

Dr. Benjamin Koch

CONTACT

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RESEARCH INTERESTS

Gravitation And Particles (GAP)

Quantum gravity phenomenology
Non-geodesic motion of spinning particles
Renormalization group and asymptotic safety
Physics beyond the standard model
Weakly interacting particles

WORKING EXPERIENCE

Since 2020, Assistant and visiting professor

Assistant at: Technical University of Vienna, Austria

Visiting at: Pontificia Universidad Católica de Chile, Santiago, Chile

2015-2020, Associate professor

At: Pontificia Universidad Católica de Chile, Santiago, Chile

2017-2019, Outreach coordinator

At: Physics Institute of Pontificia Universidad Católica de Chile, Santiago, Chile

2012-2015, Assistant professor

At: Pontificia Universidad Católica de Chile, Santiago, Chile

2014, External consultant

On: Ballistics for Carabineros de Chile

2008-2011, Postdoc

At: Pontificia Universidad Católica de Chile, Santiago, Chile

2007-2008, Postdoc

At: Johann Wolfgang Goethe University in Frankfurt, Germany

2004-2007, Teaching assistant

At: Johann Wolfgang Goethe University in Frankfurt, Germany

2001, Internship

On: Simulation and construction of a water Cherenkov detector

At: Max Planck Institute for Physics in Munich, Germany

1996-1997, Civilian service

At: Lebenshilfe Nördlingen, Germany

Ongoing supervision of undergraduate and postgraduate students

Since 2020-master Felipe Contreras on “Scale Dependence in Cosmology”
Since 2018-Ph.D. Christian Diaz on “Exploring the hidden sector with CTA”
Since 2017-Ph.D. René Araneda on “Gravitational Stern Gerlach experiments”

Completed supervision of undergraduate and postgraduate students

2020-master Trinidad Lantaño on “Path integrals for boundaries in diffusion and quantum mechanics”
2020-master Cristobal Laporte on “Variational Parameter Setting in Asymptotic Safety”
2020-bachelor Aliwen Delgado on “Deep particle searches in HADES and ANDES”

2019-master Anthony Canazas on “Antisymmetric Wilson loops in N=4 SYM”
2019-Ph.D. Angel Rincon on “Scale dependence in gravitational theories”
2019-Ph.D. Ignacio Reyes on “Aspects of quantum gravity in AdS₃/CFT₂”

2018-bachelor Trinidad Lantaño on “Path integrals in the double slit experiment”
2018-bachelor Diego Tapia on “Kepler laws and Birkhoff theorem in the light of scale dependent couplings”

2017-bachelor Sebastian Ñuñez on “Geodesic structure of black holes with scale dependence”

2016-Ph.D. Nicolas Zalaquett on “Spinning particles in general relativity”
2016-master Christian Diaz on “Hidden photons in the Casimir effect”
2016-bachelor Cristobal Laporte on “Variational parameter setting in QED”
2016-bachelor Juan Antonio Paredes on “Dark matter annihilation in the galactic center”

2015-master Paola Rioseco on “Black holes and running couplings”
2015-bachelor Javier Felipe Nunez on “Spinning massive particles in cosmology”
2015-internship Victor Munoz on “The path integral formulation of quantum mechanics”

2014-master Esteban Castillo on “QFT in time-dependent backgrounds”
2014-master Ignacio Reyes on “Differentiable-path integrals in quantum mechanics”
2014-bachelor Jose Taulis on “Black holes as particle accelerators”
2014-bachelor Hernan Cabrera on “Geoneutrinos at the ANDES underground laboratory”
2014-internship Alejandro Contreras on “How to throw a basketball?”

