

# Álvaro Pastor Gutiérrez

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## PERSONAL DETAILS

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- Born in Madrid, Spain, on the 9th of October 1996.
- Sex: male.
- Marital status: single.

## EMPLOYMENT

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- **RIKEN Center for Interdisciplinary Theoretical and Mathematical Sciences (iTHEMS)** May 2025 - Currently  
Special Postdoctoral Researcher (SPDR). Wako, J
- **Institute for Theoretical Physics of the Heidelberg University** Nov. 2024 - March 2025  
PhD in Theoretical physics. Heidelberg, D
- **Lindner Division at Max-Planck-Institut für Kernphysik** Oct. 2021 - Oct. 2024  
PhD in Theoretical physics. Heidelberg, D
- **Hinton Division at Max-Planck-Institut für Kernphysik** April 2019 - Oct. 2021  
Assistant student. Research on hadronic interaction models. Heidelberg, D  
Supervisors: Robert Daniel Parsons, Harm Schoorlemmer and Michael Schmelling.  
Part of LHCb collaboration.
- **Radiation physics Institute at Helmholtz-Zentrum Dresden Rossendorf**  
Assistant student. Research on non-equilibrium warm dense matter. Oct. 2018 - April 2021  
Supervisor: Jan Vorberger Dresden, D

## EDUCATION

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- **Ruprecht-Karls-Universität Heidelberg**  
PhD in Theoretical physics at **NEWFO** and **SCS** groups. Oct. 2021 - April 2025  
Thesis: *Non-perturbative new physics with functional methods* Heidelberg, D  
1st supervisor: Florian Goertz  
2nd supervisor: Jan M. Pawłowski  
With distinction, *summa cum laude*.
- **Ruprecht-Karls-Universität Heidelberg** April 2019 - Aug. 2021  
MSc in Physics. Heidelberg, D  
Thesis: *RG-consistency for the Standard Model and Asymptotically Safe Quantum Gravity*  
Supervisor: Jan M. Pawłowski
- **Universidad Complutense de Madrid** Sept. 2014 - Oct. 2018  
4-year BSc (Grado) in Physics. Madrid, E

Thesis: *The  $SU(3)$  flavour singlet baryon*

Supervisor: Felipe Llanes Estrada

- **Ludwig-Maximilians-Universität München** Sept. 2016- Aug. 2017  
Funded through the Erasmus+ scholarship. München, D
- **Instituto público Ramiro de Maeztu** Sept. 2012 - June 2014  
International Baccalaureate in sciences and Spanish Baccalaureate Diploma. Madrid, E

## RESEARCH INTERESTS

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- Beyond the Standard Model physics: strong new physics, GUTs, extra-dimensions, flavour physics, dark matter, asymptotic safety, gravitational waves, cosmological phase transitions, quantum gravity.
- Quantum Field Theory: renormalization theory, non-perturbative methods, functional approaches, critical phenomena, finite temperature, QCD, EFTs, CFTs.

## EVENT ORGANISATION

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- Workshop **organising committee**: [New Physics Directions in the LHC era and beyond](#). April 2024
- **Organising committee** for science communication event: [Girl's day at MPIK](#). Orientation event for girls to find out about careers and studies. March 2023
- **Student representative** of the Physics faculty at Universidad Complutense de Madrid. Sept. 2017 - June 2018

## GRANTS

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- RIKEN [Special Postdoctoral Researchers Program](#) May 2025- April 2028
- [Landesgraduiertenförderung \(LGF\) program completion grant](#) January 2025

## SEMINARS, CONFERENCES & SCHOOLS

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- Workshop [Effective Theories for Nonperturbative Physics](#). August 2025  
Talk: *IR phases of purely chiral-gauge theories* CERN, CH
- Conference [30th Symposium on Particles, Strings and Cosmology](#). July 2025  
Talk: *Cartography of strong new physics* Durham, UK
- Conference [Physics at TeV Colliders and Beyond the Standard Model 2025](#). July 2025  
Talk: *Quantum criticality of the Standard Model* Les Houches, FR
- Seminar at [iTHEMS Theoretical Physics Seminar](#). June 2025  
Talk: *Charting the landscape of gauge-fermion dynamics* Wako, J
- Seminar at [CP3 UCLouvain](#). March 2025  
Invited talk: *Cartography of gauge-fermion theories* Louvain-la-Neuve, BE

