

Name: Paola Rioseco

Nacionality: Chilean

Current Institution: Universidad de Chile (CMM)

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## RESEARCH INTERESTS

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**Strong gravity: Einstein equations, Black Holes, Compact objects, Kinetic Theory, Galactic Dynamics, Dark Matter.**

Classical and Modified Gravity, Black Holes, Matter Coupled with Gravity ((In)Stabilities), Relativistic Kinetic Theory of Gases, Galactic Dynamics, Cosmology.

## CURRENT POSITION

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**Postdoc: Center for mathematical modelling/ Faculty of physical and Mathematical Sciences/ University of Chile**

From: Jan 2021 to Present

## EDUCATION

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**Doctor of Philosophy (PhD) in Physics**

2015 – 2019

Universidad Michoacana de San Nicolás de Hidalgo & Instituto de Física y Matemáticas (Mexico)

Thesis: *Covariant formulation of relativistic kinetic theory of gases with applications in astrophysics*

Advisor: Dr. Olivier Sarbach.

**Master (MSc) in Physics: Theoretical Physics**

2013 – 2015

Pontificia Universidad Católica de Chile & Institute of physics UC (Chile)

Thesis: *Black holes solution (Anti) de Sitter and Reissner-Nordström in General relativity dependent couplings.*

Advisor: Dr. Benjamin Koch

**Bachelor in Physics (Bsc). Theoretical Physics**

2006 – 2012

Pontificia Universidad Católica de Chile & Institute of physics UC (Chile)

Thesis: *Gravitational collapse in Eddington-Born-Infeld.*

Advisor: Dr. Máximo Bañados

## RESEARCH VISITS

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**Mathematical Sciences & Chalmers University (Gothenburg, Sweden)**

Hosted by Dr. Hakan Andreasson.

June 2018

Relativistic Kinetic Theory, Mixing phenomenon (4 days)

**Faculty of Physics & University of Vienna (Austria)**

Hosted by Dr. David Fajman.

July 2018

Relativistic Kinetic Theory, Mixing phenomenon (4 days)

**Perimeter Institute & (Waterloo, Canada)**

Hosted by Dr. Luis Lehner.

August-December 2018 AdS (In)stabilities (92 days)

## Centro de estudios científicos (CECS) & (Valdivia, Chile)

Hosted by Dr. Jorge Zanelli.

August 2019

Relativistic Kinetic Theory (7 days)

## LIST OF PUBLICATIONS

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Journal abbreviations:

Class.Quant.Grav: Classical and Quantum Gravity

PRD: Physical Review D

J.Phys.Conf.Ser: Journal of Physics Conference Series

## JOURNAL PUBLICATIONS:

### Published

1. *Black Hole Solution for scale dependent gravitational couplings and the corresponding coupling flow.*  
Carlos Contreras, Benjamin Koch, **Paola Rioseco.**  
Class.Quant.Grav. 30 (2013) 175009 | [arXiv:1303.3892](#) | [ADS](#)
2. *Scale Setting for self consistent Backgrounds.*  
Benjamin Koch, **Paola Rioseco**, Carlos Contreras.  
Phys.Rev. D91 (2015) no.2, 025009 | [arXiv:1409.4443](#) | [ADS](#)
3. *Black Hole Solutions for Scale Dependent Couplings: The De Sitter and the Reissner Nordström Case.*  
Benjamin Koch, **Paola Rioseco.**  
Class.Quant.Grav. 33 (2016) 035002 | [arXiv:1501.00904](#) | [ADS](#)
4. *Accretion of a relativistic, collisionless kinetic gas into a Schwarzschild black hole*  
**Paola Rioseco**, Olivier Sarbach.  
Class.Quant.Grav. 34 (2017) no.9, 095007 | [arXiv:1611.02389](#) | [ADS](#)
5. *Phase space mixing in the equatorial plane of a Kerr black hole.*  
**Paola Rioseco**, Olivier Sarbach.  
Phys. Rev. D 98 (2018) no, 124024 | [arXiv:1807.10794](#) [ADS](#)
6. *Phase space mixing in an external gravitational central potential.*  
**Paola Rioseco**, Olivier Sarbach.  
Class. Quant. Grav. 37 (2020) 195027 | [arXiv:2005.05988](#) [ADS](#)

