

Personal data and professional situation

Name: Alejandro

Surname: Jiménez Cano

Nationality: Spain

PROFESSIONAL PROFILES AND IDENTIFIERS



Inspire-HEP

A.Jimenez.Cano.1



ORCID

0000-0002-1037-1142



Scopus

57193578466



WoS ResearcherID

AAZ-4179-2021



Research Gate



Google Scholar



LinkedIn



arXiv

CURRENT PROFESSIONAL SITUATION AND CONTACT

Professional category	Profesor Ayudante Doctor
Institution	Universidad Politécnica de Madrid
Faculty/Center	Escuela Técnica Superior de Ingeniería de Montes, Forestal y del Medio Natural
Department	Ingeniería y Gestión Forestal y Ambiental
Academic Unit	Física
Mailing address	Ciudad Universitaria s/n (Ed. Forestales), 28040 Madrid, Spain
Institutional e-mail	alejandro.jimenez.cano@upm.es
Web	https://alejandrojimenezcano.github.io/

AREAS OF RESEARCH AND INTERESTS

- ☐ **Specialization.** Theories of gravity beyond General Relativity, and viability and stability analysis of models within these theories.
- ☐ **Other interests.** I am especially interested in Mathematical Physics and other side topics related to gravitation, such as
 - advanced topics in geometry;
 - classical field theory , degrees of freedom and instabilities;
 - Hamiltonian geometry and structures;
 - effective modifications of General Relativity, completions and non-linearities;
 - quasi-normal modes and gravitational waves.

Professional career

ANECA CERTIFICATIONS

Programa de evaluación del profesorado contratado (PEP):

- | | |
|---|------------------------------------|
| <input type="checkbox"/> Profesor ayudante doctor | Positive resolution: 22 June 2022. |
| <input type="checkbox"/> Profesor de universidad privada | Positive resolution: 22 June 2022. |
| <input type="checkbox"/> Profesor contratado doctor | Positive resolution: 22 June 2022. |

RESEARCH GRANTS AND CONTRACTS

09.2024–08.2030	Profesor Ayudante Doctor	
	Center	ETSI Montes, Forestal y del Medio Natural (Univ. Politécnica de Madrid), Madrid (Spain)
10.2023–12.2023	Contract funded by project PRG356	
	Program	---
	Funding entity	Estonian Research Council (Ministry of Education and Research)
	Project title	<i>Gauge gravity: unification, extensions and phenomenology</i>
	Advisor	Tomi S. Koivisto (Lab. of theoretical physics, U. Tartu)
	Center	Institute of Physics (Univ. Tartu), Tartu (Estonia)
10.2021–09.2023	Mobilitas postdoctoral contract	[Ref MOBJD1035]
	Program	Mobilitas Pluss Postdoctoral Program 2021
	Funding entity	European Regional Development Fund
	Project title	<i>Metric-affine gravity. Viability, cosmological implications and symmetry breaking</i>
	Advisor	Manuel Hohmann and Tomi S. Koivisto (Lab. of theoretical physics, U. Tartu)
	Center	Institute of Physics (Univ. Tartu), Tartu (Estonia)
05.2017– 07.09.2021	FPU predoctoral contract	[Ref FPU15/02864]
	Program	Formación de Profesorado Universitario 2015
	Funding entity	Spanish Ministry of Education, Culture and Sport
	Project title	<i>Metric-Affine Gauge theories of gravity. Foundations and new insights</i>
	Advisor	Bert Janssen (Dpto. de física teórica y del cosmos, Universidad de Granada)
	Center	Universidad de Granada. Granada (Spain)
09.2019–11.2019	Doctoral stay in Tartu	
	Program	Estancias breves en centros de investigación nacionales y extranjeros
	Funding entity	Universidad de Granada (Plan Propio)
	Project title	<i>Ondas gravitacionales en gravedad métrico-afín</i>
	Advisor	Manuel Hohmann (Laboratory of theoretical physics, Univ. Tartu)
	Center	Institute of Physics (Univ. Tartu), Tartu (Estonia)
2015–2016	Investigador becario	
	Program	Beca de colaboración
	Funding entity	Spanish Ministry of Education, Culture and Sport
	Project title	<i>Formalismo de Palatini en frames conformes</i>
	Advisor	Bert Janssen (Dpto. de física teórica y del cosmos, Universidad de Granada)
	Center	Universidad de Granada. Granada (Spain)
2014–2015	Investigador becario	
	Program	Becas de Iniciación a la investigación
	Funding entity	Universidad de Granada (Plan Propio)
	Project title	<i>Diagramas de Penrose de algunas soluciones cosmológicas</i>
	Advisor	Bert Janssen (Dpto. de física teórica y del cosmos, Universidad de Granada)
	Center	Universidad de Granada. Granada (Spain)

