

Sven Heinemeyer: Curriculum Vitae

1 Personal data

Name: Sven Heinemeyer
Date and place of birth: December 31, 1968 in Bremen (Germany)
Citizenship: German
Address: Instituto de Física Teórica UAM-CSIC
C/ Nicolas Cabrera 13-15
28049 Madrid, Spain
Phone : (+34) 912/999830
E-Mail: Sven.Heinemeyer@cern.ch

2 Education

Sept. 1975 – July 1979 Primary school in Bremen
Sept. 1979 – June 1988 Altes Gymnasium in Bremen
June 1988 Abitur (final grade: 1.0)
(July 1988 – Sept. 1989 Compulsory military service)
Oct. 1989 – Sept. 1994 Studies of physics at Universität Karlsruhe
Sept. 1994 Diploma (final grade: sehr gut (mit Auszeichnung) (“excellent”)), Supervisor: W. Hollik
Title: The decay $h^0 \rightarrow A^0 A^0$: radiative corrections in the Higgs sector of the MSSM
(homologado en España)
Oct. 1994 – Oct. 1997 Graduate studies of physics at Universität Karlsruhe

- Feb. 1998 PhD (final grade: sehr gut (“very good”))
 Title: Two-loop calculations in the MSSM
 Supervisor: W. Hollik (homologado en España)
- Jul. 2004 Habilitation (at the Ludwig Maximilians Universität,
 München (with H. Fritzsche))
 Title: MSSM Higgs Physics at Higher Orders

Language skills (fluent): English, German, Spanish.

3 Employments

- Feb. 1998 – Sep. 1998 Postdoc at the Institut für theoretische Physik
 at Universität Karlsruhe
- Oct. 1998 – Sep. 2000 Fellow at DESY, Theory group
- Oct. 2000 – Mar. 2002 Fellow at the Brookhaven Nat. Lab., Theory division
- Apr. 2002 – Nov. 2005 Junior Faculty member (C1) at the Ludwig Maximilians
 Universität, München (Lehrstuhl H. Fritzsche)
- Dec. 2003 – Nov. 2005 Fellow at CERN, Theory division
- Dec. 2005 – Jun. 2006 “Ramon y Cajal” (University of Zaragoza, Spain) (ranked
 # 1 as RyC in physics 2004)
- From Jul. 2006 on IFCA (CSIC – UC), Santander, Spain
- Jul. 2006 – Jun. 2007 “Ramon y Cajal”
- Jul. 2007 – Jun. 2010 Científico Titular (permanent research staff)
- Jun. 2010 – Oct. 2018 Investigador Científico (permanent research staff)
- From Apr. 2016 on Prof. UAM-CEI (IFT) Madrid, Spain
- From Nov. 2018 on Profesor de Investigación (highest level of permanent re-
 search staff)

4 Scholarships/Awards

Oct. 1989 – Sep. 1994	Stipendium, Studienstiftung des deutschen Volkes
Oct. 1994 – Sep. 1996	Stipendium des Landes Baden–Württemberg
Oct. 1996 – Sep. 1997	Stipendium, Graduiertenkolleg “Elementarteilchenphysik an Beschleunigern”, Universität Karlsruhe
Jul. 2001	DPF / Snowmass Fellowship
Feb. 2010	APS Outstanding Referee Award
Apr. 2016	“Premio de Investigación”, CEI (Campus of International Excellence) UAM+CSIC

5 Research activities

- Publications in refereed journals (according to *InSpire* (26.05.2020), see enclosed list):

publications	: 166
(incl. proceedings and workshop reports	: 370)
publications with more than 100 citations	: 69
publications with more than 250 citations	: 30
total number of citations	: 31347
average number of citations	: 188
Hirsch index	: 76
Phys. Rev. Lett.	: 3
Phys. Repts. (leading author/editor)	: 3
- Many invited plenary/parallel talks at conferences and seminars/colloquia at Physics research laboratories and universities (see enclosed list).
- Leader of the *LHC Higgs Cross Section Working Group* (2012 - 2014)
Convenor of *LHC Higgs Cross Section Working Group* (2010 - ...)
Member of the *LEP Higgs working group*.
- Spanish National Project (“Consolider”, 2010 - 2017):
MultiDark: Multi messenger approach on Dark Matter.
Project board member, leader of “Particle Physics/LHC working group”
Continued for the “MultiDark Excellence Network” (2018 - ...)
- Organizer of the *Spanish network on LHC physics* (“red LHC”, 2011 - ...)
- Convenor of FCC-ee Physics WG “Precision EW calculations” (2015 - ...)
- Keeper of “FeynHiggs”, the code used for the MSSM Higgs analyses at LEP2, CDF and DØ, ATLAS and CMS.
- Author of “HiggsBounds” and “HiggsSignals”.
- Member of the “Particle Data Group” (2017 - ...)
- Organizer/conferences: (“*” ≡ main organizer)
 - * Higgs Days at Santander: Theory meets Experiment (IFCA, Santander, Spain) annually in September 2008 - 2019, ongoing.
 - * Precision Higgs Mass Calculation Workshop Series (KUTS)
MPI Munich, November 2019; Dresden University, April 2019; Würzburg University, July 2018; LPTHE Paris, January 2018; KIT Karlsruhe, July 2017;

