

# Curriculum Vitae

Géraldine Servant

Researcher in Theoretical Particle Physics & Cosmology

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## Professional Experience

- From January 2015      University of Hamburg Professor & DESY Leading Scientist
- Oct. 2012–July 2015    ICREA Research Professor, IFAE, Universitat Autònoma de Barcelona.
- July 2008–June 2013    Staff scientist in the CERN Theory Division under Starting Grant of the European Research Council (ERC).
- Jan 2006–June 2008    CERN Fellow in the CERN Theory Division.
- Jan 2004–June 2013    Researcher at Institut de Physique Théorique (IPhT) CEA/Saclay (on leave after January 2008).
- Sept 2001–Aug 2004    Joint Postdoctoral appointment at the University of Chicago (Enrico Fermi Institute) and Argonne National Laboratory.
- Summers 1997 & '99    Visiting positions at the Physics Department of McGill University in Montréal (Center for High Energy Theory).
- Sept 1998–Feb 1999    University in Montréal (Center for High Energy Theory).

## Education

- Sept 98–June 01 Ph.D. “Phenomenological studies beyond the Standard Model”.  
Supervisor: Carlos Savoy.  
Laboratory: Service de Physique Théorique du CEA-Saclay.  
University: Paris XI Orsay; Ph.D awarded on June 1st 2001.
- Sept 94–Aug 98 Scholarship from Ecole Normale Supérieure de Lyon (ENSL):  
-Sept 97–June 98 Graduate Degree: DEA “Fields, Particles, Matters” (at Université de Paris VII)  
-Sept 95–June 97: Bachelor and Master in Physics (ENSL)  
Summer 96: Training at Observatoire de la Côte d’Azur.  
-Sept 94–June 95: Bachelor in Earth Sciences (ENSL)  
Summer 95: Training at Groupe de Géodésie Spatiale, Toulouse.
- Sept 92–June 94 Undergraduate Studies in Physics & Maths at Université de Grenoble.
- June 92 Baccalauréat C, Orléans.

## Individual Research Grants

- Jul 2008–Jun 2013 Starting Grant of the European Research Council: *Cosmology at the CERN Large Hadron Collider*.  
CERN Fellow hired under this grant:  
Nov 09–Oct 11: Thomas Konstandin
- Nov 2006–Oct 2010 Grant of the french Agence Nationale de la Recherche (ANR) within the programme ‘Young researchers’: *Dark matter and dark energy: a challenge for particle physics*.  
Postdocs hired in IPhT CEA Saclay under this grant:  
Oct 07–Sept 08: Chiara Caprini  
Nov 09–Oct 10: Gabrijela Zaharijas

## Participation to other funded research groups

- From 2019 Excellence Cluster “Quantum Universe” (co-spokesperson)
- Since 2016 Cost European Network: Connecting insights in fundamental physics (‘Fundamental Connections’)
- 2016-2020 Invisibles-Plus RISE and Elusives European ITN Network through the University of Goettingen-DESY node (Horizon2020 projects).
- 2016-2018 SFB 676 Particles, Strings, and the Early Universe, U. Hamburg.
- Since 2017 DESY PIER Seed project funding: Dark Matter at 10 TeV and beyond, a new goal for cosmic-ray experiments.
- 2012–2015 Excelencia Severo Ochoa at IFAE Barcelona.
- 2011-2015 Invisibles ITN network through the CERN node.
- 2006-2011 Réseau LISA-France supported by the Centre National d’Etudes Spatiales (CNES)
- 2005–2008 Programme of the Agence Nationale de la Recherche (ANR): *Physique au-delà du Modèle Standard: Implications pour les collisionneurs et la cosmologie.*
- 2010–2013 Programme of the Agence Nationale de la Recherche (ANR): *Confronting theory with experiment at the Terascale (TH-EXP@TeV).*
- 1999–2012 French Groupement de Recherche (GDR) *Terascale*
- 2000–2008 RTN European networks *Across the energy frontier* (2000–2004) & *The quest for unification: Theory confronts experiment* (2004–2008)

## Academic Teaching

- 1998 (McGill University) Physics laboratories for undergraduates.
- 1999–2001 (University Paris XI) Tutorials in Electromagnetism (DEUG), Probability & Statistics (Licence & Magistère), Physics for biologists (DEUG).
- Spring 2015 (U. Barcelona) Cosmology (Master).
- Winter 2015, Summer 2017, Summer 2018 (U. Hamburg) Theoretical cosmology (Master).
- Summer 2016 (U. Hamburg) Standard Model of particle physics (Master).
- Winter 2018 (U. Hamburg) Exercises in Theoretical Physics I (Bachelor).

## Workshop, Conference & School Organisation

- Trieste ICTP Summer School On Particle Physics, June 10-21, 2019.
- Centro de Ciencias de Benasque Pedro Pascual, Spain, Workshop *Light scalars: origin, cosmology, astrophysics and low energy probes*, April 7-13, 2019.
- Cargèse Summer School, *Mass: from the Higgs to Cosmology*, July 09-21, 2018.
- DESY Theory Workshop, Hamburg, *Fundamental physics in the cosmos: the early, the large and the dark universe*, September 26-29, 2017.
- DESY, Hamburg, *Gravitational waves and cosmology*, October 17-21, 2016.
- Cargèse Summer School, *MultiTeV Probes of the Standard Model and beyond with the LHC*, July 14-26, 2014.
- PONT d’Avignon 2014 conference, *Progress on Old and New Themes in Cosmology*, Avignon, April 14-18 2014.
- Cargèse Summer School *Across the TeV frontier at the LHC*, August 20-Sept 1, 2012.

- TH Institute on *BSM physics*, CERN, June 2012.
- TH-LPCC Summer Institute on *LHC physics*, CERN, August 2011.
- Theory Institute *Dark matter at the LHC, underground, and in the heavens*, CERN, July 2011.
- PPC 2011, *International Workshop on the Interconnection between Particle Physics & Cosmology*, CERN, June 14-18 2011.
- PONT d'Avignon 2011 conference, *Progress on Old and New Themes in Cosmology*, Avignon, April 18-22 2011.
- Cargèse Summer School *Physics at TeV colliders: from Tevatron to LHC*, July 19-31, 2010.
- Planck 2010 conference *From the Planck scale to the EW scale*, CERN, May 31-June 4, 2010.
- ENTApP Dark Matter workshop, CERN, February 2-6 2009.
- International meeting “PONT d'Avignon 2008”, *Progress on Old and New Themes in Cosmology*, Avignon, April 21-25 2008.
- European Planck'06 Conference “From the Planck scale to the EW scale”, Carré des Sciences, Paris, May 29-June 02 2006.
- ENTApP visitor programme on Dark Matter, CERN, March'07.
- Cargèse Summer School on *Particle Physics and Cosmology beyond the Standard Models*, July 30-Aug 11, 2007; Editor of the Proceedings.
- Theory Institute on Supersymmetry, Higgs and Extra Dimensions, Argonne National Lab, May 24-28 2004.
- Neutrino Workshop, Argonne National Lab, May 11-17 2003.
- COSMO-02, International Workshop on Particle Physics and the Early Universe, Chicago, September 18-21 2002.
- Theory Institute on Supersymmetry, Higgs and Extra Dimensions, Argonne National Lab, september 9-13 2002.

