Mikael Chala

IFIC and University of Valencia C/ Catedrático José Beltrán, 46980 Paterna, Spain

PERSONAL DETAILS

Date of birth May 26, 1987

Current position Postdoc at IFIC and University of Valencia

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mikael.chala@cern.ch

EDUCATION

PhD. in Theoretical Physics

October 2011 – June 2014

Universidad de Granada

PhD. in Theoretical Physics. Thesis, Collider Signatures of a Non-Standard Higgs Sector, supervised by Prof. Francisco del Águila and Dr. José Santiago. Committee members: Manuel Masip, Manuel Pérez-Victoria, Geraldine Servant, Andreas Weiler and Verónica Sanz.

Grade: suma cum laude.

MSc. in Theoretical Physics

October 2010 – September 2011

Universidad de Granada

MSc. in Advanced Techniques and Methods in Physics. Thesis, Searches for new quarks at the LHC via the associated production channel, supervised by Dr. José Santiago. Committee members: Fernando Cornet, José Ignacio Illana and Mar Bastero-Gil.

Grade: 9.8/10.

BSc. + MSc. in Physics

October 2005 – July 2010

Universidad de Granada

Spanish *Licenciatura degree* in Physics, equivalent in scope to an American postgraduate Master's degree. Concentration in theoretical and mathematical physics.

Grade: 9.0/10.

RESEARCH EXPERIENCE

Postdoctoral contract

November 2016 – November 2018

IFIC

Postdoctoral contract for a two yeark work at the IFIC Theory group in Valencia (Spain). Funded by IFIC, Universidad de Valencia and CSIC under the *Severo Ochoa* programm.

Postdoctoral contract

November 2014 – November 2016

DESY

Postdoctoral contract for a two yeark work at the DESY Theory group in Hamburg (Germany). Funded by DESY.

Mobility grant

September – October 2014

ETH Zurich

Mobility grant for a two month work at the ITP at ETH Zurich. Advisor: Prof. Charalampos Anastasiou. Funded by MECD under the FPU programm.

Mobility grant

 $September-November\ 2013$

CERN

Mobility grant for a three month work at the CERN Theory Division. Advisor: Dr. Gilad Perez. Funded by Universidad de Granada and CEI BioTic under the *Movilidad Internacional* programm.

Doctoral grant

December 2011 – October 2014

Universidad de Granada

Doctoral grant for the study of new physics at the TeV scale and its implications at large accelerators. Advisors: Prof. Franciso del Águila and Dr. José Santiago. Funded by MEC under the FPU programm.

Doctoral grant

August – November 2011

Universidad de Granada

Doctoral grant for the study of new physics at the TeV scale and its implications at large accelerators. Advisor: Dr. José Santiago. Funded by MICINN under the FPI programm.

Postgraduate contract

February – July 2011

Universidad de Granada

Postgraduate contract for a six month work at the Dpto. Física Teórica y del Cosmos of the Universidad de Granada. Advisor: Dr. José Santiago. Funded by Universidad de Granada.

Doctoral grant

2010 – DECLINED

Universidad de Santander

Funded by MICINN under the *FPI* programm.

Postgraduate grant

July – September 2010

CERN

Postgraduate grant for the study of the Wtb vertex at the ATLAS experiment at CERN. Advisors: Prof. Antonio Onofre and Dr. Nuno Castro. Funded by LIP.

Undergraduate grant

September 2009 – June 2010

Universidad de Granada

Undergraduate grant for the study of T-duality and Einstein-Gauss-Bonnet gravity at the Universidad de Granada. Advisor: Dr. Bert Janssen. Funded by MEC under the *Becas de Colaboración* programm.

Undergraduate grant

 $May\ 2009-May\ 2010$

Universidad de Granada

Undergraduate grant for the research of symmetries on field theory and supergravity at the Universidad de Granada. Advisor: Dr. Bert Janssen. Funded by Universidad de Granada under the *Becas de Iniciación a la investigación* programm.