Education

EDUCATION

2016-2021	PhD in Physics and Mathematics
	Title of the thesis Metric-Affine Gauge Theories of Gravity. Foundations and new insights
	Director Bert Janssen
	Center Universidad de Granada. Granada (Spain)
	Date of defense 07 September 2021
	Grade Sobresaliente (Cum Laude)
	Mentions International PhD
2015-2016	Master in Physics and Mathematics
	Grade 9.51 / 10
	Center Universidad de Granada y Universidad de Castilla-La Mancha (Spain)
2011-2015	Grado en Física (Bachelor of Science - Physics)
	Grade 9.638 / 10
	Center Universidad de Granada. Granada (Spain)
2009-2011	Bachillerato - Modalidad de Tecnología
	Grade 13.525 / 14 (incluye P.A.U.)
	Center Colegio San Agustín. Ceuta (Spain)

SCHOOLS ON PHYSICS

- ❑ **North American Einstein Toolkit School 2021**
[Online] University of Illinois Urbana Champaign. Urbana-Champaign (USA). 26 – 30 July 2021.
- ❑ **IPARCOS School on Gravitational Waves**
Universidad Complutense de Madrid. Madrid (Spain). 18 – 20 December 2019.

COURSES AND COMPLEMENTARY TRAINING

- ❑ **III Curso de Historia de la Física: Construyendo un futuro (20 h)**
Granada (Spain), throughout 2017-2018. Grade: 9. Organized by the seminar "La física y sus historias" (UGR).
- ❑ **Curso Información y Caos (30 h)**
Granada (Spain), March 16, 17 and April 6, 7, 13, 14, 20, 21 (2018). Organized by Centro Mediterráneo and Universidad de Granada.
- ❑ **Writing a research paper in English: strategies and techniques (9 h)**
Granada (Spain), January 17, 24, 26 (2018). Organized by Escuela de Doctorado (UGR).
- ❑ **Curso Energía y materia (10 h)**
Granada (Spain), October 5, 6 and November 2, 9, 10 (2017). Organized by Escuela de Doctorado (UGR).
- ❑ **Scientific Research, Publishing and Ethics (30 h)**
Granada (Spain), September 25 - 28 (2017). Organized by Escuela de Doctorado (UGR).
- ❑ **Curso Energía y materia (30 h)**
Granada (Spain), June 26-29 (2017). Organized by Centro Mediterráneo and Universidad de Granada.

❑ **II Curso de Historia de la Física: Construyendo un futuro (20 h)**

Granada (Spain), throughout 2016-2017. Grade: 9. Organized by the seminar "La física y sus historias" (UGR).

COURSES AND SEMINAR ON TEACHING TRAINING, IMPROVEMENT AND INNOVATION

❑ **Novice lecturer taking part in the program: Actuación de un equipo docente en formación inicial de profesorado en áreas experimentales y técnicas (38 h)**

Granada (Spain), November 2018 – June 2019 (UGR).

Research activity

PARAMETERS [INSPIRE-HEP]

	In total	Published only
Citations	567	523
<i>h</i> -index	11	10

PUBLICATIONS

Author signature: Alejandro Jiménez Cano (old one: Alejandro Jiménez-Cano)

— *Under revision (pre-prints)*

— *Published research articles*

1. On the existence of a parent theory for General Relativity and Unimodular Gravity

G. García-Moreno, A. Jiménez Cano.

Physical Review D **109**, 104004 (2024).

DOI: [10.1103/PhysRevD.109.104004](https://doi.org/10.1103/PhysRevD.109.104004)

arXiv: [2309.06903](https://arxiv.org/abs/2309.06903) [gr-qc]

2. Pathological character of modifications to Coincident General Relativity: Cosmological strong coupling and ghosts in $f(\mathbb{Q})$ theories

D. Aguiar Gomes, J. Beltrán Jiménez, A. Jiménez Cano, T. S. Koivisto.

Physical Review Letters **132**, 141401 (2024).

DOI: [10.1103/PhysRevLett.132.141401](https://doi.org/10.1103/PhysRevLett.132.141401)

arXiv: [2311.04201](https://arxiv.org/abs/2311.04201) [gr-qc]

3. Bootstrapping gravity and its extension to metric-affine theories

A. Delhom, G. García-Moreno, M. Hohmann, A. Jiménez Cano, T. S. Koivisto.

Journal of Cosmology and Astroparticle Physics **12**, 006 (2023).

DOI: [10.1088/1475-7516/2023/12/006](https://doi.org/10.1088/1475-7516/2023/12/006)

arXiv: [2211.13056](https://arxiv.org/abs/2211.13056) [gr-qc]

4. On the physical viability of black hole solutions in Einsteinian Cubic Gravity and its generalisations

J. Beltrán Jiménez, A. Jiménez Cano.

Physics of the Dark Universe **43**, 101387 (2024).