### In preparation

7. *Dynamics of collisionless thick discs around a Kerr black hole.*  
**Paola Rioseco**, Olivier Sarbach.  
(in preparation 2021)
8. *Spherical and Rotating Axion Dark Matter Clumps: can we really detect them?.*  
**Paola Rioseco**, Enrico D. Schiappacasse.  
(in preparation 2021)

## CONFERENCE PROCEEDINGS (FIRST AUTHOR ONLY):

1. *Spherical steady-state accretion of a relativistic collisionless gas into a Schwarzschild black hole.*  
**P Rioseco**, O. Sarbach.  
J.Phys.Conf.Ser. 831 no.1, 012009, 2017, [arXiv:1701.07104](#)

## COMPUTER SKILLS (SOFTWARE)

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2006-2021    **Maple, Mathematica, Latex, Matlab, Basic Python.**

## LANGUAGES

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**Spanish** (native) **English** (good) , **French** (basic). **Turkish**(basic-A1)

## TEACHING

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March - Present    Applied physics, Physics, Universidad Autonoma de Chile.  
2021  
Jan-    Present    General Relativity crash course, University of Chile.  
2021  
Sept- Dic 2020    Electrodynamics, Physics, Universidad de La Serena.  
April- July 2020    Applied physics, Physics, Universidad Autonoma de Chile.  
May- Aug 2020    Physics of Continuous media, Physics, Universidad de La Serena.  
Sept-Oct 2019    Methods of mathematical physics, Physics, Universidad de La Serena.  
Sept-Dec 2019    Electrodynamics, Physics, Universidad de La Serena.  
April- Aug 2019    Algebra, Engineering, Universidad de La Serena.  
April - Aug 2019    Physics of Continuous media, Physics, Universidad de La Serena.

## TEACHING ASSISTANT

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Aug- Dec 2007    Geometry 1, Pontificia Universidad Católica de Chile.  
Mar- Aug 2008    Algebra, Pontificia Universidad Católica de Chile.  
Aug - Dec 2009    Linear Algebra, Pontificia Universidad Católica de Chile.  
Aug-Dec 2009    Algebra and Geometry, Pontificia Universidad Católica de Chile.  
January 2010    Linear Algebra, Pontificia Universidad Católica de Chile.  
Mar- Aug 2011    General Physics, Pontificia Universidad Católica de Chile.  
Mar- Aug 2011    Introduction to Calculus, Pontificia Universidad Católica de Chile.  
Mar- Aug 2013    Algebra and Geometry, Pontificia Universidad Católica de Chile.  
Aug - Dec 2014    Thermodynamics, Pontificia Universidad Católica de Chile.

## RESEARCH REFERENCES

**Dr. Benjamin Koch**

Instituto de Física

Pontificia Uni. Católica de Chile

[bkoch@fis.puc.cl](mailto:bkoch@fis.puc.cl)**Dr. Olivier Sarbach**

Instituto de Física y Matemáticas

Universidad Michoacana de San  
Nicolás de Hidalgo, México[sarbach@ifm.umich.mx](mailto:sarbach@ifm.umich.mx)**Dr. Hanne Van Den Bosch**Centro de Modelamiento  
Matemático.

Universidad de Chile.

[hvdbosch@cmm.uchile.cl](mailto:hvdbosch@cmm.uchile.cl)