${\bf Undergraduate\ grant}$

July – September 2009

UAM/CSIC

Undergraduate grant for the research of string theory and supergravity at the IFT in the UAM/CSIC. Advisors: Prof. Tomás Ortín and Dr. Patrick Meesen. Funded by CSIC under the JAEIntro programm.

TEACHING

Physics of the Standard Model

May – July 2016

 $56\ hours,\ 5.6\ master\ credits$ DESY

Physics beyond the Standard Model

January 2016

1.5 hours, 0.15 master credits Universität Hamburg

Physics beyond the Standard Model

June 2015

4.5 hours, 0.45 master credits Universität Hamburg

Introduction to GNU/Linux

May 2014

15 hours, 2 free elective credits Universidad de Granada

Theoretical mechanics for mathematicians

February – June 2014

30 hours, 3 ECTS credits Universidad de Granada

General physics for biologists

Frebruary – June 2014

30 hours, 3 ECTS credits Universidad de Granada

Introduction to GNU/Linux

May 2013

15 hours, 2 free elective credits Universidad de Granada

STUDENTS

Ivan Sobolev

 $July-September\ 2015$

Moscow State University

Coadvisor with Prof. Georg Weiglein of the MSc. student Ivan Sobolev within the DESY Summer Student programm.

Esperanza López Centella

Universidad de Granada

Advisor of the PhD. student Esperanza López Centella within the spanish MICINN mobility grant programm.

VISITS TO OTHER INSTITUTIONS

ITP at University of Bern

Bern, Switzerland (two weeks)

IPPP at University of Durham

Durham, United Kingdom (one week)

MITP at University of Mainz

Mainz, Germany (one week)

Universidad de Granada

Granada, Spain (two weeks)

Fermilab
Chicago, United States (two weeks)

ITP at ETH Zurich

Zurich, Switzerland (two months)

LPT d'Orsay

Orsay, France (one week)

CERN Theory Division

Geneva, Switzerland (three months)

ITP at ETH Zurich

Zurich, Switzerland (one week)

LPT d'Orsay

Orsay, France (one week)

CERN Theory Division

Geneva, Switzerland (one week)

March 2017

Wiaitii 2011

February 2017

September 2016

October 2016

November 2015

 $September-October\ 2014$

November 2013

 $September-December\ 2013$

October 2013

July 2012

June 2012

ORGANIZATION OF CONFERENCES AND WORKSHOPS

BSM faces LHC run-2 realities

Hamburg (Germany)

September 2016

International workshop on future linear colliders

Granada (Spain)

September 2011

LECTURES

Invited lectures are labeled with

✓ Introduction to composite Higgs models II

March 2017

University of Bern (Bern, Switzerland)

✓ Introduction to composite Higgs models I

 $March\ 2017$

University of Bern (Bern, Switzerland)

Introduction to collider physics

May 2016

DESY(Hamburg, Germany)

Composite Higgs models

January 2016

DESY(Hamburg, Germany)

SEMINARS AND TALKS AT CONFERENCES AND **WORKSHOPS**

Invited presentations are labeled with

A light sneutrino rescues the light stop

March 2017

IFIC seminar (Valencia, Spain)

✓ Non-minimal composite Higgs models with dark matter

February 2017

University of Durham seminar (Durham, United Kingdom)

Models of composite dark matter

Februay 2017

University of Valencia seminar (Valencia, Spain)

☑ Direct dark matter versus mediator searches at 100 TeV

January 2017

1st FCC physics workshop (Geneva, Switzerland)

The MSSM faces the LHC run 2

December 2016

First Christmas workshop (Granada, Spain)
✓ Predictive models of dark matter Universidad de Granada seminar (Granada, Spain) October 2016
Exotic searches of new vector-like quarks BSM faces LHC run-2 realities (Hamburg, Germany) September 2016
Composite dark matter Effective field theories as discovery tools (Mainz, Germany)
Collider signals of new quarks and vector bosons University of Dortmund seminar (Dortmund, Germany)
Observable effects of general new scalar particles Physics at the terascale (Hamburg, Germany)
Composite Higgs models and dark matter Composite Higgs program at Fermilab (Chicago, United States)
Interplay between dark matter models and LHC data DESY theory workshop: Physics at the LHC and beyond (Hamburg, Germany)
Collider signatures of LNV Higgs sectors BLV 2015 (Amherst, United States)
An effective field-theory approach to LHC data DESY theory seminar (Hamburg, Germany)
Searches for heavy gluons Workshop on new physics searches in the top quark sector at the LHC (Braga, Portugal)
LNV in non-standard Higgs sectors DISCRETE 2014 (London, United Kingdom)