Aachen University, January 2017; IFT Madrid, June 2016; Heidelberg University, January 2016; LPTHE Paris, May 2015; DESY Hamburg, October 2014; MPI Munich, April 2014.

- * 25th IFT Christmas Workshop (Madrid, Spain, December 2019)
- * 4th IBS-IPPP-MultiDark Workshop (Daejeon, Korea, October 2019)
- * IFT Program on “Future High Energy Colliders” (IFT, Madrid, Spain, June/July 2019)
- * 3rd Workshop of the “Spanish Network for LHC Physics” (UAM, Madrid, Spain, May 2019)
- * 24th IFT Christmas Workshop (Madrid, Spain, December 2018)
- * Dark Matter 2018 (Santander, Spain, June 2018)
- * 2nd Workshop of the “Spanish Network for LHC Physics” (Ciemat, Madrid, Spain, May 2018)
- * 23rd IFT Christmas Workshop (Madrid, Spain, December 2017)
- * 1st Workshop of the “Spanish Network for LHC Physics” (IFT, Madrid, Spain, May 2017)
- * 22nd IFT Christmas Workshop (Madrid, Spain, December 2016)
- 3rd IBS-IPPP-MultiDark workshop (Durham, UK, November 2016)
- * “Is SUSY alive and well?” (IFT, Madrid, Spain, September 2016)
- * Dark Matter 2016 (Santander, Spain, June 2016)
- * ECFA-LC workshop (Santander, Spain, June 2016)
- * XLIV International Meeting on Fundamental Physics (IMFP 2016, Madrid, Spain)
- * Spanish school for High Energy Physics (TAE, Benasque, Spain, September 2015)
- * FCC-ee Miniworkshop on Precision Calculations (CERN, July 2015)
- * 573. Heraeus-Seminar: Physics Landscape after the Higgs Discovery at the LHC (Bad Honnef, Germany, November 2014)
- * Workshop series on “Precision Calculations for SUSY Higgs boson masses”, (Munich, Hamburg, Paris, Heidelberg, ...), 2014 - ...
- * XLI International Meeting on Fundamental Physics (IMFP 2013, Santander, Spain)

- * Higgs: Quo Vadis (Aspen Higgs workshop, March 2013)
- XL International Meeting on Fundamental Physics (IMFP 2012, Benasque, Spain)
- * LHC2TSP (CERN workshop series to provide results for the *European Strategy for Particle Physics*), 2011–2012
- * 2nd workshop of *Spanish National Project on Dark Matter* (IFCA, Santander, Spain, June 2010)
- * TH institute (CERN) Feb. 2009: LHC2FC (*From the LHC to Future Colliders*)
- 2. LHC/Flavor workshop 2007–2011 (CERN)
- * “The LHC Early Phase: Shaping the Future of Particle Physics”, workshop on early LHC data (Fermilab, April 2007)
- International Advisory board/program committee:
 - HiggsHunting (Orsay, Paris, France):
July 2019, July 2018, July 2017, August 2016, July 2015, July 2014, July 2013
 - Charged (Higgs) (Uppsala university, Sweden):
September 2018, October 2016, September 2014, October 2012, September 2010, September 2008, September 2006
 - FCC Physics Workshop (CERN, January 2020)
 - First Mediterranean Conference on Higgs Physics (Tangier, Morocco, October 2019)
 - ECFA-LC workshop (Santander, Spain, June 2016)
 - International Workshop on Linear Colliders (LCWS11, Granada, Spain, 09/2011)
 - SUSY07 (Karlsruhe, Germany)
- Editor: European Physics Journal C
- Referee:
 - European Research Council (ERC)
 - National Science Foundation (USA)
 - ANEP (Spain)
 - STFC (UK)
 - SNSF (Switzerland)
 - Wissenschaftsfond (Austria)