- Conference on the **Exact Renormalisation Group (ERG 2024)**. Sept. 2024  
Talk: *Cartography of gauge-chiral dynamics* Les Diablerets, CH
- Conference **QuantFunc**. Sept. 2024  
Talk: *Conformality,  $d\chi SB$  and confinement: cartography of gauge-chiral dynamics* Valencia, E
- Seminar at the **TPI of the Friedrich Schiller University Jena**. Aug. 2024  
Invited talk: *Cartography of gauge-chiral dynamics* Jena, D
- Workshop **Effective Theories for Nonperturbative Physics**. Aug. 2024  
Talk: *Conformality,  $d\chi SB$  and confinement: cartography of gauge-chiral dynamics* Mainz, D
- Workshop **New Physics Directions in the LHC era and beyond**. April 2024  
Poster: *Conformality,  $d\chi SB$  and confinement: cartography for strong BSM* Heidelberg, D
- Workshop **The Future of Fundamental Composite Dynamics**. March 2024  
Talk: *Conformality,  $d\chi SB$  and confinement: cartography of strong dynamics* Mainz, D
- Seminar at the **Theoretical Particle Physics group, University of Sussex**. Jan. 2024  
Invited talk: *Unveiling hidden phases and charting strong sectors* Brighton, UK
- Seminar at the **Theorie Palaver, University of Mainz**. Jan. 2024  
Invited talk: *Unveiling hidden phases and charting strong sectors* Mainz, D
- Seminar at **IPARCOS, UCM Theory department**. Dec. 2023  
Invited talk: *Unveiling hidden phases and charting strong sectors* Madrid, E
- Seminar at the **Theoretical Particle Physics group at SISSA**. Nov. 2023  
Invited talk: *Unveiling hidden phases and charting strong sectors* Trieste, I
- Seminar at the **Maryland Center for Fundamental Physics**. Nov. 2023  
Invited talk: *Unveiling hidden phases and charting strong sectors* Maryland, U.S
- Seminar at the **Cornell LEPP Theory seminar**. Nov. 2023  
Invited talk: *Unveiling hidden phases and charting strong sectors* Ithaca, U.S
- Workshop **UV Complete Quantum Field Theories for Particle Physics**. Sept. 2023  
Invited talk: *New Phases of the Standard Model Higgs potential* San Miniato, I
- Seminar at the **Institute for Theoretical Physics, University of Cologne**. July 2023  
Invited talk: *Non-perturbative new physics with functional methods* Cologne, D
- Workshop **Exploring New Topics with Functional Renormalisation**. May 2023  
Poster: *New physics with the Functional Renormalisation Group* Bad Honnef, D
- Workshop **Asymptotic Safety meets Particle Physics and Friends**. Dec. 2022  
Invited talk: *The Asymptotically Safe Standard Model* Hamburg, D
- Seminar at the **Universidade Federal de Minas Gerais**. Dec. 2022  
Invited talk: *The ASSM: a framework for non-perturbative new physics* Online
- Seminar part of the online **Asymptotic Safety seminar** series. Nov. 2022  
Invited talk: *The Asymptotically Safe Standard Model* Online

- Seminar part of the online **Asymptotic Safety seminar** series. Oct. 2022  
Invited talk: *UV completion of extra-dimensional theories for GH unification* Online
- Conference **27th Symposium on Particles, Strings and Cosmology**. July 2022  
Talk: *The Asymptotically Safe Standard Model* Heidelberg, D
- Workshop **FUNQCD: from first principles to effective theories**. April 2021  
Talk: *Lightest flavor-singlet qqg baryons as witnesses to colour* Online
- Conference **37th International Cosmic Ray Conference (ICRC21)**. July 2021  
Talk: *Sub-TeV hadronic interactions [...]* Online
- Workshop **CORSIKA Cosmic Ray Simulation Workshop**. June 2020  
Talk: *Sub-TeV hadronic interactions [...]* Online

Over 15 seminar talks since 2021 at the MPIK and ITP Heidelberg.

#### Schools & research stays:

- Research stay at the **Centre for Cosmology, Particle Physics and Phenomenology of UCLouvain**. March 2025  
Collaboration visit to Dr. Shahram Vatani. Louvain-la-Neuve, BE
- Research stay at **Theory group at Brookhaven National Laboratory**. Nov. 2023  
Visit to Prof. Sally Dawson. New York, U.S.
- Research stay at **Danish Institute for Advanced Studies**. June 2023  
Visit to Prof. Francesco Sannino. Odense, DK
- Summer school: **Joint ICTP-SAIFR/MITP Summer School on Particle Physics beyond the Standard Model**. Sep. 2022  
Sao Paulo, BR
- Graduate school: **48th Heidelberg Physics Graduate Days**. April 2022  
Heidelberg, D
- Winter school: **Galileo Galilei Institute Lectures on the Theory of Fundamental Interactions**. Jan. 2022  
Online

#### Other conferences:

- Workshop **Quantum spacetime and the Renormalization Group 2025**. April 2025  
Heidelberg, D
- 5th Annual Symposium of the **European Consortium for Astroparticle Theory**. May 2025  
Online

#### TEACHING EXPERIENCE

- Tutor on **Advanced Quantum Field Theory (QFTII)**. Summer term 2022  
Lecturer: Prof. Dr. Razvan Gurau Heidelberg, D

- Tutor on **Quantum Field theory** (QFTI). Winter term 2022/2023  
Lecturer: Prof. Dr. Jan M. Pawłowski Heidelberg, D
- Supervision experience:
  - ◊ Jordanis Bolotas. MSc. thesis (2024)
  - ◊ Silas Mezger. Now MSc student at ITP, Heidelberg. BSc. thesis (2023)
  - ◊ Giacomo Ruisi. Now PhD student at DESY, Zeuthen. MSc. thesis (2022/2023)
  - ◊ Stefan Nellen. Now PhD student at ÖAW, Vienna. MSc. thesis (2022)

## LANGUAGE SKILLS

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<b>Spanish</b>	<i>Mother tongue</i>
<b>English</b>	<i>Fluent (C1-C2)</i>
<b>German</b>	<i>Intermediate Level (C1)</i>

## SOFTWARE & PROGRAMMING SKILLS

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<b>Programming Languages</b>	C++, Python, Mathematica, MATLAB, Bash, R
<b>Specialised Software &amp; Tools</b>	ROOT, HepMC, CORSIKA, CRMC, CubaLibrary, HPC