DOI: [10.1016/j.dark.2023.101387](https://doi.org/10.1016/j.dark.2023.101387)

arXiv: [2306.07095](https://arxiv.org/abs/2306.07095) [gr-qc]

5. Junction conditions in bi-scalar Poincaré Gauge gravity

A. Casado-Turrión, A. de la Cruz-Dombriz, A. Jiménez Cano, F. J. Maldonado Torralba.

Journal of Cosmology and Astroparticle Physics **07**, 023 (2023).

DOI: [10.1088/1475-7516/2023/07/023](https://doi.org/10.1088/1475-7516/2023/07/023)

arXiv: [2303.01206](https://arxiv.org/abs/2303.01206) [gr-qc]

6. On parity-odd sector in metric-affine theories

J. Beltrán Jiménez, A. Jiménez-Cano, Y. N. Obukhov.

European Physical Journal C **83**, 115 (2023).

DOI: [10.1140/epjc/s10052-023-11250-2](https://doi.org/10.1140/epjc/s10052-023-11250-2)

arXiv: [2210.01729](https://arxiv.org/abs/2210.01729) [gr-qc]

7. **Vector stability in quadratic metric-affine theories**
A. Jiménez-Cano, F. J. Maldonado Torralba.
 Journal of Cosmology and Astroparticle Physics **09**, 044 (2022).
 DOI: [10.1088/1475-7516/2022/09/044](https://doi.org/10.1088/1475-7516/2022/09/044) arXiv: [2205.05674](https://arxiv.org/abs/2205.05674) [gr-qc]
8. **Review of Gravitational Wave Solutions in Quadratic Metric-Affine Gravity**
A. Jiménez-Cano.
 International Journal of Geometric Methods in Modern Physics **19**, 2240004 (2022).
 DOI: [10.1142/S0219887822400047](https://doi.org/10.1142/S0219887822400047) arXiv: [2203.03936](https://arxiv.org/abs/2203.03936) [gr-qc]
9. **Gravitational waves in metric-affine gravity theory**
A. Jiménez-Cano, Y. N. Obukhov.
 Physical Review D **103**, 024018 (2021).
 DOI: [10.1103/PhysRevD.103.024018](https://doi.org/10.1103/PhysRevD.103.024018) arXiv: [2010.14528](https://arxiv.org/abs/2010.14528) [gr-qc]
10. **On the strong coupling of Einsteinian Cubic Gravity and its generalisations**
 J. Beltrán Jiménez, **A. Jiménez-Cano**.
 Journal of Cosmology and Astroparticle Physics **01**, 069 (2021).
 DOI: [10.1088/1475-7516/2021/01/069](https://doi.org/10.1088/1475-7516/2021/01/069) arXiv: [2009.08197](https://arxiv.org/abs/2009.08197) [gr-qc]
11. **Inconsistencies in four-dimensional Einstein-Gauss-Bonnet gravity**
 J. Arrechea, A. Delhom, **A. Jiménez-Cano**.
 Chinese Physics C **45**, 013107 (2021).
 DOI: [10.1088/1674-1137/abc1d4](https://doi.org/10.1088/1674-1137/abc1d4) arXiv: [2004.12998](https://arxiv.org/abs/2004.12998) [gr-qc]
12. **Comment on “Einstein-Gauss-Bonnet Gravity in four-dimensional space-time”**
 J. Arrechea, A. Delhom, **A. Jiménez-Cano**.
 Physical Review Letters **125**, 149002 (2020).
 DOI: [10.1103/PhysRevLett.125.149002](https://doi.org/10.1103/PhysRevLett.125.149002) arXiv: [2009.10715](https://arxiv.org/abs/2009.10715) [gr-qc]
13. **New metric-affine generalizations of gravitational wave geometries**
A. Jiménez-Cano.
 The European Physical Journal C **80**, 672 (2020).
 DOI: [10.1140/epjc/s10052-020-8239-5](https://doi.org/10.1140/epjc/s10052-020-8239-5) arXiv: [2005.02014](https://arxiv.org/abs/2005.02014) [gr-qc]
14. **General Teleparallel Quadratic Gravity**
 J. Beltrán Jiménez, L. Heisenberg, D. Iosifidis, **A. Jiménez-Cano**, T. S. Koivisto.
 Physics Letters B **805**, 135422 (2020).
 DOI: [10.1016/j.physletb.2020.135422](https://doi.org/10.1016/j.physletb.2020.135422) arXiv: [1909.09045](https://arxiv.org/abs/1909.09045) [gr-qc]
15. **Geometric inequivalence of metric and Palatini formulations of General Relativity**
 C. Bejarano, A. Delhom, **A. Jiménez-Cano**, G. J. Olmo, D. Rubiera-Garcia.
 Physics Letters B **802**, 135275 (2020).
 DOI: [10.1016/j.physletb.2020.135275](https://doi.org/10.1016/j.physletb.2020.135275) arXiv: [1907.04137](https://arxiv.org/abs/1907.04137) [gr-qc]
16. **On the topological character of metric-affine Lovelock Lagrangians in critical dimensions**
 B. Janssen, **A. Jiménez-Cano**.
 Physics Letters B **798**, 134996 (2019).
 DOI: [10.1016/j.physletb.2019.134996](https://doi.org/10.1016/j.physletb.2019.134996) arXiv: [1907.12100](https://arxiv.org/abs/1907.12100) [gr-qc]
17. **A non-trivial connection for the metric-affine Gauss-Bonnet theory in $D = 4$**
 B. Janssen, **A. Jiménez-Cano**, J. A. Orejuela.
 Physics Letters B **795**, 42–48 (2019).
 DOI: [10.1016/j.physletb.2019.06.002](https://doi.org/10.1016/j.physletb.2019.06.002) arXiv: [1903.00280](https://arxiv.org/abs/1903.00280) [gr-qc]
18. **Projective symmetries and induced electromagnetism in metric-affine gravity**
 B. Janssen, **A. Jiménez-Cano**.
 Physics Letters B **786**, 462–465 (2018).
 DOI: [10.1016/j.physletb.2018.10.032](https://doi.org/10.1016/j.physletb.2018.10.032) arXiv: [1807.10168](https://arxiv.org/abs/1807.10168) [gr-qc]