## Convenorships, Seminar organisation

- Organiser of Workshop Seminar semester series at DESY/U. Hamburg: Winter 2018: ‘Hot topics in QFT’ Summer 2018: ‘Flavor’, Winter 2017: ‘Vacuum energy’, Summer 2017: ‘Gravitational waves’, Winter 2016: ‘ Axions’, Summer 2016: ‘Getting prepared for LHC Run II’, Winter 2015: ‘Hierarchy problem’.
- Member of the Scientific Organizing Committee (SOC) for the 22th International Conference on General Relativity and Gravitation (GR22).
- Member of Scientific Programme Committee of the conference ”Exploring the Dark Universe”, Quy Nhon (Vietnam), July 23-29 2017.
- Convener of the Baryogenesis sessions of the Baryon and Lepton number violation (BLV 2017) conference, Case Western Reserve University in Cleveland, USA, May 2017.
- Convener of the “Dark Matter @ LHC” sessions of the TeVPA 2016 conference, CERN, Geneva, September 2016.
- Convener of the “BSM/Cosmology” sessions of the International Workshop on Future Linear Colliders LCWS 2014, Belgrade, October 6-10 2014.
- Convener of the “Particle Physics” sessions of the TeVPA/IDM Astroparticle Physics 2014 conference, Amsterdam, June 23-28 2014.
- Jan. 2006–June 2013: Co-organiser of the Wednesday Theoretical informal cosmology seminars at CERN.
- Jan. 2011–June 2013: Co-organiser of the Friday Theoretical particle & astroparticle

physics seminars at CERN.

- Convener of the “Alternatives” session of SUSY 2012, Beijing, August 13-18 2012.
- Convener of the “Beyond the SM: SUSY, Cosmology, Alternative” sessions for LCWS 2012, U. Texas Arlington, October 22-26 2012.
- Editor of the “Cosmological Connections” Physics chapter of the ILC Detailed Baseline Design Report, 2012.
- Editor of the “New Fermions” chapter of the WG3-Exotic report submitted to the European Strategy group, 2012.
- Convener of the ‘Beyond SM: Susy, Cosmology, Alternatives’ sessions for the 2011 International Workshop on Future Linear Colliders (LCWS11), Universidad de Granada, September 26-30 2011.
- Local Organizing Committee of the “Sixth CERN-Fermilab Hadron Collider Physics Summer School” (HCPSS 2011), CERN, June 8-17 2011.
- Convener of the Cosmology sessions of the “International Workshop on Linear Colliders 2010” (ECFA-CLIC-ILC), Geneva, October 18-22 2010.
- Convener of the group “Alternatives to Supersymmetry” for the french Groupe de Recherche *Terascale*, LPSC Grenoble March 30-31 2009, Grenoble March 30-31 2009, Brussels November 3-5 2010, Lyon, April 18-20 2011, Clermont-Ferrand, Apr. 23-25 2012, Paris, Nov. 5-7 2012.
- Convener of the Dark Matter session at the TeV Particle Astrophysics 2007 conference, Venice, August 27-30 2007.
- Convener of the Dark Matter parallel session of the Kavli Institute Symposium in honor of David Schramm, *New views of the universe*, Chicago, Dec 8-13 2005.

## **Long-term participation in Advisory Committees (selection)**

- 2009–2017: Scientific Committee of the Institut d’Etudes Scientifiques de Cargèse.
- Since 2012: Program Advisory Committee of the Munich Institute for Astro- and Particle Physics (MIAPP).
- Since 2018: Advisory Board, Mainz Institute for Theoretical Physics (MITP).
- Since 2018: High Energy Particle Physics Board, European Physical Society (EPS).

## **Memberships**

- Since 2013: Member of LISA Consortium (cosmology working group).

## **Refereeing**

- Phys. Rev. Lett., Phys. Rev. D, JHEP, JCAP, Nucl. Phys. B, Phys. Lett. B.

## **Student supervision**

- Supervision of Master student Peera Simakachorn (U. Hamburg) since Fall 2018.
- Supervision of PhD student Yann Gouttenoire (DESY & U. Hamburg &UPMC) since Fall 2017.
- Supervision of PhD student Sebastian Bruggisser (DESY & U. Hamburg) 09-2015 to 08-2018: *Flavour Cosmology: Electroweak Baryogenesis from varying Yukawas*.

- Supervision of Master student Christoph Krpoun (U. Hamburg) Oct 2017-Sept 2018: *Production Mechanisms of Primordial Black Holes.*
- Supervision of visiting Master student Namitha Suresh (Birla Institute of technology and science, Pilani, India), January-July 2017: *Analysis of a First-Order Electroweak Phase Transition with Dynamical Yukawas in the Froggatt-Nielsen Mechanism.*
- Supervision of visiting Master student Augustin Vanrietvelde (Ecole Polytechnique), April-August 2017: *Effects of particle production on cosmological relaxation of scalar fields.*
- Supervision of visiting Master student Antoine Lesauvage (Ecole Normale Supérieure de Lyon), May-July 2017: *Study of a first-order electroweak phase transition for composite Higgs with varying Yukawa couplings.*
- Supervision of visiting PhD student Nayara Fonseca (U. Sao Paulo) September 2015-May 2016.
- Supervision of PhD student Romain Kukla (CEA Saclay) since Fall 2013: *Analysis of four-top events at the LHC.*
- Supervision of visiting PhD student Jérémie Quévillon (Paris XI), Fall 2012-Summer 2013.
- Supervision of Master student Romain Kukla (Stockholm/CEA Saclay) since Fall 2012: *Analysis of four-top events at the LHC.*
- Co-supervision of ATLAS PhD student Léa Gauthier from CEA Saclay (IRFU) on *Search for new physics in four-top production at the LHC.* Sept 2009-Aug 2012.
- Co-supervision of visiting PhD student Marco Farina (Pisa), spring 2012.
- Supervision of Master student Jean-Baptiste Flament (ENS Lyon): *Effective Field Theory Approach to  $t\bar{t}$  Production at the LHC.* April-July 2011.
- Co-Supervision of visiting PhD student Paolo Panci (L'Aquila): *Asymmetric Dark Matter.* April-June 2011.
- Co-Supervision of visiting PhD student Javi Serra (U. Barcelona): June-August 2011.
- Co-Supervision of visiting PhD student Céline Degrande (Louvain): Nov-Dec. 2009. *Non-resonant New Physics in Top Pair Production at Hadron Colliders.*
- Supervision of visiting PhD student Marco Taoso (Padova): *Gamma Ray line signatures of Dark Matter.* May-July+Sept. 2009.
- Co-supervision of Master student Benjamin Topper (ENS Paris): *Physics Beyond the Standard Model: Effective Lagrangian Approach to New Physics.* Jan 12 - Feb 27 2009.
- Co-supervision of Master student Cédric Delaunay (ENS Lyon): *The Electroweak phase transition.* April-July 2005.

## Thesis Committees

- Marco Taoso, U. Padova & U. Paris, April 8, 2009, *Particle dark matter and astrophysical constraints*, PhD advisors: A. Masiero & G. Bertone.
- Mattia Fornasa, U. Padova, April 8, 2009, *Not-so-Dark matter: Strategies for indirect detection and identification of dark matter*, PhD advisor: A. Masiero.
- Jérémie Llodra-Perez, U. Lyon, July 1, 2011, *Modèles effectifs de Nouvelle Physique au Large Hadron Collider*, PhD advisor: A. Deandrea.
- Javi Serra, U. Barcelona, Jan 13, 2012, *Compositeness at the electroweak scale*, PhD advisor: A. Pomarol.
- Sascha Joerg (Master thesis), EPFL Lausanne, Feb 13, 2012, *Top partners in composite models*, Advisor: R. Rattazzi.

- Xiaoyong Chu, U. Bruxelles, Sept 19, 2013, *Study of new dark matter production mechanisms and their possible signatures*, PhD advisor: T. Hambye.
- Mikael Chala, U. Granada, June 24, 2014, *Collider signatures of a non-standard Higgs sector*, PhD advisor: J. Santiago.
- Garoe Gonzalez (ATLAS), IFAE Barcelona, March 20 2015, *Search for the SM Higgs boson in the  $(W/Z)H$  channel with  $H \rightarrow BB$  using the ATLAS detector at the LHC*, PhD advisor: M. Martinez.
- Elina Fuchs, DESY, July 6 2015, *Interference effects in new physics processes at the LHC*, PhD advisor: G. Weiglein.
- Peter Drechsel, DESY, January 20 2016, *Precise predictions for Higgs physics in the Next-to-Minimal Supersymmetric Standard Model (NMSSM)*, PhD advisor: G. Weiglein.
- Laura Sagunski, DESY, July 5 2016, *On Soft Limits of Large-Scale Structure Correlation Functions*, PhD advisor: T. Konstandin.
- Benedict Broy, DESY, July 6 2016, *Inflation and Effective Shift Symmetries*, PhD advisor: A. Westphal.
- Christian Weiss, DESY, June 19 2016, *Top quark physics as a prime application of automated higher order corrections*, PhD advisor: Juergen Reuter.
- Shruti Patel, DESY, October 16 2017, *Interplay of Higgs Phenomenology and New Physics in Supersymmetric Theories*, PhD advisor: G. Weiglein.
- Shadi Shacker, Hamburg Sternwarte, March 19 2018, *The effect of dynamical speed of light theories in Palatini formalism on the cosmic evolution*, PhD advisor: R. Banerjee.
- Petar Pavlovic, DESY, May 18 2018, *On Quantum Anomalous Effects in Electrodynamics of the Early Universe*, PhD advisor: G. Sigl.
- Anne Ernest, DESY, December 5 2018, PhD advisor: A. Ringwald.