October 2014

Stretching the LHC discovery power University of Zurich seminar (Zurich, Switzerland)

Leptophilic physics at the LHC VI CPAN days (Sevilla, Spain)	October 2014
Constraining new physics at the LHC ETH Zurich seminar (Zurich, Switzerland)	October 2013
Searching for doubly-charged scalars at the LHC CERN CMS seminar (Geneva, Switzerland)	September 2013
Distinguishing LNV scalars at the LHC Scalars 2013 (Warsaw, Poland)	September 2013
Top and bottom partners in composite Higgs models at the LHC LHCP conference 2013 (Barcelona, Spain)	May 2013
Dark matter from composite Higgs models 8th MultiDark workshop (Granada, Spain)	April 2013
Searching for LNV scalars at the LHC IV CPAN days (Granada, Spain)	November 2012
Diphoton excess and dark matter from composite Higgs models Universidad de Granada seminar (Granada, Spain)	November 2012
New Higgs production mechanisms in composite Higgs models BOOST 2012 (Valencia, Spain)	July 2012
New Higgs production mechanisms in composite Higgs models Higgs hunting 2012 (Orsay, France)	July 2012
New Higgs production mechanisms in composite Higgs models Workshop on strongly coupled physics beyond the SM (Trieste, Italy)	January 2012
New vectorlike production mechanisms at the LHC	November 2011

PARTICIPATION IN OTHER CONFERENCES AND WORKSHOPS

HEFT 2015 November 2015 Chicago (United States) Anticipating discoveries: LHC14 and beyond July 2015 Munich (Germany) April 2014 Hunting for a non-standard Higgs sector Benasque (Spain) **HEFT 2013** October 2013 Geneva (Switzerland) Fast simulators for the LHC June 2012 Geneva (Switzerland) International workshop on future linear colliders September 2011 Granada (Spain) Workshop on discovery physics at the LHC December 2010

PARTICIPATION IN SCHOOLS

Geneva (Switzerland)

Kruger National Park (South Africa)

IDPASC neutrino school	October 2012
Granada (Spain)	
International school Cargese 2012	August 2012
Cargese (France)	
School on strongly coupled physics beyond the	
Standard Model	January 2012
Trieste (Italy)	
Taller de altas energías	July 2011
$Bilbao\ (Spain)$	
CERN summer school	Juy 2010

OUTREACH ACTIVITIES

Public talk August 2014

Porcuna, Spain

Talk entitled Quantum Physics and Relativity: when reality overcomes fiction, addressed to the general public and promoted by the Contrapunto association.

Student engagement

November 2012 – June 2013

Granada, Spain

Programm entitled Searching for the Higgs boson in four lepton events, addressed to secondary schools and promoted by the PIIISA project.

Public engagement

November 2012

Granada, Spain

Programm entitled *Physics of elementary particles*, addressed to the general public and promoted by the XII Science week in Andalucía.

Public talk September 2012

Granada, Spain

Talk entitled *Elementary*, my dear Higgs?, addressed to PhD. students and promoted by the official PhD. physics programm.

Public engagement

November 2011

Granada, Spain

Programm entitled *Physics of elementary particles*, addressed to the general public and promoted by the XI Science week in Andalucía.

LIST OF PUBLICATIONS

The list of publications, including citations, can be found in the **inSPIRE** database under the command find a chala, mikael. As of today, the total number of citations is 776.

Title / Authors / Journal reference

arXiv number

A light sneutrino rescues the light stop

1702.07359

Mikael Chala, Antonio Delgado, Germano Nardini and Mariano Quirós To be submitted.