19. On the (non-)uniqueness of the Levi-Civita connection in the Einstein-Hilbert-Palatini formalism

A. N. Bernal, B. Janssen, **A. Jiménez-Cano**, J. A. Orejuela, M. Sánchez, P. Sánchez-Moreno.

Physics Letters B **768**, 280–287 (2017).

DOI: [10.1016/j.physletb.2017.03.001](https://doi.org/10.1016/j.physletb.2017.03.001)

arXiv: [1606.08756](https://arxiv.org/abs/1606.08756) [gr-qc]

— Published school proceedings and lecture notes

1. Quantum field theory and the structure of the Standard Model

J. I. Illana, **A. Jiménez-Cano**.

PoS(CORFU2021) **406**, 314 (2022).

Description: *Proceedings of Corfu Summer Institute 2021 “School and Workshops on Elementary Particle Physics and Gravity”*

DOI: [10.22323/1.406.0314](https://doi.org/10.22323/1.406.0314)

arXiv: [2211.14636](https://arxiv.org/abs/2211.14636) [hep-ph]

Published: 23 November 2022

— Books chapters

1. (Non-)uniqueness of Einstein-Palatini Gravity

B. Janssen, **A. Jiménez-Cano**, J. A. Orejuela, P. Sánchez-Moreno.

Book: *Fundamental Physics and Physics Education Research*, p. 49-59, Springer (2020).

Editors: B. G. Sidharth, J. Carnicer, M. Michelini, C. Perea.

DOI: [10.1007/978-3-030-52923-9](https://doi.org/10.1007/978-3-030-52923-9)

arXiv: [1901.02326](https://arxiv.org/abs/1901.02326) [gr-qc]

— Books

1. Instabilities in Field Theory: A Primer with Applications in Modified Gravity

A. Delhom, **A. Jiménez Cano**, F. J. Maldonado Torralba.

SpringerBriefs in Physics, Springer (2023).

DOI: [10.1007/978-3-031-40433-7](https://doi.org/10.1007/978-3-031-40433-7)

arXiv: [2207.13431](https://arxiv.org/abs/2207.13431) [gr-qc]

eBook ISBN: [978-3-031-40433-7](https://doi.org/10.1007/978-3-031-40433-7)

ISBN: [978-3-031-40432-0](https://doi.org/10.1007/978-3-031-40432-0)

PARTICIPATION IN FUNDED RESEARCH PROJECTS

❑ Gauge gravity: unification, extensions and phenomenology

(PRG356)

Funding entity: Estonian Research Council (Ministry of Education and Research)

Period: 01 January 2019 – 31 December 2023

Amount: 1 148 375 EUR

Principal investigator (PI): Tomi S. Koivisto (Lab. of theoretical physics, U. Tartu)

Type of participation: Researcher

N° participant researchers: 7

❑ COST Action – Addressing observational tensions in cosmology with systematics and fundamental physics (CosmoVerse)

(CA21136)

Funding entity: European Union

Period: 21 October 2022 – 20 October 2026

Amount: -----

Principal investigator (PI): Jackson Levi Said (University of Malta)

Type of participation: Researcher of the group WG3: Fundamental Physics

N° participant researchers: -----

❑ Mobilitas Pluss Project

(MOBJD1035)