## Summary of Research

I work in theoretical research at the interface between particle physics and cosmology, especially on models of the early universe and their experimental signatures, baryogenesis, dark matter, primordial gravitational waves and Higgs boson cosmology. My main contributions to this field have been:

- to reconcile the existence of extra spatial dimensions with standard Friedmann cosmological expansion [3].
- to propose the lightest Kaluza-Klein particle as a viable dark matter candidate [9,10,11].
- to study the nature of the electroweak phase transition in various extensions of the Standard Model [2,16,22] and the consequences of a modified cosmological expansion at the electroweak epoch [8]. In [41,58,60,61], we have outlined the peculiar cosmological properties characterizing some models of strong dynamics (Composite Higgs) at the TeV scale, in particular we stressed the natural occurrence of a supercooled electroweak phase transition. We motivated the mechanism of cold baryogenesis in this context [42].
- to show that detection of a stochastic background of Gravity Waves at the space-interferometer LISA would be a major experimental implication of the Randall-Sundrum model [22] and related constructions [41,61].
- I have been particularly interested in the possibility of probing early universe phase transitions with upcoming gravity wave experiments [21] and I have been advertising the relevance of LISA for electroweak scale physics [21,52].
- I have been involved in analytic calculations of the gravity wave spectrum produced during first order phase transitions [25,30,32] and in studies of the energy budget associated with bubble growth [35].

- I have also been working on collider phenomenological studies. I have studied the LHC prospects for pair production and decay of new heavy bottom quarks [22]. In [27] we proposed a refined analysis (in the same-sign dilepton channel) that applies as well to the pair-production of new quarks carrying electric charge  $Q_e = 5/3$ , which are well-motivated in a class of composite Higgs models. I have been interested in searching for new physics in LHC events involving top quarks especially four-top production [36,37,38]. Effective field theory (EFT) approaches to top quark pair production, same-sign top pair production (in relation with the  $t\bar{t}$  forward-backward asymmetry) and  $t\bar{t}H$  production were investigated respectively in [39], [40] and [44]. I have co-supervised PhD students Léa Gauthier and Romain Kukla for their analysis related to top partners and search for four-top events at the LHC with the ATLAS detector.
- As far as dark matter (DM) is concerned, I have also investigated the case of heavy Dirac neutrinos [14,17,24] and contributed to review chapters in the book “Particle dark matter” [31]. In [33,46], we showed that in a well-motivated class of WIMP models connected to the top quark, large gamma ray lines are naturally expected from DM annihilations in the center of our galaxy. In [45], we computed all one-loop annihilation channels responsible for gamma ray lines and continuum in a large class of DM models and studied in details prospects for indirect detection with gamma-ray telescopes.
- In [43], we provided the first detailed study of the effect of dark matter/anti dark matter oscillations during freeze-out, showing how these oscillations reopen the parameter space of asymmetric dark matter and naturally enable TeV scale asymmetric dark matter to have the correct relic abundance.
- In [47], we proposed a theory of baryogenesis does not require B nor L violation beyond the SM. Our idea is to use instead the Higgs chemical potential to link an asymmetry in a new physics sector to the visible matter asymmetry, ultimately biasing sphalerons into generating B+L. We call this mechanism “Higgsogenesis”. Inversely, we proposed that a Higgs asymmetry can generate asymmetric dark matter.
- In [50], I showed that strong CP violation from the QCD axion can explain the matter antimatter asymmetry of the universe in the context of cold baryogenesis.
- In [51], we showed that the mechanism of cosmological relaxation of the electroweak scale addressing the hierarchy problem up to  $10^8$  GeV does not require any new physics at the EW scale. In [55], we discussed constraints on the relaxion mechanism from string theory. In [62], we showed how the relaxion mechanism can be implemented independently from inflation.
- In [53,54,56,57,59,60,61,63], we initiated a research programme on flavour cosmology and the flavour-electroweak symmetry breaking interplay, with relevance for baryogenesis.

## List of publications

(most conference proceedings removed)

**Full and updated list is available at <http://inspirehep.net/?ln=en>**

[63] I. Baldes and G. Servant, “*High scale electroweak phase transition: Baryogenesis and symmetry non-restoration.*”, arXiv:1807.08770 [hep-ph]. **JHEP** **10**, 53 (2018).

[62] N. Fonseca, E. Morgante and G. Servant, “*Higgs relaxation after inflation*”, arXiv:1805.04543 [hep-ph]. **JHEP** **10**, 20 (2018).

[61] S. Bruggisser, B. Von Harling, O. Matsedonskyi and G. Servant, “*Electroweak Phase Transition and Baryogenesis in Composite Higgs Models,*” arXiv:1804.07314 [hep-ph].