## TALKS AND SEMINARS

- 7 Jul 2020 **CMM Online- Seminar:** *Relativistic Kinetic Theory with Applications in Astrophysics*, CMM, Santiago, Chile.
- 13 Aug 2019 **CECS Seminar:** *Relativistic Kinetic Theory with Applications in Astrophysics*, Ceecs, Valdivia, Chile.
- 9 May 2019 **Instituto de Física PUCV Seminar:** *Relativistic Kinetic Theory with Applications in Astrophysics*, Valparaiso, Chile.
- 8 Apr 2019 **GRAV19 Seminar:** *Relativistic Kinetic Theory with Applications in Astrophysics*, Famaf, Cordoba, Argentina.
- 10 Jul 2018 **Seminar in Gravitational physics:** *Mixing phenomenon in relativistic kinetic gas distributions around black holes*, Faculty of Physics (University of Vienna), Vienna, Austria.
- Jul 2018 **Conference 15 Marcel Grossmann Meeting:** *Mixing phenomenon in relativistic kinetic gas distributions around black holes*, La sapienza, Rome, Italy.
- 28 Jun 2018 **Seminar in Analysis and probability:** *Mixing phenomenon in relativistic kinetic gas distributions around black holes.*, Mathematical Sciences (Chalmers University). Gothenburg, Sweden.
- 17 May 2018 **Seminar in Institute of nuclear Sciences:** *Mixing phenomena in relativistic kinetic gas distributions around black holes.* ICN-UNAM, Mexico city, Mexico.
- 20 Feb 2018 **Multidisciplinary Seminar:** *Sasaki metric in the cotangent bundle*, IFM-UMICH, Morelia, Mexico.
- Dec 2017 **Non Perturbative Aspect of QFT and Loewe's Fest:** Conference in honor of 65 years of Marcelo Loewe *A first approach to the mixing phenomena in relativistic kinetic gas distributions around black holes.* PUC, Santiago, Chile.
- Nov 2017 **Second annual meeting of the thematic network ANyOG:** *Mixing phenomena in relativistic kinetic gas distributions around black holes*, CUCEI, Guadalajara, Mexico.
- 23 Jun 2017 **Seminar in department of physic and mathematic:** *Relativistic collisionless kinetic gas accreted by a Schwarzschild black hole.* IFM-UMSNH, Morelia, Mexico.
- 24 Apr 2017 **Seminar in gravity and cosmology group:** *Relativistic collisionless kinetic gas accreted by a Schwarzschild black hole.* ICF-UNAM, Cuernavaca, Mexico.
- Aug 2016 **IV taller de Gravitación y Cosmología ICF:** *Accretion of a relativistic, collisionless kinetic gas into a Schwarzschild black hole*, ICF-UNAM, Cuernavaca, Mexico.
- Jan 2014 **La parte y el todo: Advanced topics of High Energy Physics and Gravitation:** *Exact solutions for scale dependent gravitational couplings - new solutions and physical approach*, PUC. Afunalhue-Villarica, Chile.

## SELECTED CONFERENCES AND SCHOOLS ATTENDED

- Feb 2017 **Geometric Transport Equations in General Relativity.** ESI, Erwin Schrödinger Institute, Vienna, Austria.
- Jul 2016 **GR21. 21st International conference on General Relativity and Gravitation** Columbia University, New York, USA.(Poster presentation: *Accretion of a relativistic kinetic gas into a black hole*).

- Dec 2015     **28th Texas Symposium on Relativistic Astrophysics.** Cern, Geneva, Switzerland.  
(Poster presentation: *Accretion of a relativistic kinetic gas into a black hole*).
- Nov 2015     **Latin-American String School.** Cinvestav, Mexico city, Mexico
- Nov 2012     **Third South Pacific coast Gravity Meeting.** UNAB, Viña del Mar, Chile

## SERVICE AND AWARDS

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- Bachelor's Chilean fellowship Padre Hurtado**  
Pontificia Universidad Católica, Chilean institution. 2006-2011
- Bachelor's Chilean fellowship Juan Gomez Millas**  
Chilean Government 2006-2010
- CONACYT Students in a Mexican Postgraduate Quality Program, PhD Stu-** 2015-2019  
dents fellowship, Mexican Government
- Beca Mixta, PhD Mobility Scholarship, Mexican Government** 2018
- Visiting Graduate Fellows, PhD Visiting fellow, Perimeter Institute** 2018
- Junior Research Fellow, Postdoc fellow, Erwin Schrodinger International In-** 2020 (Postponed  
stitute for Mathematics and Physics (ESI), Vienna 2021)

## OTHER INTERESTS

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- 2009 - 2012     I trained with the Triathlon UC team in Chile (2012), i finished 3 marathons (Santiago's marathon 2010, 2011, 2012) with an average of 4:08 hrs. I participated in Ironman 70.3 Pucón Chile 2011.
- 2012 - 2018     I am an advancer yoga practitioner, interested in ashtanga vinyasa flow yoga.
- 2014             I volunteered at Family Clinic nursing terminal patients. During this time I had to complete a short course on palliative care.
- 2020             Wild Bird Watching: Studied of habits and behaviour of Wild City Chilean Birds.