2013-internship David Valenzuela on “Black hole analog in soap film?”
2013-internship Antonio Henriquez on “Symmetries in physics”

2012-internship Cristobal Armaza on “The spinning top in general relativity”

Teaching at Pontificia Universidad Católica

- 2021-I Cosmology and particles & Electrodynamics I (U.A.)
- 2020-II Electrodynamics I
- 2019-I Statics and Dynamics
- 2018-II Electricity and Magnetisms & QFT II
- 2018-I General Physics
- 2017-II Electrodynamics & Electricity and Magnetism
- 2017-I General Physics
- 2016-II Electricity and Magnetism & Thermodynamics & QFT II
- 2016-I Introduction to Renormalization Group (at UNAB school)
- 2015-II Electricity and Magnetism for Physicists and Engineers
- 2015-I Quantum Field Theory II
- 2014-II Electrodynamics & Thermodynamics for Engineers
- 2014-I Advanced Quantum Mechanics & Introduction to Particle Physics
- 2013-II Modern Physics
- 2013-I Modern Physics & General Physics for College

- 2012-II Electricity and Magnetism for Engineers
- 2012-I General Physics for College

- 2011-II Electricity and Magnetism
- 2011-I General Physics for Engineers

- 2010-II Introduction to Particle Physics
- 2010-I Introduction to Physics

- 2009-II Introduction to Physics
- 2009-I Quantum Field Theory I

- 2008-II Introduction to Particle Physics

Teaching assistant at University of Frankfurt

- 2007-I Statistical Physics
- 2006-I Quantum Mechanics I
- 2005-I Elektrodynamics
- 2004-II Theoretical Mechanics II
- 2004-I Theoretical Mechanics I

EXTERNAL
FUNDING

2018-2020, Co-investigator, Fondecyt Regular 1181694

Physics beyond the Standard Model

2017, Luksburg grant for Masterclasses Collaborating in las Americas-IV

Organization cosmic ray measurement expeditions in northern and southern hemisphere

2016-2017, Principal organizer, VRA funds for workshops and seminars

Graviticulas seminar series

2016-2018, Co-investigator, Fondecyt Regular 1161150

Looking for signatures of a hidden sector

2012-2016, Principal investigator, Fondecyt Regular 1020360

Theory and Phenomenology at the Terascale

2012-2016, Senior researcher, Anillo ACT1102

Anillo Atlas Andino - High Energy Particle Physics

2015, Luksburg grant for Masterclasses Collaborating in las Americas-III

Organization the Chilean LHC Masterclasses 2016

2014, Luksburg grant for Masterclasses Collaborating in las Americas-II

Organization of a combined workshop and of the Chilean LHC Masterclasses 2015

2014, External funding of Swiss Embassy

Invitation in context of honorary doctorate for Peter Jenni (ATLAS)

2013, Luksburg grant for Masterclasses Collaborating in las Americas-I

Organization of the Chilean LHC Masterclasses 2014

COMMISSIONS
OF TRUST

Reviewing activity for the following journals

Physical Review Letters
General Relativity and Gravitation
Nuclear Physics B
Physics Letters B
Foundations of Physics
European Physics Letters
Universe
European Physical Journal C

Reviewing activity for the following programs

Veni, Netherlands
FONCyT Science and Technology, Argentina
Conicyt Formation of Human Capital, Chile
Swiss School Santiago, Matura, Switzerland/Chile
Fondecyt Regular, Chile
Fondecyt Inerción, Chile

OUTREACH

2017-2019 Outreach coordinator of physics institute

2014-2017, Leading organizer of first chilean LHC masterclasses

Several TV and newspaper interviews

LANGUAGES

German: native language

English: fluently

Spanish: fluently

Latin: reading only

EDUCATION

2007, Ph.D.

Title: Black hole production and graviton emission
in models with large extra dimensions
At: Frankfurt International Graduate School of Science and
Johann Wolfgang Goethe University in Frankfurt , Germany

2003, Diploma

Title: Einschleifenrechnungen zur tiefinelastischen
Neutrino-Nukleon-Streuung im MSSM
At: Max Planck Institute for Theoretical Physics, and
Technical University Munich, Germany

2001, One semester Erasmus exchange program

At: Universidad de Complutense in Madrid, Spain

1996, School leaving examination (Abitur)

At: Theodor Heuss Gymnasium Nördlingen, Germany

OTHER INTERESTS Climbing, guitar, and surfing

Santiago, February 23, 2021