- Netherlands Foundation for Fundamental Research on Matter, FOM
- Fondecyt (Chile)
- Wallenberg Foundation (Sweden)
- Various journals:
 Physics Review Letters, JHEP, European Physics Journal C, Physical Review D, Physics Letters B, Nuclear Physics B, New Journal of Physics
- Particle Data Group
- Editor of *LHC2TSP Report (2012)*
LHC2FC Report (2009)
LHC/Flavor Report (2006) (sub-editor)
Snowmass Higgs Report (2005)
LHC/ILC Study Group report (2004)
CERN CLIC report (2004) (sub-editor)
- Convenor at workshops series (partially ongoing):
 - Spanish National Project (“Dark Matter Consolidator”) 2009 – 2017;
 Continued for the “MultiDark Excellence Network” (2018 - ...)
 Particle Physics and Dark Matter
 - LHC2TSP (CERN workshop series to provide results for the *European Strategy for Particle Physics*), 2011–2012: Higgs/EWSB
 - ECFA–CLIC–ILC workshop 2010–2013: Higgs (theory)
 - LHC Higgs Cross Section Working Group 2010 – ...: Branching ratios
 - LHC Higgs Cross Section Working Group 2011 – 2012: Charged Higgs
 - LHC Higgs Cross Section Working Group 2010 – 2011: Pseudo observables
 - ILC–ECFA workshop 2003–2008: Higgs (theory)
 - 2. LHC/Flavor workshop 2007–2011 (CERN): Flavor/Tools
 - LHC/Flavor workshop 2005–2007 (CERN): Flavor/Tools
- Convenor at single workshops:
 - CEPC Workshop (Beijing, November 2019): Electroweak Physics
 - International Workshop on Linear Colliders (LCWS19, Sendai, Japan, October 2019): Physics/Phenomenology
 - SUSY19 (Corpus Cristi, USA, May 2019): SUSY Phenomenology

- International Workshop on Linear Colliders (LCWS16, Morioka, Japan, December 2016): Higgs/EW
- SUSY16 (Melbourne, Australia): Tools for HEP
- ECFA-LC workshop (Santander, Spain, June 2016): Physics/Phenomenology
- International Workshop on Linear Colliders (LCWS15, Whistler, Canada, November 2015): Higgs/EWSB
- SUSY15 (Lake Tahoe, USA): Higgs/EWSB & SUSY Precision Calculations
- International Workshop on Linear Colliders (LCWS14, Belgrade, Serbia, October 2014): Higgs/EWSB
- SUSY14 (Manchester, UK): Higgs/EWSB & SUSY Precision Calculations
- SUSY12 (Beijing, China): Higgs/EWSB
- Joint ACFA Physics / Detector Workshop and GDE meeting on Linear Collider (KILC12, Daegu, Korea): Physics
- International Workshop on Linear Colliders (LCWS11, Granada, Spain, September 2011): Higgs/EWSB
- ISMD 2010 (Antwerpen, Belgium): New Physics Results
- TeV and Astro Particle Physics Conf. (Paris, France): Particle Physics
- LHC2FC (From the LHC to Future Colliders, CERN TH institute 2009): Higgs
- International Linear Collider World Conference 2007 (DESY, Hamburg, Germany): Higgs Physics & Electroweak Symmetry Breaking
- International Linear Collider World Conference 2006 (Bangalore, India): Higgs Physics & Electroweak Symmetry Breaking
- 2005 International Linear Collider Physics and Detector Workshop (Snowmass, USA): Higgs Physics
- EPS 2005 (Lisbon, Portugal): Tests of the Standard Model
- SUSY05 (Durham, UK): Collider Physics
- Linear Collider World Conference 2005 (SLAC, USA): Higgs & electroweak symmetry breaking
- SUSY02 (DESY, Hamburg, Germany): Low energy, flavor, CPV
- Workshop on the Future of Particle Physics 2001 (Snowmass, USA): P1-WG1 (“Precision Analyses”)
- Supervisor for students at “31. Herbstschule für Hochenergiephysik”, Maria Laach, September 1999.

- Organizer/chairman:
 - IFT Seminar organizer, 2015 - ...
 - CERN PhenClub organizer and chairman, 2004-2005.
 - BNL Theory Seminar organizer and chairman, 2001-2002.
 - DESY Theory Seminar organizer and chairman, 1999-2000.

