

## Prof. Dr. Benjamin Koch

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### CONTACT

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Santiago, Chile

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### RESEARCH INTERESTS

#### **Gravitation And Particles (GAP)**

Quantum gravity phenomenology  
Renormalization group and asymptotic safety  
Physics beyond the standard model  
Weakly interacting particles

### WORKING EXPERIENCE

**Since 2017**, Outreach coordinator

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

**Since 2015**, Associate professor

At: 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 2018-PhD	Christian Diaz on “Exploring the hidden sector with CTA”
Since 2018-master	Trinidad Lantaño on “Topological paths in the double slit experiment”
Since 2018-master	Anthony Canazas on “Antisymmetric Wilson loops in N=4 SYM”
Since 2018-bachelor	Aliwen Delgado on “Geoneutrinos and the ANDES laboratory”
Since 2018	Felipe Contreras on “Scale Dependence in Cosmology”
Since 2017-PhD	René Araneda on “Gravitational Stern Gerlach experiments”
Since 2017-master	Cristobal Laporte on “Variational Parameter Setting in Asymptotic Safety”
Since 2016-PhD	Angel Rincon on “Scale dependence in gravitational theories”
Since 2015-PhD	Cristopher Gonzalez on “Hidden photons in cosmology”

**Completed supervision of undergraduate and postgraduate students**

2019-PhD	Ignacio Reyes on “Aspects of quantum gravity in AdS <sub>3</sub> /CFT <sub>2</sub> ”
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 coupling”
2017-bachelor	Sebastian Ñuñez on “Geodesic structure of black holes with scale dependence”
2016-PhD	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**

- 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

**2018-2021, 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**, PhD

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 Gymnastics, guitar, and surfing

Santiago, February 14, 2019