Funding entity: European Regional Development Fund
Period: 01 November 2021 – 31 October 2023
Amount: 107 500 EUR
Principal investigador (PI): Alejandro Jiménez Cano (University of Tartu)
Type of participation: PI
N° participant researchers: 1

❑ **Tume Universum / The Dark Side of the Universe** (TK133)

Funding entity: Archimedes Foundation (Estonia)
Period: 01 March 2016 – 01 March 2023
Amount: 778 050 EUR
Principal investigador (PI): Manuel Hohmann (University of Tartu)
Type of participation: Senior researcher
N° participant researchers: 25

❑ **COST Action – Quantum Gravity Phenomenology in the Multi-messenger Approach** (CA18108)

Funding entity: European Union
Period: 14 March 2019 – 14 March 2023
Amount: - - - - -
Principal investigador (PI): José Manuel Carmona (Universidad de Zaragoza)
Type of participation: Researcher of the group WG1: Theoretical frameworks for gravity effects below the Planck energy; WG2: Phenomenology of quantum gravity; WG6: Gravitational waves
N° participant researchers: - - - - -

❑ **Teorías efectivas de gravedad y cosmología** (PID2019-105943GB-I00)

Funding entity: Ministerio de Economía y Competitividad // Ministerio de Ciencia e Innovación (certif.)
Period: 01 June 2020 – 31 May 2023
Amount: 38 720 EUR
Principal investigador (PI): Mar Bastero Gil (Universidad de Granada)
Type of participation: Collaborator
N° participant researchers: 6

❑ **Teorías efectivas de cosmología y gravedad** (FIS2016-78198-P)

Funding entity: Ministerio de Economía y Competitividad // Ministerio de Ciencia e Innovación (certif.)
Period: 30 December 2016 – 29 December 2019
Amount: 39 325 EUR
Principal investigador (PI): Mar Bastero Gil (Universidad de Granada)
Type of participation: Collaborator
N° participant researchers: 5

Seminars and contributions at conferences

CONTRIBUTIONS

— *Contributions and talks at conferences and workshops*

Symbols Invited talk: | Talk: | Organizer: | Poster:

1. **Stueckelberg fields to uncover the global degree of freedom of Unimodular Gravity** **Invited talk**
 VII FTAE Christmas Workshop
 ETS Caminos, canales y puertos (Univ. Granada), Granada (Spain). 20 – 21 December 2023

2. **Pathologies in $f(Q)$ cosmology** Talk
 VII Winter Workshop on Theoretical Physics
 Facultad de Física (Univ. Valencia), Valencia (Spain). 11 – 13 December 2023
3. **Quadratic metric-affine gravity and stability of the vector sector** Invited talk
 Third Workshop on Current Challenges in Cosmology
 Campus Central de la Universidad Industrial de Santander, Bucaramanga (Colombia). 23 – 27 October 2023
4. **Stueckelberg fields and the global degree of freedom of Unimodular Gravity** Talk
 Spanish and Portuguese Relativity Meetings 2023 (EREP2023)
 Universidad del País Vasco, Bilbao (Spain). 17 – 21 July 2023
5. **Stueckelberg procedure in General Relativity and Unimodular Gravity** Talk
 Geometric Foundations of Gravity 2023
 Institute of Physics (Univ. Tartu), Tartu (Estonia). 19 – 22 June 2023
6. **Restrictions in quadratic metric-affine gravity from the stability of the vector sector** Invited talk
 Gravity and Black Holes: moving beyond the paradigm
 Max Planck Institute for Physics, Munich (Germany). 11 – 12 April 2023
7. **Bootstrapping General Relativity and beyond** Invited talk
 VI FTAE Christmas Workshop
 Ed. Mecenás (Univ. Granada), Granada (Spain). 20 – 21 December 2022
8. **Bootstrapping gravity: extension to the metric-affine framework** Talk
 Madrid Winter Workshop in Theoretical Physics
 Facultad de Ciencias Físicas (Univ. Complutense de Madrid), Madrid (Spain). 12 – 15 December 2022
9. **Restrictions in quadratic metric-affine gravity from the stability of the vector sector** Talk
 Spanish and Portuguese Relativity Meetings 2022 (EREP2022)
 Auditorio Fonseca (Univ. Salamanca), Salamanca (Spain). 29 August 2022 – 02 September 2022
10. **Restrictions in quadratic metric-affine gravity from the stability of the vector sector** Talk
 Metric-Affine Frameworks for Gravity 2022 (MaffGrav2022)
 Institute of Physics (Univ. Tartu), Tartu (Estonia). 27 June 2022 – 01 July 2022
11. **On the strong coupling of Einsteinian Cubic Gravity and its generalisations** Talk
 V Winter Workshop on Theoretical Physics
 [Online] Facultad de Física (Univ. Valencia), Valencia (Spain). 13 – 15 December 2021
12. **Gravitational wave solutions in quadratic metric-affine gravity** Talk
 Geometric Foundations of Gravity 2021
 [Online] Institute of Physics (Univ. Tartu), Tartu (Estonia). 28 June 2021 – 02 July 2021
13. **Inconsistencies in four-dimensional Einstein-Gauss-Bonnet gravity** Talk
 IV Winter Workshop on Theoretical Physics
 [Online] Facultad de Física (Univ. Valencia), Valencia (Spain). 14 – 18 December 2020
14. **On the solutions of the Einstein-Hilbert and Gauss-Bonnet metric-affine Lagrangians** Poster
 22nd International Conference on General Relativity and Gravitation (GR22)
 Valencia Conference Centre (Univ. Valencia), Valencia (Spain). 07 – 12 July 2019
15. **Ondas gravitacionales en gravedad métrico-afín** Talk
 IV Jornadas/II Congreso Nacional Investigadores en Formación Fomentando la Interdisciplinariedad (JIFFI)
 Espacio V Centenario (Univ. Granada), Granada (Spain). 26 – 28 June 2019
16. **Non-trivial solutions of the Einstein-Hilbert and Gauss-Bonnet metric-affine Lagrangians** Talk
 Geometric Foundations of Gravity 2019
 Institute of Physics (Univ. Tartu), Tartu (Estonia). 17 – 21 June 2019