- [60] S. Bruggisser, B. Von Harling, O. Matsedonskyi and G. Servant, “*The Baryon Asymmetry from a Composite Higgs*,” arXiv:1803.08546 [hep-ph]. **Phys. Rev. Lett.** **121**, 131801 (2018).
- [59] G. Servant, “*The serendipity of electroweak baryogenesis*,” arXiv:1807.11507 [hep-ph]. *Phil. Trans. Roy. Soc. Lond. A* **376**, no. 2114, 20170124 (2018).
- [58] B. von Harling and G. Servant, “*QCD-induced Electroweak Phase Transition*,” [arXiv:1711.11554 [hep-ph]]. **JHEP** **1801**, 159 (2018).
- [57] S. Bruggisser, T. Konstandin and G. Servant, “*CP-violation for Electroweak Baryogenesis from Dynamical CKM Matrix*,” arXiv:1706.08534 [hep-ph]. **JCAP** **1711**, no. 11, 034 (2017).
- [56] B. von Harling and G. Servant, “*Cosmological evolution of Yukawa couplings: the 5D perspective*,” arXiv:1612.02447 [hep-ph]. **JHEP** **1705**, 077 (2017).
- [55] L. McAllister, P. Schwaller, G. Servant, J. Stout and A. Westphal, “*Runaway Relaxation Monodromy*,” arXiv:1610.05320 [hep-th]. **JHEP** **1802**, 124 (2018)
- [54] I. Baldes, T. Konstandin and G. Servant, “*Flavor Cosmology: Dynamical Yukawas in the Froggatt-Nielsen Mechanism*,” arXiv:1608.03254 [hep-ph]. **JHEP** **1612**, 073 (2016)
- [53] . Baldes, T. Konstandin and G. Servant, “*A First-Order Electroweak Phase Transition in the Standard Model from Varying Yukawas*,” arXiv:1604.04526 [hep-ph]. **Phys. Lett. B** **786**, 373 (2018).
- [52] C. Caprini, M. Hindmarsh, S. Huber, T. Konstandin, J. Kozaczuk, G. Nardini, J.M. No, A. Petiteau, P. Schwaller, G. Servant and D.J. Weir “*Science with the space-based interferometer eLISA. II: Gravitational waves from cosmological phase transitions*”, [arXiv:1512.06239 [hep-ph]]. **JCAP** **1604**, no. 04, 001 (2016).
- [51] J. R. Espinosa, C. Grojean, G. Panico, A. Pomarol, O. Pujols and G. Servant. “*Cosmological Higgs-Axion Interplay for a Naturally Small Electroweak Scale*”, [arXiv:1506.09217 [hep-ph]]. **Phys. Rev. Lett.** **115**, 25, 251803 (2015).
- [50] G. Servant, “*Baryogenesis from Strong CP Violation and the QCD Axion*,” **Phys. Rev. Lett.** **113**, 17, 171803 (2014). [arXiv:1407.0030 [hep-ph]].
- [49] G. Servant, “*Status Report on Universal Extra Dimensions after LHC8*,” *Mod.Phys.Lett. A* **30** (2015) 15, 1540011. arXiv:1401.4176 [hep-ph].
- [48] H. Baer *et al.*, “*The International Linear Collider Technical Design Report - Volume 2: Physics*,” chapter “Cosmological Connections”. arXiv:1306.6352 [hep-ph].
- [47] G. Servant and S. Tulin, “*Higgsogenesis*,” **Phys. Rev. Lett.** **111**, 151601 (2013). arXiv:1304.3464 [hep-ph].
- [46] C. Jackson, G. Servant, G. Shaughnessy, T. Tait and M. Taoso, “*Gamma-rays from Top Mediated Dark Matter annihilations*,” **JCAP** **1307**, 006 (2013). [arXiv:1303.4717 [hep-ph]].
- [45] C. Jackson, G. Servant, G. Shaughnessy, T. Tait and M. Taoso, “*Gamma-ray lines and one-loop continuum from s-channel Dark Matter annihilations*,” **JCAP** **1307**, 021 (2013). [arXiv:1302.1802 [hep-ph]].
- [44] C. Degrande, J. M. Gerard, C. Grojean, F. Maltoni and G. Servant, “*Probing top-Higgs non-standard interactions at the LHC*,” **JHEP** **1207**, 036 (2012). [arXiv:1205.1065 [hep-ph]].
- [43] M. Cirelli, P. Panci, G. Servant and G. Zaharijas, “*Consequences of DM/antiDM Oscillations for Asymmetric WIMP Dark Matter*,” **JCAP** **1203**, 015 (2012). [arXiv:1110.3809 [hep-ph]].
- [42] T. Konstandin and G. Servant, “*Natural Cold Baryogenesis from Strongly Interacting Electroweak Symmetry Breaking*,” **JCAP** **1107**, 024 (2011). [arXiv:1104.4793

[hep-ph]].

- [41] T. Konstandin and G. Servant, “*Cosmological Consequences of Nearly Conformal Dynamics at the TeV scale*,” JCAP **1112**, 009 (2011). [arXiv:1104.4791 [hep-ph]].
- [40] C. Degrande, J. -M. Gérard, C. Grojean, F. Maltoni and G. Servant, “*An effective approach to same sign top pair production at the LHC and the forward-backward asymmetry at the Tevatron*,” Phys. Lett. B **703**, 306 (2011). [arXiv:1104.1798 [hep-ph]].
- [39] C. Degrande, J. -M. Gérard, C. Grojean, F. Maltoni and G. Servant, “*Non-resonant New Physics in Top Pair Production at Hadron Colliders*,” JHEP **1103**, 125 (2011). [arXiv:1010.6304 [hep-ph]].
- [38] G. Servant, “*Four-top events at the LHC*,” DESY-PROC-2010-01/251, 254-257, proceedings of the “Physics at the LHC 2010” DESY conference.
- [37] M. Battaglia, G. Servant, “*Four-top production and  $t\bar{t}$  + missing energy events at multi TeV  $e^+e^-$  colliders*,” Nuovo Cim. **C33N2**, 203-208 (2010), proceedings of the Perugia Linear Collider workshop 2009, [arXiv:1005.4632 [hep-ex]].
- [36] G. Brooijmans, C. Grojean, G. D. Kribs *et al.*, “*New Physics at the LHC. A Les Houches Report: Physics at TeV Colliders 2009 - New Physics Working Group*,” [arXiv:1005.1229 [hep-ph]].
- [35] J. R. Espinosa, T. Konstandin, J. M. No and G. Servant, “*Energy Budget of Cosmological First-order Phase Transitions*,” JCAP **1006**, 028 (2010). [arXiv:1004.4187 [hep-ph]].
- [34] K. Kong, K. Matchev, G. Servant, “*Extra Dimensions at the LHC*”, [arXiv:1001.4801 [hep-ph]].
- [33] C. Jackson, G. Servant, G. Shaughnessy, T. Tait and M. Taoso, “*Higgs in Space*,” JCAP **1004**, 004 (2010). [arXiv:0912.0004 [hep-ph]].
- [32] C. Caprini, R. Durrer and G. Servant, “*The Stochastic Gravitational Wave Background from Turbulence and Magnetic fields Generated by a First-Order Phase Transition*,” arXiv:0909.0622 [astro-ph]. **JCAP** 0912, 024 (2009).
- [31] ‘Particle dark Matter, Observations, Models, Searches’, book edited by G. Bertone. Two contributed chapters: “*Dark matter at the electroweak scale: non-supersymmetric candidates*,” and “*Extra dimensions at the LHC*,” Cambridge University Press.
- [30] C. Caprini, R. Durrer, T. Konstandin and G. Servant, “*General Properties of the Gravitational Wave Spectrum from Phase Transitions*,” arXiv:0901.1661 [astro-ph]. **Phys. Rev. D** 79, 083519 (2009).
- [29] G. Brooijmans *et al.*, “*New Physics at the LHC: A Les Houches Report. Physics at TeV Colliders 2007 – New Physics Working Group*,” [arXiv:0802.3715].
- [28] F. del Aguila *et al.*, “*Collider aspects of flavour physics at high Q*,” [arXiv:0801.1800]. **Eur. Phys. J. C** 57 (2008) 183
- [27] R. Contino and G. Servant, “*Discovering the top partners at the LHC*,” [arXiv:0801.1679]. **JHEP** 0806 (2008) 026
- [26] K. Agashe, A. Falkowski, I. Low and G. Servant, “*KK parity in warped extra dimension*,” [arXiv:0712.2455]. **JHEP** 0804 (2008) 027
- [25] C. Caprini, R. Durrer and G. Servant, “*Gravitational wave generation from bubble collisions in first-order phase transitions: an analytic approach*,” [arXiv:0711.2593]. **Phys. Rev. D** 77 (2008) 124015
- [24] G. Belanger, A. Pukhov and G. Servant, “*Dirac Neutrino Dark Matter*,” arXiv:0706.0526 [hep-ph]. **JCAP** 0801, 009 (2008).
- [23] C. Dennis, M. K. Unel, G. Servant and J. Tseng, “*Multi-W events at LHC from a warped extra dimension with custodial symmetry*,” [hep-ph/0701158].
- [22] L. Randall and G. Servant, “*Gravitational Waves from Warped Spacetime*,” [hep-

ph/0607158]. **JHEP** 0705, 054 (2007).

