.doi.org/10.1016/j.nima.2015.06.057>
- ³⁶ A. Yu. Barnyakov et al., *Micro-channel plates in ionization mode as a fast timing device for future hadron colliders*, JINST 12 (2017) no.08, C08014, doi: [10.1088/1748-0221/12/08/C08014](https://doi.org/10.1088/1748-0221/12/08/C08014)
- ³⁷ The CMS Collaboration, *Search for a fermiophobic Higgs boson in pp collisions at $\sqrt{s} = 7$ TeV*, JHEP 09(2012) 111, doi: [http://dx.doi.org/10.1007/JHEP09\(2012\)111](http://dx.doi.org/10.1007/JHEP09(2012)111)
- ³⁸ The CMS Collaboration, *Search for the standard model Higgs boson decaying into two photons in pp collisions at root s=7 TeV*, Phys. Lett. B 710, 403 (2012), doi: <http://dx.doi.org/10.1016/j.physletb.2012.03.003>
- ³⁹ **The CMS Collaboration, *Observation of the diphoton decay of the Higgs boson and measurement of its properties*, Eur. Phys. J. C 74, no. 10, 3076 (2014), doi: <http://dx.doi.org/10.1140/epic/s10052-014-3076-z> [selected publication s7]**
- ⁴⁰ The CMS Collaboration, *A New Boson with a Mass of 125 GeV Observed with the CMS Experiment at the Large Hadron Collider*, Science 338 (2012) 1569, doi: [10.1126/science.1230816](https://doi.org/10.1126/science.1230816)
- ⁴¹ The CMS Collaboration, *Combined results of searches for the standard model Higgs boson in pp collisions at $\sqrt{s} = 7$ TeV*, Phys. Lett. B 710, 26 (2012), doi: <http://dx.doi.org/10.1016/j.physletb.2012.02.064>
- ⁴² **The 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), doi: <http://dx.doi.org/10.1016/j.physletb.2012.08.021> [selected publication s11]**
- ⁴³ **The CMS Collaboration, *Observation of a new boson with mass near 125 GeV in pp collisions at $\sqrt{s} = 7$ and 8 TeV*, JHEP 1306, 081 (2013), doi: [http://dx.doi.org/10.1007/JHEP06\(2013\)081](http://dx.doi.org/10.1007/JHEP06(2013)081) [selected publication s9]**
- ⁴⁴ **The CMS Collaboration, *Precise determination of the mass of the Higgs boson and tests of compatibility of its couplings with the standard model predictions using proton collisions at 7 and 8 TeV*, Eur. Phys. J. C 75, no. 5, 212 (2015), doi: <http://dx.doi.org/10.1140/epic/s10052-015-3351-7> [selected publication s5]**
- ⁴⁵ **Aleksandr Azatov, Roberto Contino, Daniele Re, Jamison Galloway, Marco Grassi, Shahram Rahatlou (2012), *Determining Higgs couplings with a model-independent analysis of h to gamma gamma*, JHEP 1206, 134 (2012), doi: [http://dx.doi.org/10.1007/JHEP06\(2012\)134](http://dx.doi.org/10.1007/JHEP06(2012)134) [selected publication s16]**



- ⁴⁶ The CMS Collaboration, *Intercalibration of the barrel electromagnetic calorimeter of the CMS experiment at start-up*, JINST 3 (2008) P10007, doi: <http://dx.doi.org/10.1088/1748-0221/3/10/P10007>
- ⁴⁷ P. Adzic et al., *Energy resolution of the barrel of the CMS electromagnetic calorimeter*, JINST 2, P04004 (2007), doi: <http://dx.doi.org/10.1088/1748-0221/2/04/P04004>
- ⁴⁸ The CMS Collaboration, *Performance and operation of the CMS electromagnetic calorimeter*, JINST 5 (2010) T03010, doi: <http://dx.doi.org/10.1088/1748-0221/5/03/T03010>
- ⁴⁹ The CMS Collaboration, *Measurement of the Isolated Prompt Photon Production Cross Section in pp Collisions at root s=7 TeV*, Phys. Rev. Lett. 106 (2011) 082001, doi: <http://dx.doi.org/10.1103/PhysRevLett.106.082001>
- ⁵⁰ The BaBar Collaboration, *Measurement of $B\text{-}\bar{0}\text{-}\rightarrow D^{(*)0} K^{*0}$ branching fractions*, Phys. Rev. D74 (2006) 031101, <http://dx.doi.org/10.1103/PhysRevD.74.031101>
- ⁵¹ The BaBar Collaboration, *Measurement of CP-violating asymmetries in B-0 decays to CP eigenstates*, Phys. Rev. Lett. 86 (2001) 2515-2522, doi: <http://dx.doi.org/10.1103/PhysRevLett.86.2515>
- ⁵² The BaBar Collaboration, *Observation of CP Violation in the B0 Meson System*, Phys. Rev. Lett. 87 (2001) 091801, doi: <http://dx.doi.org/10.1103/PhysRevLett.87.091801>
- ⁵³ The BaBar Collaboration, *Study of time-dependent CP-violating asymmetries and flavor oscillations in neutral B decays at the Upsilon(4S)*, Phys. Rev. D 66 (2002) 032003, <http://dx.doi.org/10.1103/PhysRevD.66.032003>
- ⁵⁴ The BaBar Collaboration, *Measurement of the CP asymmetry amplitude $\sin^2\beta$ with B-0 mesons*, Phys. Rev. Lett. 89 (2002) 201802, doi: <http://dx.doi.org/10.1103/PhysRevLett.89.201802>
- ⁵⁵ The BaBar Collaboration, *Measurement of B-0-(B)over-bar(0) flavor oscillations in hadronic B-0 decays*, Phys. Rev. Lett. 88 (2002) 221802, doi: <http://dx.doi.org/10.1103/PhysRevLett.88.221802>
- ⁵⁶ The BaBar Collaboration, *Measurement of the B-0 and B+ meson lifetimes with fully reconstructed hadronic final states*, Phys. Rev. Lett. 87 (2001) 201803, doi: <http://dx.doi.org/10.1103/PhysRevLett.87.201803>