17. **Electromagnetism induced by projective symmetry in metric-affine gravity** Talk
 II Winter Workshop on Theoretical Physics
 Facultad de Física (Univ. Valencia), Valencia (Spain). 11 – 14 December 2018
18. **Electromagnetism induced by projective symmetry in metric-affine gravity** Talk
 Teleparallel Universes in Salamanca
 Facultad Ciencias Matemáticas (Univ. Salamanca), Salamanca (Spain). 26 – 28 November 2018
19. **La conexión afín y su papel en teorías modificadas de gravedad** Talk
 III Jornadas/I Congreso Nacional Investigadores en Formación Fomentando la Interdisciplinariedad (JIFFI)
 Espacio V Centenario (Univ. Granada), Granada (Spain). 20 – 22 June 2018
20. **Palatini-Metric equivalence in EH gravity and beyond** Talk
 I Winter Workshop on Theoretical Physics
 Facultad de Física (Univ. Valencia), Valencia (Spain). 11 – 14 December 2017
21. **Palatini connections in EH-Palatini gravity and extensions** Talk
 VI Postgraduate meeting on Theoretical Physics
 Facultad de Física (Univ. Valencia), Valencia (Spain). 29 November 2017 – 1 December 2017
22. **(Non-)Uniqueness of Einstein-Palatini gravity** Talk
 Frontiers of Fundamental Physics 15
 Campus Salelas (Univ. Miguel Hernández), Orihuela (Spain). 27 – 28 November 2017

— Seminars

1. **Junction conditions: foundations and subtleties**
 Institute of Physics (Univ. Tartu), Tartu (Estonia). 14 November 2023
2. **Stability of vectors and its implications in quadratic metric-affine gravity**
 University of Granada, Granada (Spain). 12 May 2022
3. **Modified gravity theories. Metric-Affine framework and instabilities**
 [Online] University of Tübingen, Tübingen (Germany). 17 December 2021
4. **Gravitational wave solutions in metric-affine gravity**
 [Online] Institute of Physics (Univ. Tartu), Tartu (Estonia). 09 February 2021
5. **Gravitational wave solutions in metric-affine gravity**
 [Online] ZARM (Univ. Bremen), Bremen (Germany). 18 January 2021
6. *About the paper: New metric-affine generalizations of gravitational wave geometries*
 [Online] Institute of Physics (Univ. Tartu), Tartu (Estonia). 12 May 2020
7. **Are critical Lovelock Lagrangians topological in the metric-affine formulation?**
 Institute of Physics (Univ. Tartu), Tartu (Estonia). 10 September 2019

OTHER WORKSHOPS' ATTENDANCE (WITHOUT CONTRIBUTION)

1. **Teleparallel Gravity Workshop 2020 [Online workshop]**
 Institute of Physics (Univ. Tartu), Tartu (Estonia). 15 – 19 June 2020 (Organized by: Laboratory of Theoretical Physics)
2. **Spring Workshop on gravity and cosmology [Online workshop]**
 Jagiellonian University. Kraków (Poland). 25 – 29 May 2020
3. **COST – Quantum Gravity Phenomenology in the Multimessenger Approach**
 Ed. Mecenás (Univ. Granada), Granada (Spain). 10 – 13 March 2020 (Organized by: CA18108)

4. 3rd CAFPE–Física Teórica Christmas Workshop

Ed. Mecenás (Univ. Granada), Granada (Spain). 20 – 21 December 2018 (Organized by: Dpto. Física Teórica y del Cosmos and CAFPE)