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## Talks at conferences and workshops

- Florence, GGI Institute, Johns Hopkins Workshop, October 3 2018. *Cosmological implications of electroweak symmetry breaking.*
- Daejeon, Korea, COSMO 2018 conference, August 31 2018, *Theories of baryogenesis.*

- Warsaw, String phenomenology conference, July 4 2018. *Higgs relaxation after inflation.*
- Barcelona, Strong and electroweak matter conference, June 27 2018, *The Electroweak Phase Transition-Flavour Cosmology Interplay.*
- Paris UPMC, APC, Workshop Gravity, cosmology, and physics beyond the Standard Model, 15 June 2018, *Supercooled electroweak phase transition.*
- Passa Cuatro, Annual meeting of the Brazilian physics society, 20 September 2017, *The serendipity of electroweak baryogenesis.*
- Budapest, Eötvös University, July 5 2017, Johns Hopkins Workshop “Beyond the Standard Model - Exploring the Frontier. *Flavour cosmology.*
- Hamburg, DESY, June 7 2017, Symposium Hamburg and Kyoto University, *Higgs-Flavour cosmological interplay.*
- University Warsaw, 26 May 2017, Planck conference, *Electroweak baryogenesis - flavour interplay.*
- Bielefeld University, Center for Interdisciplinary Research, ZiF May 18 2017, Kosmologietag, *The serendipity of electroweak baryogenesis.*
- Leiden U, 10 May 17, Snellius workshop on Sakharov conditions 10 May 17. *Electroweak baryogenesis from Higgs-Flavon cosmological interplay.*
- Göttingen U., 03 April 2017, Workshop ”Open Questions in Particle Physics and Cosmology, *Serendipity of electroweak baryogenesis.*
- Munster U, 30 March 2017, DPG conference, *Gravitational waves from cosmological phase transitions.*
- The Royal Society at Chicheley Hall, home of the Kavli Royal Society International Centre, 27 March 2017, Higgs cosmology Theo Murphy meeting, *The Serendipity of Electroweak Baryogenesis.*
- Brookhaven, October 6 2016, Dark Interactions workshop, *Gravitational Wave Signals of Cosmological Phase Transitions.*
- Padova, Invisibles16 Workshop, September 16 2016, *Relaxion.*
- Zurich, LISA Symposium, September 8 2016, *Probing cosmological phase transitions with eLISA.*
- Stavanger, Strong and Electroweak matter conference, July 12 2016. *Electroweak baryogenesis from dynamical CKM matrix.*
- Kitzbühel, Humboldt Kolleg, From the vacuum to the Universe, June 30 2016 *Flavour cosmology.*
- Warsaw, 03 June 2016, Workshop on Multicomponent Dark Matter and Beyond. *Cosmological Higgs-Axion Interplay for a naturally small Electroweak scale.*
- Blois, May 29 2016, 28th Rencontre de Blois -Particle Physics and Cosmology, *A cosmological solution to the hierarchy problem.*
- APS Spring meeting, Salt Lake City April 2016, *New ideas for baryogenesis.*
- Bonn, March 16 2016, Bethe Forum on Axions and the Low Energy Frontier, *Relaxion mechanism.*
- Hamburg, 29 February 2016, spring meeting of the DPG, *Cosmology and LHC.*
- DESY, 9th Annual Meeting of the Helmholtz Alliance ”Physics at the Terascale”, Nov. 17 2015. *HEP and Cosmology*
- Florence, GGI Institute, Gearing up for LHC 13 conference, Oct. 14 2015. *A natural desert at the EW scale from Higgs-Axion cosmological interplay.*
- Stavanger, eLISA Cosmology working group Workshop, Sept. 22-25 2015. *Gravity waves from a delayed electroweak phase transition and cold baryogenesis.*
- Juelich, annual meeting of Matter and Universe, Sept. 29 2015. *Dark Matter: Theory.*

- Orsay, Higgs Hunting Conference, July 31 2015. *Electroweak Symmetry Breaking and Cosmology*.
- Zaragoza, “Axions and WIMPs” conference, June 25 2015. *Axion and Baryogenesis*.
- Kloster Irsee, Symposium ”Symmetries and Phases in the Universe”, June 22 2015. *Opening Talk: From Particles to Cosmology*.
- Amherst, International Workshop on Baryon and Lepton Number Violation (BLV) 2015, April 26-30 2015. *Higgs and QCD axion implications for the Dark Matter/ baryon asymmetry connection*.
- Paris, 7th Symposium on large TPCs for low-energy rare event detection, Dec. 15-17 2014. *Dark Matter-Baryogenesis connection: status after LHC run 1 and future tests*
- London, Queen Mary University, ‘Interplay of Particle and Astroparticle Physics IPA 2014’ workshop, August 18-22 2014. *Higgs and its implications for baryogenesis*.
- Paris, ‘PLANCK 2014 conference, From the Planck scale to the EW scale’, May 26-30 2014. *Baryogenesis from Strong CP Violation and the QCD Axion*.
- Stockholm, ‘Latest results in Dark Matter research’ Workshop, May 13, 2014: *WIMP Theory*.
- Stockholm, ‘EPSHEPP 2013’, the biennial Europhysics conference on High Energy Physics, July 22-24, 2013: *Dark Matter: Theory*.
- CERN, ‘SpacePart12, 4th international conference on particle physics and fundamental physics in space’, November 6, 2012: *Beyond the standard WIMP paradigm*.
- CERN, ‘Implications of LHC results for TeV-scale physics: second WG3 meeting’, March , 2012: *New fermions*.
- Bologna, ‘Conference on Astrophysics from the radio to the sub-millimetre, Planck and other experiments’, Feb. 15, 2012: *Cosmology and the LHC*.
- ICTP Trieste, ‘Workshop on Strongly Coupled Physics Beyond the Standard Model’, Jan. 25-27, 2012: *Cosmological aspects of strongly interacting EW symmetry breaking*.
- CERN, ‘Implications of LHC results for TeV-scale physics: first WG3 meeting’, Dec 8-9, 2011: *New fermions*.
- Vienna, ‘8th Vienna central european seminar on Particle Physics and QFT: Particle Physics and the LHC’, November 25 - 27, 2011: *Cosmology and the LHC*.
- Amsterdam, workshop ‘Strong coupling and holography in cosmology’, November 7 - 8, 2011: *A strong first-order phase transition at the TeV scale and its cosmological consequences*.
- Sant Feliu de Guixols, Spain, ‘4th International workshop on Top quark physics (TOP 2011)’, September 25 - 30, 2011: *New physics in top quark production*.
- Iguacu, Brasil, ‘Encontro de física 2011, Integração da Física na América Latina’, June 5-10 2011: *The electroweak phase transition*.
- Lisbon, ‘PLANCK 2011 conference, From the Planck scale to the EW scale’, May 30-June 3 2011: *Cosmological consequences of near-conformal dynamics at the TeV scale*.
- Weizmann Institute, Rehovot, ‘Electroweak Baryogenesis in the Era of the LHC workshop’, May 2-5 2011: *Natural Cold Baryogenesis*.
- Madrid, Instituto de física teórica ‘XV IFT-UAM/CSIC Christmas Workshop’, December 15-17 2010: *Cosmological aspects of electroweak symmetry breaking*.
- Geneva, ‘International Workshop on Linear Colliders 2010 (ECFA-CLIC-ILC)’, October 22 2010: *Summary of the cosmology sessions*.
- Lisbon, ‘JENAM 2010’ (Joint European and National Astronomy Meeting), the european week of astronomy and space science, September 6 2010: *The particle accelerator/astrophysics connection*.
- Zurich U., ‘AXION-WIMP 2010’, the 6th Patras workshop on axions, wimps and

wisps, July 8 2010: *Dark Matter & electroweak symmetry breaking*.