6 Education of (PhD) Students

- Supervision of PhD students
 - M. Olea Romacho, DESY Hamburg (joint with Prof. G. Weiglein)
Title: “CP violation and unstable particles in extended Higgs sectors”
Finished: expected in 2022
 - F. Arco, IFT Madrid (joint with Prof. M. Herrero)
Title: “Double Higgs production in BSM theories”
Finished: expected in 2021
 - T. Biekötter, IFT Madrid (joint with Prof. C. Muñoz)
Title: “High Precision Calculations in the $\mu\nu$ S \overline{S} M”
Finished: 09/2019
 - L. Galeta, University of Santander
Title: “Theory Predictions for Higgs Physics at the LHC”
Finished: 09/2017
 - M. Rehman, University of Santander (joint with Prof. M. Gomez)
Title: “Flavor Mixing Phenomenology in Supersymmetric Models”
Finished: 02/2016
 - M. Arana, UAM Madrid, Spain (joint with Prof. M. Herrero)
Title: “Non-Minimal Flavor Violation Phenomenology in the MSSM”
Finished: 12/2013
- Supervision of Diploma/master students
 - E. Fraile, IFT Madrid, Spain
Title: “Investigation of the Viability of the hMSSM”
Finished: expected 09/2019
 - U. de Miguel Sarraga, Univ. of Cantabria, Spain
Title: “Predictions for the W Boson mass in the MSSM”
Finished: 01/2019
 - F. Arco, IFT Madrid, Spain
Title: “Higgs-Photon Production in the MSSM at Future e^+e^- Colliders”
Finished: 09/2018
 - X. Marcano, UAM Madrid, Spain (joint with Prof. M. Herrero)
Title: “Sensitivity to Heavy Majorana Neutrino Masses via Higgs Boson Physics”
Finished: 10/2013

- J. Hernandez, UAM Madrid, Spain (joint with Prof. M. Herrero)
Title: “Radiative Corrections for M_h in the MSSM-seesaw with Three Generations of neutrinos and sneutrinos”
Finished: 10/2013
- Supervision of students
 - C. Acereda Ortiz (University of Santander, “trabajo fin de carrera”, 2012)
 - I. Garcia Garcia (University of Santander, “trabajo fin de carrera”, 2011)
 - P. Arenas Guerrero (University of Granada, “introduction to scientific investigations”, 2010)
 - A. Sierra (University of Santander, “introduction to scientific investigations”, 2009)
 - J. Casal Boo (University of Santander, “trabajo fin de carrera”, 2008)
- Supervision of summer students
 - M. Garcia Ferrero (“MultiDark summers student”, 2012)
 - M. Reig (“MultiDark summers student”, 2012)
 - M. Sierra Seco de Herrera (“MultiDark summers student”, 2012)
- Collaboration in supervision of PhD students
 - A. Weber from Technical University Munich (with Prof. W. Hollik)
 - H. Rzehak from University of Karlsruhe (with Prof. W. Hollik)
 - M. Frank from University of Karlsruhe (with Prof. W. Hollik)
- Collaboration in supervision of diploma students
 - M. Arana, UAM (Madrid, Spain, joint with Prof. M. Herrero, “Tesina”)
 - F. Merz from University of Karlsruhe (with Prof. W. Hollik)

7 Visiting professor/Lectures/Physics schools

- Grad course at the UAM (Madrid, Spain) 04/18, 04/17, 03/15, 03/14, 03/13, 03/12, 03/11, 03/10, 04/09:
“SUSY phenomenology”
- Grad course at the university of Santander (Spain) 02/16, 05/15, 05/14, 05/13, 05/11, 05/10, 04/09, 04/08:
“SUSY phenomenology”
- NExt PhD workshop (Cosener’s House, UK) 07/19
“Higgs/BSM phenomenology”
- Master in HEP and Cosmology @ IFCA (UC/CSIC; Santander, Spain) 04/19
“Why the SM is not Enough”
- Puebla University (UDLAP, Mexico) 03/19
“BSM Higgs Physics”
- CALC’18 (Dubna, Russia) 07/18:
“Higgs in the SM and BSM”
- LC school (Frauenchiemsee, Germany), 06/16: “Precision for the Linear Collider”
- 15th Hellenic School and Workshop on HEP and Gravity (Corfu), 09/15: “Higgs Theory: SM and SUSY”
- BUSSTEPP (Southampton) 08/14:
“Phenomenology”
- 42. ITEP winter school (Moscow) 02/14:
“Higgs Physics”
- SUSSP69 (St. Andrews) 08/12:
“Higgs and Electroweak Physics”
- ISAPP summer school (St. Cruz de La Palma, Spain) 08/12:
“The Standard Model of Particle Physics”
- CP3-Origins/DESY/Gttingen Autumn School on Particle Physics and Cosmology (DESY, Hamburg, Germany) 10/11:
“Higgs and BSM Phenomenology”