5. Spanish-Portuguese Relativity Meeting (EREP) 2018

Public Library, Palencia (Spain). 4 – 7 September 2018 (Organized by: SEGRE and SPRG)

6. Iberian Strings 2018

Ed. Mecenás (Univ. Granada), Granada (Spain). 24 – 26 January 2018 (Organized by: Dept. de Física Teórica y del Cosmos and Dept. de Matemática Aplicada)

7. Iberian Strings 2016

Instituto de Física Teórica (IFT), Madrid (Spain). 27 – 29 January 2016 (Organized by: IFT, CSIC)

CONFERENCES ORGANIZATION

Member of the *local organising committee* of

❑ Geometric Foundations of Gravity 2023

Institute of Physics (Univ. Tartu), Tartu (Estonia). 19 – 22 June 2023

❑ Metric-Affine Frameworks for Gravity 2022

Institute of Physics (Univ. Tartu), Tartu (Estonia). 27 June 2022 – 01 July 2022

❑ Iberian Strings 2018

Ed. Mecenás (Univ. Granada), Granada (Spain). 24 – 26 January 2018

Teaching experience

UNIVERSITY COURSES

— Bachelor courses

Total number of hours: 140 h (+ 60 h [current semester])

2018-2019	Física (Laboratory) Bachelor's degree in Civil Engineering (1st year). Universidad de Granada (Granada, Spain)	Credits: 4,5
2019-2020	Física de los procesos biológicos (Laboratory) Bachelor's degree in Biology (1st year). Universidad de Granada (Granada, Spain)	Credits: 4
	Física II (Problems) Bachelor's degree in Chemistry (1st year). Universidad de Granada (Granada, Spain)	Credits: 1
2020-2021	Física (Laboratory) Bachelor's degree in Civil Engineering (1st year). Universidad de Granada (Granada, Spain)	Credits: 3
	Quantum Mechanics (Problems) — Given in English Bachelor's degree in Physics (4th year). Universidad de Granada (Granada, Spain)	Credits: 1,5
2024-2025	Physics I Bachelor's degree in Environmental Technologies Engineering (1st year). Universidad Politécnica de Madrid (Madrid, Spain)	Credits: 6

— *Master and PhD courses*

Total number of hours: 3h

2021-2022	Selected Topics in the Theories of Gravity (LOFY.04.017) University of Tartu (Tartu, Estonia)	Hours: 3h
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— *Invited lectures*

Total number of hours: 2h

19–20/12/2023	“Hawking Singularity theorem” For last-year students of the Bachelor’s degree in Physics. Universidad de Granada (Granada, Spain)	Hours: 2h
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PRIVATE CLASSES

— *Student’s preparation for exams at University*

- ☐ **Física General I.** Physics degree, first year course (UGR)
- ☐ **Física General II.** Physics degree, first year course (UGR)

— *Primary and Secondary Education*

- ☐ **Mathematics.** Second, third and fourth courses of Secondary Education (Ceuta, Spain)

Visits to other institutions

LONG VISITS (MORE THAN 1 MONTH)

1. **Department of Fundamental Physics of the University of Salamanca (5 weeks)**
Facultad de Ciencias Físicas (USAL). Salamanca (Spain). 18 September 2023 – 20 October 2023
Funding: Mobilitas Pluss MOBJD1035.
2. **Gravity group of the Institute of Physics in Tartu (3 months)**
Institute of Physics (Univ. of Tartu). Tartu (Estonia). September 1 – November 30, 2019
Funding: Plan Propio de la UGR (program: *Estancias breves en centros de investigación nacionales y extranjeros*); project FIS2016-78198-P; and contract FPU15/02864.

SHORT VISITS (LESS THAN 1 MONTH)

1. **Modified gravity group of the Universidad de Valencia (1 week)**
Facultad de Física (UV). Valencia (Spain). 11 – 15 December 2017
2. **Department of Theoretical Physics of the Universidad Complutense de Madrid (3 days)**
Facultad de Ciencias Físicas (UCM). Madrid (Spain). 27 – 29 January 2020
3. **Department of Fundamental Physics de la Universidad de Salamanca (2 days)**
Facultad de Ciencias Físicas (USAL). Salamanca (Spain). 30 – 31 January 2020