- McGill U., Montréal, ‘Strong and Electroweak Matter 2010’, June 29-July 2 2010: *Energy budget of cosmological first-order phase transitions*.
- DESY Hamburg, ‘Physics at the LHC 2010’, June 7 2010: *Four-top events at the LHC from top-philic new physics*.
- Granada, ‘1st Granada workshop on Latest News on Physics at the TeV Scale’, May 27 2010: *Four-top events at the LHC from top-philic new physics*
- La Thuile, ‘Rencontres de Moriond EW 2010’, March 12 2010: *Higgs in space!*
- U. Warsaw, ‘Particles and Cosmology workshop, Marie Curie Transfer of Knowledge project’, Feb 6 2010: *Higgs in space!*
- CERN, ‘CLIC workshop’, Oct. 14 2009: *Non-Supersymmetric Dark Matter at CLIC*
- Perugia, Italy, ‘LC09 workshop:  $e^+e^-$  Physics at the TeV scale and the Dark Matter connection’, Sept. 23 2009: *Higgs in space!*
- Les Houches, ‘Physics at TeV colliders’, June 25 2009:  *$Z_3$  versus  $Z_2$  Dark Matter*.
- Ecole Polytechnique, Palaiseau, ‘Rencontres de Physique des Particules 2009’, March 23-25 2009, review talk: *New phenomena at the TeV scale: What to expect?*.
- KITP Santa Barbara, Conference ‘Anticipating physics at the LHC’, June 2-6 2008, *Multi W events at the LHC from new heavy quarks*.
- CERN, Workshop ‘Monte Carlo Tools for Beyond the standard Model Physics’, March 10 2008, *Discovering the Top Partners at the LHC using same-sign dilepton final states*.
- Hamburg, Annual meeting of the european network on theoretical astroparticle physics, March 3 2008, *Gravitational waves from the early universe*.
- Venice, TeV Particle Astrophysics conference, August 28 2007, *Dark matter in new models of EW symmetry breaking: a review*.
- Les Houches, Workshop Physics at TeV Colliders, June 22 2007, *Top partners at the LHC*.
- Annecy, LAPTH, Journées LISA-France, Feb 1 2007, *Probing the electroweak scale with LISA*.
- Tucson, University of Arizona, conference “Rethinking Gravity”, January 22 2007. *Stochastic gravity wave background in RS models*
- Valencia, Nov 9 2006, “International Linear Collider Workshop”. *Randall-Sundrum model and its tests at ILC*.
- Pisa, November 21-24 2006, “European RTN mid-term meeting”. *Searching for warped geometry with gravity waves*.
- Genève, CERN, October 11 2006, “Flavour@LHC Workshop”. *Multi W events at LHC*.
- La Rochelle, October 6 2006, Colloque du Service de Physique Théorique de Saclay, *Transitions de phase dans l’univers primordial et production d’ondes gravitationnelles*.
- Bad Honnef, August 31 2006, Aachen HEP department internal annual meeting. *Introduction to extra dimensions and KK dark matter*.
- Geneva, CERN, CMS internal susy-BSM meeting, July 21 2006, *Multi W final states from KK fermions*.
- LPNHE Jussieu, Feb 1 2006, “Charmless 3-body B decays” workshop, introductory review talk *CP and Flavour Violation in Astrophysics, Cosmology and Beyond the Standard Model*.
- Chicago, Kavli Institute Inaugural Symposium in Honor of David Schramm, Dec 12 2005, “New views of the Universe” conference, *Gravitational waves from first-order phase transitions*.
- Trieste, Planck 2005 conference, May 28 2005, Eighth european meeting ‘From the

Planck scale to the electroweak scale’, plenary talk *First order electroweak phase transition from higher dimensional Higgs self-interactions*.

- Les Houches workshop “Physics at TeV colliders”, May 15 2005, *Kaluza-Klein dark matter: a review*.
- Grenoble, GDR SUSY, April 6 2005, *Revue sur la matiere noire de Kaluza-Klein*.
- Aspen, Aspen Winter Conference ‘The highest energy physics’, February 17 2005, *Kaluza-Klein dark matter: a review*.
- CERN, European meeting “Quest for unification”, December 6 2004, *A first-order EW phase transition and a large Higgs mass*.
- Santa Fe, Summer Workshop ‘Beyond the Higgs’, August 11 2004, *First-order electroweak phase transition in the Standard Model with a low cutoff*.
- Victoria, Linear Collider workshop’, July 30 2004, *First-order electroweak phase transition in the Standard Model with a low cutoff: Signatures at the Linear Collider*.
- Victoria, Linear Collider workshop’, July 30 2004, *Warped dark matter: motivations and signatures*.
- La Thuile, Italy, March 25 2004, *Proton stability and dark matter: are they related? 39th Rencontres de Moriond on Electroweak Interactions and Unified Theories*.
- Argonne, ‘Brane workshop’, October 20 2003, *Phenomenological aspects of warped geometry*.
- KITP Santa Barbara, ‘String cosmology workshop’, August 14 2003, *Kaluza-Klein dark matter*.
- Saclay, 8th Itzykson meeting ‘Which model for the primordial universe ?’, June 19 2003, *Radionactive universe*.
- Madrid, Planck 2003 conference, May 30 2003, Sixth european meeting ‘From the Planck scale to the electroweak scale’, *Constraints on models with TeV compactification scale from cosmology*.
- Madison, Pheno 2003 conference, May 6 2003, *Constraints on TeV extra dimensions from primordial cosmology*.
- Chicago, September 20 2002, *Testing Friedmann equation at LHC (Tevatron)...* COSMO-02, International Workshop on Particle Physics and the Early Universe.
- Argonne, September 12 2002, *Kaluza-Klein Dark Matter*. ‘Supersymmetry, Higgs and Extra Dimensions’ Theory Institute 2002.
- Santa Fe, New Mexico August 8 2002, *Kaluza-Klein Dark Matter*. ‘Extra Dimensions and Beyond’ Santa Fe 2002 Summer Workshop.
- Aspen, Colorado, July 9 2002, *Kaluza-Klein Dark Matter*. ‘Advances in Field theory and Applications to Particle Physics’ Summer Workshop.
- Kazimierz, Poland, May 28 2002, *Is the lightest Kaluza-Klein particle a viable dark matter candidate?* Fifth european meeting ‘From the Planck scale to the electroweak scale’.
- Argonne, Theory Institute, January 25 2001. *Towards a dynamical solution to the supersymmetric CP and Flavor problems*.
- Lalonde-les-Maures, May 15 2001. *Dilaton Stabilization in effective type I string models*. Conference ‘From the Planck scale to the electroweak scale’.
- Warsaw, Institute of Theoretical Physics, February 16 2001. *CP and Flavour in effective type I string models* Workshop ‘Physics in Extra dimensions’.
- Oxford, December 8 2000. *Dilaton Stabilization in effective type I string models*. European network meeting ‘Across the energy frontier’.
- Ecole Polytechnique, November 30 2000. *Stabilisation du dilaton et violation de CP dans les théories effectives de cordes de type I*. SUSY GDR Meeting, Flavour group.

- Collège de France, October 19 2000. *Cosmologie branaire dans un modèle de gravité localisée*. Programme National de Cosmologie Colloquium.
- LPNHE Jussieu, November 30 1999. *Transition de phase électrofaible et baryogénèse*. SUSY GDR meeting, Flavour group.
- LPNHE Jussieu, November 29 1999. *Constantes cosmologiques effectives dans une géométrie branaire avec gravité localisée*. SUSY GDR Meeting, Cosmology group.
- CPHT, Ecole Polytechnique, November 9 1999. *Sur la Dérivation de l'action de Randall–Sundrum en supergravité et de l'interprétation des termes de constantes cosmologiques*. Réunion du GDR SUSY, groupe Dimensions Supplémentaires.
- Les Houches Summer school, July 1999. *Is a 2-stage electroweak phase transition with color breaking cosmologically viable?*

## Lectures at schools and workshops

- GGI winter school, Florence, January 2017, Lectures on *Early universe cosmology*.
- CERN, Summer student programme, July 8-10 2014. Lectures on “*Fundamental concepts in particle physics*”.
- CERN, 8th CERN-Fermilab Hadron Collider Physics Summer School, August 2013. Lecture on *Recent developments in Dark Matter/ Cosmology with implications for collider physics*.
- Durbach, meeting of the graduate school of Freiburg HEP group, October 19 2012, *Alternatives for Dark Matter (non-SUSY Dark Matter)*.
- CERN “Korean Teachers Programme”, August 7 2012, *The particle-physics - cosmology connection*.
- MCnet-LPCC Summer School on Monte Carlo Event Generators for LHC, CERN, July 27 2012, closing lectures on “*Beyond the Standard Model Physics*”.
- CERN “International Teachers Programme”, July 18 2012, *The particle-physics - cosmology connection*.
- CERN, Summer student programme, July 11-16 2012. Four lectures on “*Fundamental concepts in particle physics*”.
- The 2012 European School of High Energy Physics, Anjou, France, 6-19 June 2012. Three lectures on “*Other BSM*”.
- BadHonnef, Physics workshop, March 2012. Introductory lecture on “*Cosmology and particle physics*”.
- CERN, Norwegian mini-winter school (for master students), Nov 2-4 2011. One lecture on “*Dark Matter*”.
- CERN, Norwegian mini-winter school (for master students), Nov 2-4 2011. One lecture on “*Dark Matter*”.
- Heidelberg, Max-Planck-Institut, July 8-15, 2011. ISAPP 2011 summer school “The Dark Side of the Universe”. Lectures on ‘*Non Supersymmetric Dark Matter candidates*’.
- Mainz U., Retreat, Sept 28-29 2010. Lectures on *Cosmological and astroparticle aspects of physics beyond the Standard Model*.
- Corfu, Summer school, August 27 2010. Lecture on *Cosmological consequences of new physics at the TeV scale*.
- CERN “International Teachers Programme”, July 11-12 2011, *The particle-physics - cosmology connection*.
- CERN “French Teachers Programme”, June 16 2011, *La connexion physique des particules-cosmologie*.