Confronting SUSY models with LHC data via electroweakino production

1610.03822

Chiara Arina, Mikael Chala, Víctor Martín-Lozano and Germano Nardini. JHEP **1612** (2016) 149

Physics at a 100 TeV pp collider: beyond the Standard

Model phenomena

1606.00947

T. Golling, M. Hance, P. Harris, M.L. Mangano et al. Submitted to Phys. Rept.

A unified explanation for dark matter and electroweak baryogenesis with direct detection and gravitational wave signatures

1605.08663

Mikael Chala, Germano Nardini and Ivan Sobolev Phys. Rev. D94 (2016) 055-006	
Deciphering the CP nature of the 750 GeV resonance M. Chala, C. Grojean, M. Riembau and T. Vantalon Phys. Lett. B760 (2016) 220-227	1604.02029
Tricking Landau-Yang: How to obtain the diphoton excess from a vector resonance M. Chala, M. Duerr, F. Kahlhoefer and K. Schmidt-Hoberg Phys. Lett. B755 (2016) 145-149	1512.06833
Renormalization Group Constraints on New Top Interactions from Electroweak Precision Data Jorge de Blas, Mikael Chala and Jose Santiago JHEP 1509 (2015) 189	1507.00757
Composite Dark Sectors Adrián Carmona and Mikael Chala JHEP 1506 (2015) 105	1504.00332
Constraining Dark Sectors with Monojets and Dijets M. Chala, F. Kahlhoefer, M. McCullough, G. Nardini and K. Schmidt-Hoberg JHEP 1507 (2015) 089	1503.05916
Observable Effects of General New Scalar Particles J. Blas, M. Chala, M. Pérez-Victoria and J. Santiago. JHEP 1504 (2015) 078	1412.8480
Collider limits on leptophilic interactions F. del Águila, M. Chala, J. Santiago and Y. Yamamoto. JHEP 1503 (2015) 059	1411.7394
The Elusive Gluon Mikael Chala, José Juknevich, Gilad Perez and José Santiago. JHEP 1501 (2015) 092	1411.1771
From Tevatron's top and lepton-based asymmetries to the LHC A. Carmona, M. Chala, A. Falkowski, S. Khatibi, M. Najafabadi et al. JHEP 1407 (2014) 005	1401.2443
Lepton Number Violation and Scalar Searches at the LHC Francisco del Águila, Mikael Chala, Arcadi Santamaría and José Wudka Acta Phys. Polon. B44 (2013) 1001-1011	1311.2950
LHC bounds on Lepton Number Violation mediated by doubly and singly-charged scalars Francisco del Águila and Mikael Chala JHEP 1403 (2014) 027	1311.1510

Global Constraints on Lepton-Quark Contact Interactions

1307.5068

Jorge de Blas, Mikae	l Chala and José Santiago
Phys. Rev D88 (2	2013) 095-011

Discriminating between lepton number violating scalars using events with four and three charged leptons at the LHC Francisco del Águila, Mikael Chala, Arcadi Santamaría and José Wudka Phys. Lett. B725 (2013) 310-315	1305.3904
$Hb\bar{b}$ production in Composite Higgs Models Mikael Chala and José Santiago Phys. Rev. D88 (2013) 035-010	1305.1940
Searches for New Vector Like Quarks: Higgs Channels Anupama Atre, Mikael Chala, José Santiago JHEP 1305 (2013) 099	1302.0270
$h\to\gamma\gamma$ excess and Dark Matter from Composite Higgs Models $\it Mikael~Chala$ $\it JHEP~1301~(2013)~122$	1210.6208
New Higgs Production Mechanism in Composite Higgs Models Adrián Carmona, Mikael Chala, José Santiago JHEP 1207 (2012) 049	1205.2378
Single Vectorlike Quark Production at the LHC R. Barceló, A. Carmona, M. Chala, M. Masip, J. Santiago Nucl. Phys. B857 (2012) 172-184	1110.5914
Proceedings	
Four and two-lepton signals of leptophilic gauge interactions at large colliders F. del Aguila, M. Chala, J. Santiago and Y. Yamamoto Proceedings of the Corfu Summer Institute 2014	1505.00799
interactions at large colliders F. del Aguila, M. Chala, J. Santiago and Y. Yamamoto	1505.00799 1311.2708
 interactions at large colliders F. del Aguila, M. Chala, J. Santiago and Y. Yamamoto	
 interactions at large colliders F. del Aguila, M. Chala, J. Santiago and Y. Yamamoto Proceedings of the Corfu Summer Institute 2014 Boosted objects and jet substructure at the LHC A. Altheimer, A. Arce, L. Asquith, J. Backus Mayes et al. BOOST Proceedings 2012 Distinguishing between LNV scalars at the LHC Francisco del Águila, Mikael Chala, Arcadi Santamaría and José Wudka 	1311.2708