4. Instituto de Astrofísica de Andalucía (1 week)

IAA. Granada (Spain). 21 – 27 February 2022

5. Department of Fundamental Physics of the University of Salamanca (2 weeks)

Facultad de Ciencias Físicas (USAL). Salamanca (Spain). 14 – 27 March 2022

6. Department of Theoretical Physics and Physics of the Cosmos of the University of Granada (1 week)

Facultad de Ciencias (UGR). Granada (Spain). 09 – 15 May 2022

7. Instituto de Astrofísica de Andalucía (1 week)

IAA. Granada (Spain). 17 – 23 October 2022

8. Origins Cluster (2 weeks)

Origins Cluster. Garching, Munich (Germany). 10 – 21 April 2023

9. Instituto de Astrofísica de Andalucía (1 week)

IAA. Granada (Spain). 08 – 14 May 2023

10. Department of Theoretical Physics and Physics of the Cosmos of the University of Granada (1 week)

Facultad de Ciencias (UGR). Granada (Spain). 15 – 21 May 2023

11. Modified gravity group of the Universidad de Valencia (1 week)

Facultad de Física (UV). Valencia (Spain). 11 – 15 December 2023

12. Department of Theoretical Physics and Physics of the Cosmos of the University of Granada (1 week)

Facultad de Ciencias (UGR). Granada (Spain). 18 – 22 December 2023

Other academic activities

PEER-REVIEW IN SCIENTIFIC JOURNALS

See statistics in [\[Web of Science\]](#).

❑ 2023: Phys. Lett. B (1)

❑ 2022: Phys. Rev. D (2)

❑ 2021: Phys. Dark Univ. (1) | Phys. Rev. D (1) | Int. J. Geom. Methods Mod. Phys. (1) | Phys. Rev. Lett. (1).

MEMBERSHIP AND PARTICIPATION IN SCIENTIFIC SOCIETIES

❑ Member of the Royal Spanish Physics Society (RSEF) since 26 February 2016.

❑ Participant in the Network of Relativity and Gravitation (RTRG) since 2018.

❑ Junior Member of the Spanish Society of Gravitation and Relativity (SEGRE) from 2019 to 2023.

❑ Senior Member of the Spanish Society of Gravitation and Relativity (SEGRE) since 2023.

❑ Member of the Asociación de Científicos Españoles en Estonia (ACEE) since its foundation in 2022.

Contributions in popular science

INFORMATIVE TALKS AND PUBLIC WORKSHOPS

1. Un paseo por la Relatividad

- Colegio San Agustín, Ceuta (Spain), April 28, 2017. Addressed to secondary students.
- IES Padre Manjón, Granada (España), March 16, 2017 (Organized by Royal Spanish Society of Physics). Addressed to secondary students.

2. Agujeros negros en Relatividad. ¿Cómo funcionan? (*Science week 2017, 2018*)

- Facultad de Ciencias, Granada (Spain). November 2017 (days 6-9, 13-15). Addressed to 7 groups of secondary students.
- Facultad de Ciencias, Granada (Spain). November 2018. Addressed to 3 groups of secondary students.

3. La física de las partículas elementales (*Science week 2018*)

- Facultad de Ciencias, Granada (Spain). November 2018. Addressed to one group of secondary students.

4. Descubriendo la gravedad (*Aula Científica permanente 2018*)

- Facultad de Ciencias, Granada (Spain). May, 2018 (days 18 and 25). Addressed to 3 groups of primary students.

5. ¿Dónde están los electrones? (*Aula Científica permanente 2019*)

- Facultad de Ciencias, Granada (Spain). May, 2019 (days 3 and 10). Addressed to 2 groups of secondary students.

Other skills

LANGUAGES

— Languages. Level

	Comprehension		Speaking		Writing
	Reading	Listening	Interaction	Production	
English (B2.2)	C1	B2	B2	B2	C1
Spanish (C2)	Mother tongue				

— Languages. Certificates (accredited level)

☐ First Certificate in English (B2 Grade B)

Granada (Spain), February 2017. Given by Cambridge University (UK)

— Courses abroad

☐ EF English course

Brighton (UK), August 2014. Grade B2.

COMPUTATIONAL SKILLS

— Scientific programming

■■■■■ xAct (Mathematica package)
 ■■■■□ Mathematica
 ■■■■□ C++
 ■■■□□ FORTRAN
 ■□□□ Gnuplot

— Scientific writing

■■■■■ LaTeX
 ■■■■■ Lyx

— Web design

■■■□□ html

— Image and sound edition

■■■■□ Inkscape
 ■■■□□ Adobe Photoshop
 ■■□□□ Audacity
 ■■□□□ Sony Vegas Pro
 ■■□□□ Adobe Premiere
 ■□□□□ Adobe After Effects

— Others

■■□□□ Git
 ■■■■□ MS Word
 ■■■■□ MS Excel

Miscellany

ACADEMIC AWARDS

1. **First prize. Outstanding student of the Autonomous City of Ceuta.**
01 July 2011. Ceuta (Spain). Given by: Rotary Club.
2. **Award for excellence in academic performance.**
06 June 2016. Granada (Spain). Given by: Univ. Granada and Caja Rural de Granada.

POPULAR SCIENCE AWARDS

1. **First prize at the Carbono tournament on popular science 2017.**
May 2017. Facultad de Ciencias, Granada (Spain). Given by: Babel.