

Curriculum Vitae

Sven Heinemeyer

1 Personal data

Name: Sven Heinemeyer
Date and place of birth: December 31, 1968 in Bremen (Germany)
Citizenship: German
Marital status: Single
Address: Instituto de Fisica de Cantabria IFCA-CSIC
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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: 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)
- From Jun. 2010 on Investigador Científico (permanent research 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

5 Research activities

- More than 200 publications in journals and proceedings of conferences and workshops (see enclosed list and description of my research interests and activities) with more than 13000 citations (23 publications in refereed journals with more than 100 citations, 8 of them with more than 250 citations; average citation for published papers more than 90). Author of two *Phys. Repts.* (leading author or editor).
- Many invited plenary/parallel talks at conferences and seminars/colloquia at Physics research laboratories and universities (see enclosed list).
- Member of the *LHC Higgs Cross Section Working Group*
Member of the *LEP Higgs working group*.
(Keeper of “FeynHiggs”, the code used for the MSSM Higgs analyses at LEP2, CDF and DØ, ATLAS and CMS.)
- Contribution to several workshops, especially on current and future colliders:
 - *LHC2FC: From the LHC to Future Colliders, CERN TH institute 2009*
 - *LHC/Flavor workshop; 2nd LHC/Flavor workshop*
 - *The LHC Early Phase for the ILC (Fermilab 2007)*
 - *CMS PTDR*
 - *ECFA(/DESY) Linear Collider workshop*
 - *Tev4LHC workshop*
 - *CERN Workshop on SM physics (and more) at the LHC*
 - *ILC Physics and Detector workshop (Snowmass 2005)*
 - *Physics at RunII: Workshop on Supersymmetry/Higgs at Fermilab*
 - *CERN CLIC workshop/CERN μ -Collider workshop*
- Editor of the *LHC2FC Report (2009)*.
(Sub)editor of the *LHC/Flavor Report (2006)*.
Editor of the *Snowmass Higgs Report (2005)*.
Editor of the *LHC/ILC Study Group report (2004)*.
(Sub)editor of the *CERN CLIC report (2004)*.
- Contributions to the *CMS PTDR* (Higgs part), to the *TESLA TDR* (Higgs, SUSY and Electroweak part), to the *Orange Report* for the NLC (Higgs, SUSY and Electroweak section)

- Spanish National Project (“Consolider”):
MultiDark: Multi messenger approach on Dark Matter:
 Project board member, leader of “Particle Physics/LHC working group”
- Editor: European Physics Journal C
- Referee:
 - National Science Foundation (USA)
 - ANEP (Spain)
 - SNSF (Switzerland)
 - Wissenschaftsfond (Austria)
 - Netherlands Foundation for Fundamental Research on Matter, FOM
 - Fondecyt (Chile)
 - Various journals:
 Physics Review Letters, Nuclear Physics B, Physical Review D, Physics Letters B, JHEP, European Physics Journal C, New Journal of Physics
 - Particle Data Group
- Convenor at workshops series (partially ongoing):
 - ECFA–CLIC–ILC workshop 2010–???: Higgs (theory)
 - LHC Higgs Cross Section Working Group 2010 – ???: Branching ratios
 - LHC Higgs Cross Section Working Group 2010 – ???: Pseudo observables
 - Spanish National Project (“Dark Matter Consolider”) 2009 – 2014:
 Particle Physics and Dark Matter
 - ILC–ECFA workshop 2003–2008: Higgs (theory)
 - 2. LHC/Flavor workshop 2007–???: (CERN): Flavor/Tools
 - LHC/Flavor workshop 2005–2007 (CERN): Flavor/Tools
- Convenor at single workshops:
 - 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/conferences: (“*” \equiv main organizer)
 - * Higgs Days at Santander 2010: Theory meets Experiment (IFCA, Santander, Spain, October 2010)
 - Charged (Higgs) 2010 (Uppsala university, Sweden, September 2010)
 - * 2nd workshop of *Spanish National Project on Dark Matter* (IFCA, Santander, Spain, June 2010)
 - * Higgs Days at Santander 2009: Theory meets Experiment (IFCA, Santander, Spain, September 2009)
 - * TH institute (CERN) Feb. 2009: LHC2FC (*From the LHC to Future Colliders*)
 - * MSSM Higgs Physics at the LHC: Theory meets Experiment (IFCA, Santander, Spain, October 2008)
 - Charged (Higgs) 2008 (Uppsala university, Sweden, September 2008)
 - 2. LHC/Flavor workshop 2007–??? (CERN)
 - SUSY07 (Karlsruhe, Germany)
 - * “The LHC Early Phase: Shaping the Future of Particle Physics”, workshop on early LHC data (Fermilab, April 2007)
 - Charged (Higgs) 2006 (Uppsala university, Sweden, September 2006)
 - Organizer/chairman:
 - 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

- Supervision of PhD students
 - L. Galeta, University of Santander
 - M. Arana, UAM Madrid, Spain (joint with Prof. M. Herrero)
- 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)
- Supervision of students
 - Aníbal Sierra (University of Santander, “introduction to scientific investigations”)
 - J. Casal Boo (University of Santander, “trabajo fin de carrera”)
- 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

- School for High Energy Physics (“Taller de Altas Energias 2010”, Barcelona, Spain):
“BSM Physics at the LHC”
- Grad course at the university of Santander (Spain) 05/10:
“SUSY phenomenology”
- Grad course at the UAM (Madrid, Spain) 03/10:
“SUSY phenomenology”
- Spanish Winter Meeting 2010 (La Palma, Spain):
“New Physics at the LHC”
- SUSSP’09 (St. Andrews) 08/09:
“Higgs and electroweak symmetry breaking”
- CALC’09 (Dubna, Russia) 07/09:
“SUSY: From the basics to phenomenology”
- Grad course at the university of Santander (Spain) 04/09:
“SUSY phenomenology”
- Grad course at the UAM (Madrid, Spain) 04/09:
“SUSY phenomenology”
- Grad course at the university of Santander (Spain) 04/08:
“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, September 2006.
- School for High Energy Physics (“Taller de Altas Energias 2006”, Santander, Spain):
“ILC Physics”
- SUSY exercises at “37. Herbstschule für Hochenergiephysik”, Maria Laach, September 2005.
- 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.

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 start-up of the LHC in spring 2010 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:

- Phenomenological predictions for current and future colliders (especially for the Tevatron, the LHC and the ILC) of the SM and its supersymmetric extensions, Synergy between the LHC and the ILC
- The lightest Higgs boson as a probe of Supersymmetry
- Implications for the MSSM from cosmology and unified theories. Precision calculations for cosmological observables.
- Low-energy and electroweak precision observables as a test of the SM and the MSSM

In particular I calculated corrections up to two-loop order for the above subjects, thus deriving a new stage of precision, especially for the SUSY calculations. Furthermore I performed detailed studies for the phenomenology of the SM and the MSSM at current/future colliders (Tevatron, LHC, ILC, γC , CLIC and μC). These studies combined (partially for the first time) results from low- and high-energy colliders and from cosmological observations.