OTHER EXPERIENCE

Referee 2014 – today

Peer-reviewed Journals

I have been referee in the following peer-reviewed journals: Physical Review D.

AWARDS

Individual performance bonus

December 2015

October 2014

DESY

Individual performance bonus in recognition of the exceptionally good work done in 2015.

First prize

CPAN

First prize in the V Outreach Contest organized by the spanish CPAN in the category Outreach Articles, by the article: Neutrino masses: where is our Neptune? Event held in Sevilla (Spain).

Bronze medal March 2005

Royal Spanish Mathematical Society

Bronze medal in the national phase of the spanish National Mathematical Olympiad organized by the Royal Spanish Mathematical Society. Event held in Santiago de Compostela (Spain).

Second prize March 2005

Royal Spanish Mathematical Society

Second prize in the local phase of the spanish National Mathematical Olympiad organized by the Royal Spanish Mathematical Society. Event held in Córdoba (Spain).

INSTITUTIONAL CHARGES

Dpto. Física Teórica y del Cosmos

 $January\ 2011-June\ 2012$

Universidad de Granada

Member of the *Junta de Dirección* of the Dpto. Física Teórica y del Cosmos of the Universidad de Granada.

PARTICIPATION IN FUNDED PROJECTS

PITN-GA-2012-316704

2016 - 2018

Universidad de Valencia

SEV-2014-0398. IP: Prof. Juan José Hernández Rey. Number of members: 24. Funded by the "Centro de excelencia Severo Ochoa" programme.

PITN-GA-2012-316704

2016 - 2018

Universidad de Valencia

FPA2014-54459-P. IP: Prof. Arcadi Santamaria. Number of members: 24. Funded by MINECO.

PITN-GA-2012-316704

2014 - 2018

Universidad de Granada

Higgs Tools. IP: Prof. Roberto Pittau. Number of members: 13. Funded by European Commission.

FPA2013-47836-C3-1-P

2014 - 2016

Universidad de Granada

Cálculos precisos para la búsqueda de nueva física a la escala del TeV en grandes colisionadores y observatorios de partículas. IP: Prof. Francisco del Águila. Number of members: 11. Funded by MINECO.

FPA 2010-17915

2011 - 2015

Universidad de Granada

Nueva física a la escala del TeV y sus implicaciones en grandes colisionadores. IP: Prof. Francisco del Águila. Number of members: 9. Funded by MICINN.

CERN/FP/116397/2010

2012 - 2014

LIP

Phenomenologic Studies at the LHC. IP: Prof. Antonio Onofre. Number of members: 17. Funded by LIP.

FQM 101

1995 - 2014

 $Universidad\ de\ Granada$

Física Teórica (Partículas Elementales). IP: Prof. Francisco del Águila. Number of members: 25. Funded by Junta de Andalucía.

CERN/FP/116397/2010

2011 - 2012

LIP

Phenomenological Studies at the LHC. IP: Prof. Antonio Onofre. Number of members: 19. Funded by LIP.

CERN/FP/109309/2009

2010 - 2010

ATLAS

Collaboration in the ATLAS experiment. IP: Prof. Amélia Arminda. Number of members: 32. Funded by LIP.