- CERN “International Teachers Programme”, July 12-13 2010, *Introduction to cosmology*.
- CERN, 4th CERN-Fermilab Hadron Collider Physics Summer School, June 8-17 2009. Lecture on *Cosmology and the particle accelerator connection*.
- CERN “French Teachers Programme”, April 13-18 2008. *Introduction to cosmology*.
- Rio de Janeiro, December 6-13 2006, “First Rio-Saclay meeting”. *Lectures on baryogenesis*.
- Les Houches Summer School, August 10-11 2006. Specialized lectures, *Extra-dimensional cosmology*.
- Annecy, April 23 2006, two GDR lectures “A few lectures on extra-dimensional phenomenology”: *Xdim et implications astrophysiques/cosmologiques*.

## Talks at universities and research institutes

- Max-Planck-Institut für Gravitationsphysik, Albert-Einstein-Institut, Hannover, Colloquium, September 20 2018, *Probing the early universe with gravitational waves*.
- CERN, Theory Colloquium, May 23 2018. *The Electroweak Phase Transition-Flavour Cosmology Interplay*
- ICTP-SAIFR Sao Paulo, Theory seminar, September 18 2017, *The serendipity of electroweak baryogenesis*.
- ENS Lyon, Seminar for Master students, January 16 2017, *De la physique des particules la cosmologie primordiale*.
- DESY colloquium Hamburg, April 26 2016, *The decline of antimatter*.
- DESY colloquium Zeuthen, April 27 2016, *The decline of antimatter*.
- Karlsruhe, Theory colloquium, KIT, February 11 2016 *Cosmological relaxation of the weak scale*.
- IFAE retreat and Jamboree, January 14 2016, *Review on DM searches*.
- Würzburg Universität, Particle Physics seminar, Nov. 5 2015 *A natural desert at the ‘EW scale from Higgs-axion interplay*.
- IFAE Barcelona, Theory seminar, June. 29 2015 *Higgs and QCD axion implications for baryogenesis*.
- Nikhef, Theory seminar, Feb. 5 2015 *Higgs (and axion) implications for baryogenesis*.
- Universität de Barcelona, Theory seminar, Jan. 29 2015 *Higgs (and axion) implications for baryogenesis*.
- IFAE, Barcelona, Colloquium, Feb. 24, 2014: *The role of the Higgs in baryogenesis theories*
- DESY, seminar, Oct. 18, 2013: *Dark matter and the matter-antimatter asymmetry of the universe: Are they related?*
- DESY, Theoretical colloquium, Feb. 6, 2013: *Gamma ray lines from Dark Matter annihilations*.
- TU Munich, Theoretical HEP seminar, Oct. 18, 2012: *Large Gamma ray lines from Dark Matter annihilations*.
- Orsay, séminaire du LAL, Apr. 16, 2012: *New physics hunting with top quarks*.
- U. Geneva, séminaire de physique théorique, Dec. 2, 2011: *Cosmology and the LHC*.
- Heidelberg, Max-Planck-Institut, July 14, 2011, Colloquium ‘*Dark Matter and EW symmetry breaking: Are they related?*’
- CERN, ATLAS junior seminar, April 6 2011, *Search for new physics in top-pair and four-top production at the LHC*.

- CEA Saclay, Rencontres SPP/IPhT, April 1 2011, *Searching for new physics in top-pair and four-top production at the LHC*.
- CERN, special joint Top Properties/Exotics ATLAS meeting, March 21 2011, *Effective field theory approach to top-pair production at hadron colliders*.
- U. Barcelona, IFAE, weekly seminar of the high energy theory group, March 11 2011, *Searching for new physics in top-pair and four-top production at the LHC*.
- CERN, ATLAS physics meeting “Searches for New Physics”, January 24 2011, *Feedback from theorists on two recent ATLAS papers*.
- Thoiry workshop of CERN Physics staff, October 28 2010, *On the generation of the matter-antimatter asymmetry at the electroweak scale*.
- ETH Zurich, weekly particle physics seminar, March 16 2010, *Higgs in Space!*
- University of Southern Denmark, Odense, Center for Particle Physics Phenomenology, CP3-Origins Lecture, Feb 15 2010, *Higgs in Space!*
- CERN, Theoretical seminar, Jan 20 2010, *Higgs in Space!*
- UC Berkeley, weekly seminar of the Berkeley Center for Theoretical Physics, June 9 2008, *Probing the electroweak scale with gravity waves*.
- CERN CMS internal meeting, June 8 2007, *Top partners at LHC*.
- Universitat de Valencia, seminar of the Department of Theoretical Physics, May 30 2007, *Probing warped geometry and the electroweak scale with gravity waves*.
- Observatoire de Meudon, seminar of the laboratoire Univers et théories (LUTH), May 24 2007, *Gravitational Waves from 1st order phase transitions*.
- CERN phen Club, March 29 2007, *Multi W events at LHC*.
- University of Neuchatel, Institut de physique, seminar of the High Energy Physics theory group, January 31 2007. *Searching for warped geometry with gravity waves*.
- University of Geneva, seminar of cosmology and particle physics, June 9 2006. *Probing the electroweak scale (and beyond) with gravitational waves*.
- Trieste, May 9 2006, Theory Seminar. *Probing the electroweak scale (and beyond) with gravitational waves*.
- CERN, Cosmo Coffee, Mar 5 2006, *Discussion of latest WMAP results*.
- CERN, Wednesday theoretical seminar, Feb 15 2006, *Probing the electroweak scale (and beyond) with gravitational waves*.
- Saclay, Service de Physique des Particules, DAPNIA-SPhT Joint seminar, April 20 2005, *A la recherche des dimensions supplémentaires: Motivations et signatures*.
- Paris, Institut d’Astrophysique de Paris, April 15 2005, *Gravitational waves from a first-order electroweak phase transition*.
- Oxford, Rudolf Peierls Centre for Theoretical Physics, Theoretical Particle Physics Seminar, March 11 2005, *Baryon number and Dark matter in warped GUTs*.
- Bruxelles, Service de Physique Théorique, séminaire de physique théorique, January 26 2005, *Baryon number and Dark matter in warped GUTs*.
- Grenoble, Laboratoire de Physique Subatomique et Cosmologie, theory seminar, November 10 2004, *Matière noire de Kaluza–Klein*.
- Warsaw university, Institute for theoretical physics, High energy physics seminar, October 29 2004, *Kaluza–Klein Dark Matter: Motivations and signatures*.
- Orsay, Laboratoire de Physique Théorique, Orsay cosmology meeting, October 19 2004, *A way of resuscitating a first order electroweak phase transition*.
- Saclay, Service de Physique Théorique du CEA, Particle physics seminar, September 22 2004, *Vers une transition de phase électrofaible du premier ordre*.
- McGill university, High energy physics seminar, July 5 2004, *Warped unification, proton stability and dark matter*.