- School for High Energy Physics (“Taller de Altas Energias 2010”, Barcelona, Spain):
“BSM Physics at the LHC”
- Spanish Winter Meeting 2010 (La Palma, Spain):
“New Physics at the LHC”
- SUSSP65 (St. Andrews) 08/09:
“Higgs and electroweak symmetry breaking”
- CALC’09 (Dubna, Russia) 07/09:
“SUSY: From the basics to phenomenology”
- Higgs-Maxwell Meeting 2008 (Edinburgh, UK):
“SM and MSSM Higgs Theory”
- Spanish Winter Meeting 2008 (Baeza, Spain):
“LHC Physics: Theory”
- preSUSY 2007 (Karlsruhe, Germany):
“Basics of Higgs Physics”
- School for High Energy Physics (“Taller de Altas Energias 2007”, Jaca, Spain):
“Higgs Physics in the SM and Beyond”
- Visiting Professor at the *Louvain university*, Brussels, Belgium, May 2007;
Lecture on “Higgs Physics in the SM and the MSSM”
- Nordic Winter School 2007 (Gausdal, Norway):
“SUSY, Higgs, LHC”
- SUSY exercises at “38. Herbstschule für Hochenergiephysik”, Maria Laach, 09/06.
- School for High Energy Physics (“Taller de Altas Energias 2006”, Santander, Spain):
“ILC Physics”
- SUSY exercises at “37. Herbstschule für Hochenergiephysik”, Maria Laach, 09/05.
- preSUSY 2005 (Durham, UK): “Electroweak Precision Observables in the MSSM”
- ATLAS lectures 2004/2005: “SUSY for ATLAS – ATLAS for SUSY”
- **Teaching/exercises** (before Habilitation in 2004):
 - Organization and teaching of tutorials (including problem sheets),
single lectures as substitute:

- * *Theoretical Mechanics*, LMU München, 2003 (with A. Schenzle)
- * *Basic Quantum Mechanics*, LMU München, 2002-2003 (with A. Schenzle)
- * *Theoretical Electrodynamics*, LMU München, 2002 (with W. Stocker)
- * *GUTs and Supersymmetry*, DESY, 2000 (with P. Zerwas and M. Spira)
- * *Electroweak interactions*, DESY, 1999-2000 (with P. Zerwas and M. Spira)
- Various tutorials in theoretical physics, Karlsruhe University, 1993-1998:
 - * theoretical mechanics
 - * theoretical electrodynamics
 - * basic quantum mechanics
 - * advanced quantum mechanics
- Various tutorials in mathematics (analysis), Karlsruhe University, 1991-1993.

8 Summary of Research interests

My field of research is theoretical high-energy physics. In particular I am concerned with the the Standard Model (SM) and the Minimal Supersymmetric Standard Model (MSSM), radiative corrections therein, and corresponding experimental tests, in particular at the LHC.

Despite the impressive success of the SM, most physicists are convinced that it is only a low energy limit of a more predictive theory beyond. Supersymmetry (SUSY), and in particular the MSSM, is widely considered as the theoretically most appealing extension of the SM. The questions arise, how can one decide whether Supersymmetry is an extension of the SM that is realized in nature, and what can be learned about Supersymmetry already today from high- and low-energy collider experiments and from cosmological observations.

The discovery of a Higgs-like boson at the LHC in 2012 presents a unique opportunity to make substantial progress on these fundamental questions. My research in this context has been focused on studying the phenomenological consequences of the SM and its supersymmetric extension with the following main subjects:

- The discovery of a light Higgs(-like) boson as a probe of the SM and BSM physics.
- Phenomenological predictions for current and future colliders (especially for the LHC and the LC) of the SM and BSM models.
Synergy between the LHC and the LC
- Implications for BSM/SUSY from cosmology and gravitational waves.
- Low-energy and electroweak precision observables as a test of the SM and BSM models