- University of Washington, Seattle, particle theory seminar, June 22 2004, *Gauged baryon number in warped GUT*
- Caltech, Pasadena, High energy physics seminar, May 9 2004, *Warped unification, proton stability and dark matter*
- University of Wisconsin in Madison, Cosmology seminar, April 22 2004, *Proton stability and dark matter: are they related?*
- Berkeley National Laboratory, theory seminar, February 2 2004, *Baryon number and dark matter in warped  $SO(10)$ .*
- University of Illinois at Urbana-Champaign, high energy theoretical/experimental seminar, November 3 2003, *Kaluza-Klein Dark Matter.*
- University of Michigan, high energy theory seminar, October 30 2003, *Dark matter from approximate baryon number symmetry.*
- Cornell particle theory seminar, October 22 2003, *Generalizing the possibility of Kaluza-Klein dark matter.*
- Michigan State University, Particle Seminar, April 29 2003 , *Dark Matter and new physics.*
- University of Chicago, Theory Seminar, April 23 2003 , *Radion cosmology.*
- University of Madison, Particle Theory Seminar, April 10 2003 , *Constraints on theories with extra dimensions from radion cosmology.*
- CEA Saclay, Theory Seminar, January 29 2003, *Dark Matter and New Physics.*
- Yale University, Particle Theory Seminar, December 16 2002 , *(Kaluza-Klein) Dark Matter.*
- Fermilab, Theory journal club, December 6 2002, *Dark Matter.*
- University of Chicago, Center for Cosmological Physics Seminar, November 15 2002, *Kaluza-Klein Dark Matter: Relic density predictions, direct detection prospects and indirect searches.*
- University of Minnesota, Theoretical Physics Institute, Joint Nuclear/Particle Seminar, October 24 2002, *(Kaluza-Klein) Dark Matter.*
- University of Illinois in Chicago, High Energy Physics/Heavy Ion Physics Seminar, October 7 2002, *Is the lightest Kaluza-Klein particle a viable dark matter candidate?*
- Argonne National Lab, HEP Division Seminar, September 25 2002, *Kaluza-Klein Dark Matter.*
- Centre de Physique Théorique de Marseille, May 6 2002, *Baryogénèse électrofaible.*
- Indiana University, High Energy Physics and Astrophysics seminar, April 15 2002, *Reopening the window for electroweak baryogenesis in cosmologies with non standard Friedmann equation.*
- University of Wisconsin-Madison, Particle Phenomenology seminar, March 29 2002, *How to rescue electroweak baryogenesis with non standard cosmology?*
- Service de Physique Théorique CEA Saclay, March 19 2002. *Tester l'équation de Friedmann au LHC (Tevatron?) ou comment sauver la baryogénèse électrofaible avec une cosmologie non standard.*
- University of Wisconsin-Milwaukee, Center for Gravitation and Cosmology seminar, February 29 2002. *Reopening the window for electroweak baryogenesis with non conventional cosmology.*
- University of Chicago, Theory seminar, January 30 2002. *On the electroweak phase transition, sphalerons, baryon asymmetry ... and cosmology.*
- Fermilab, Theory seminar, January 17 2002. *Reopening the window for electroweak baryogenesis.*
- Argonne, Theory seminar, January 14 2002. *Revisiting the sphaleron bound.*

- Purdue University, Theory seminar, October 30 2001. *Supersymmetry breaking by gaugino condensation in effective Type I string models.*
- University of Chicago, October 26 2001. *How is string theory connected to the Standard Model?* Enrico Fermi Institute one-day Mini-Symposium: String Theory and Experiment.
- Ecole Polytechnique, seminar at CPHT, April 18 2001. *Aspects of phenomenology in effective type I string models.*
- SPhT CEA-Saclay, Oct. 7 2000. *Stabilisation du dilaton par condensation de jauginos.*
- SPhT CEA-Saclay, Oct. 1999. *Réconcilier la cosmologie standard avec l'existence de dimensions supplémentaires.*
- SPhT CEA-Saclay, March 1999. *La transition de phase électrofaible peut-elle être précédée par une brisure de couleur?*
- McGill University, Theory seminar, January 1999. *Was the electroweak phase transition preceded by a color broken phase?*

## Outreach

- Supervision of a 1-week internship at DESY of a high-school student, Oct 8-12, 2018.
- Cargèse, IESC, public lecture, July 17 2018, “*Sonder l’univers avec les ondes gravitationnelles.*”
- Erice International School of Science Journalism: Whats Next: Challenges and Opportunities for Tomorrows Fundamental Physics. Lecture, June 26 2018, *The search for the universe missing matter.*
- Contribution to special issue article on Higgs and Cosmology in Bild der Wissenschaft, October 2015.
- Cargèse, IESC, public lecture, July 18 2014, “*Voyage dans le noir: matière noire, énergie noire et antimatière.*”
- Cargèse, IESC, public lecture, August 28 2012, “*Voyage au coeur de la matière.*”
- CERN, presentation for high school students from Terminale Lycée St-Julien-en-Genevois, May 30 2012.
- Genève, Collège de Saussure, presentation for high school students, April 8 2011.
- Cargèse, IESC, public lecture, July 29 2010, “*La fabrique de l’univers: Voyage au coeur de la matière.*”
- CERN, lecture for swedish teachers, July 10 2010, *Searching for new physics at CERN.*
- Torino, EuroScience Open Forum’10, July 6 2010, *Renaissance for Discovery at CERN.*
- Genève, Collège Rousseau, dialogue with high school students, March. 2 2010.
- CERN, Introduction to Particle physics for the research cluster of the AA School of Architecture (London), Feb. 26 2010, *Physics goals at the LHC.*
- CERN, videoconferenced dialogue with french (Annecy) high school students, April 7 2009.
- CERN, presentation for french Master students (NPAC Paris VI,VII,XI), Jan. 10 2009, Jan. 9 2010 & Jan. 8 2011: *Physics goals at the Large Hadron Collider.*
- Lausanne, EPFL, talk at “colloque international Hannah Arendt”, May 12 2007, *Des quarks au cosmos.*
- Contribution to science popularization articles (La Recherche 1999, New Scientist 2002, Reflex 2008, La Recherche, autumn 2010, January 2013).
- Conversations with high school students (small groups), oct ’08, july ’09, dec ’09, feb’10, feb’11, dec ’11.
- Participation to the CERN “International Teachers Programmes”, (see section ”Lec-

tures at schools and workshops”).

- Participation to ARTE media visit (documentary on Dark Matter), July 7 2010.
- Participation to NHK shooting at CERN, Japan TV crew, January 2011.
- Participation to Tribune de Genève article, July 2008.
- Interviews with Andri Pol (photographer) and Peter Stamm (writer), August 2012 and 2013 for preparation of book “Inside CERN”.
- Interview with US astrophysicist and book author Wallace Tucker, July 2013.
- Conversations with Karine Clairsinvil, Master of Arts, Zurich University of the Arts, February 2013.
- Participation to TV show “30 minuts”, by Televisió de Catalunya, “Ciència amb comptagotes”, January 2013.

### **Other schools and workshops attended (selection)**

- 58th Meeting of Nobel laureates meeting, Lindau, Germany, June 29-July 4 2008.
- Planck 08 conference, Barcelona, May 2008.
- String Phenomenology conference, Ann Arbor, August 1-5 2004.
- New Horizons in String Cosmology, Banff International Research Station, Canada, June 12-17 2004.
- Theory and phenomenology of physics at the TeV scale, Aspen Center for Physics, Colorado, June 30-july 20 2003.
- Workshop ‘Neutrino News from the Lab and the Cosmos’, Fermilab, Oct 17-19 2002.
- PHENO 2002 Symposium, University of Wisconsin, Madison, April 22-24, 2002.
- Les Houches Summer School “Gravity, Gauge Theories and Strings”, Les Houches, August 2001.
- SUSY 2K, 8th International Conference on Supersymmetries in Physics, CERN, June 2000.
- Euroconference ‘From the Planck scale to the Electroweak scale’, Castelvecchio Pascoli, April 2000.
- Les Houches Summer School “The Primordial Universe”, Les Houches, July 1999.
- Pritzker Symposium and Workshop on the Status of Inflationary Cosmology, University of Chicago, Jan 29 - Feb 3 1999.
- Summer School in High Energy Physics, International Center for Theoretical Physics, Trieste. July 1998.