

Rodrigo Voivodic

Curriculum Vitae

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Research Interests

Large Scale Structure of the Universe – Modified Gravity – Dark Energy – Numerical Simulations
– Cosmic Voids – Dark Matter Halos – Perturbation Theory – Cosmological Constraints – Neural
Networks

Education

- 2016–2021 **Ph.D. in Physics**,
Department of Mathematical Physics, Institute of Physics, University of São Paulo,
São Paulo, Brazil.
Thesis: Constraining Modified Gravity with Cosmic Voids
Supervisor: Marcos Lima
- 2019–2020 **Visitor**,
Max Planck Institute for Astrophysics,
Garching bei München, Germany.
Project: A New Method for the Fast Generation of Halo Catalogues in Modified Gravity
Supervisor: Fabian Schmidt
- 2014–2016 **Master in Physics**,
Department of Mathematical Physics, Institute of Physics, University of São Paulo,
São Paulo, Brazil.
Thesis: Properties of Cosmic Voids and Modified Gravity
Supervisor: Marcos Lima
- 2011–2014 **Bachelor in Physics**,
Institute of Physics, University of São Paulo,
São Paulo, Brazil.
Projects: The Mass Function of Galaxy Clusters and Galaxy Cluster Finders
Supervisors: Laerte Sodré Jr. and Marcos Lima

Publications

- 13 **Perturbative Likelihoods for Large-Scale Structure of the Universe**,
Rodrigo Voivodic,
arXiv:2505.23750 .
- 12 **Gaussian Lagrangian galaxy bias**,
*Jens Stücker, Marcos Pellejero-Ibañez, **Rodrigo Voivodic**, and Raul E. Angulo* ,
Astron.Astrophys. 694 (2025) A29, Astron.Astrophys. 694 (2025) A29, arXiv:2405.01951.
- 11 **Probabilistic Lagrangian bias estimators and the cumulant bias expansion**,
*Jens Stücker, Marcos Pellejero-Ibañez, Raul E. Angulo, Francisco Maion, and **Rodrigo Voivodic***,
Astron.Astrophys. 699 (2025) A197, Astron.Astrophys. 699 (2025) A197, arXiv:2405.01950.
- 10 **The effective field theory of large-scale structure and multi-tracer II: redshift space
and realistic tracers**,
*Thiago Mergulhão, Henrique Rubira, and **Rodrigo Voivodic***,
JCAP 04 (2022) 04, 021, arXiv:2306.05474 .

- 9 **The Effective Field Theory of Large-Scale Structure and Multi-tracer,**
*Thiago Mergulhão, Henrique Rubira, **Rodrigo Voivodic**, and Luis Raul Abramo,*
JCAP 04 (2022) 04, 021, arXiv:2012.04637.
- 8 **Responses of Halo Occupation Distributions: a new ingredient in the halo model & the impact on galaxy bias,**
***Rodrigo Voivodic** and Alexandre Barreira,*
JCAP 05 (2021) 069, arXiv:2012.04637.
- 7 **The Effective Field Theory and Perturbative Analysis for Log-Density Fields,**
*Henrique Rubira and **Rodrigo Voivodic**,*
JCAP 03 (2021) 070, arXiv:2011.12280.
- 6 **The Halo Void (Dust) Model of Large Scale Structure,**
***Rodrigo Voivodic**, Henrique Rubira, and Marcos Lima,*
JCAP 10 (2020) 033, arXiv:2003.06411.
- 5 **Excursion Set Halos – ExSHalos: A New Parameter Free Method for Fast Generation of Halo Catalogues,**
***Rodrigo Voivodic**, Marcos Lima, and Luis Raul Abramo,*
arXiv:1906.06630.
- 4 **Cosmic Voids in Modified Gravity Scenarios,**
*Eder L.D. Perico, **Rodrigo Voivodic**, Marcos Lima, and David F. Mota,*
Astron.Astrophys. 632 (2019) A52, arXiv:1905.12450.
- 3 **Relation between the Turnaround radius and virial mass in $f(R)$ model,**
*Rafael C. C. Lopes, **Rodrigo Voivodic**, Luis Raul Abramo, and Laerte Sodré, Jr.,*
JCAP, 1907(07):026, 2019, arXiv:1809.10321.
- 2 **Turnaround radius in $f(R)$ model,**
*Rafael C. C. Lopes, **Rodrigo Voivodic**, Luis Raul Abramo, and Laerte Sodré, Jr.,*
JCAP, 1809(09):010, 2018, arXiv:1805.09918.
- 1 **Modelling Void Abundance in Modified Gravity,**
***Rodrigo Voivodic**, Marcos Lima, Claudio Llinares, and David F. Mota,*
Phys. Rev., D95(2):024018, 2017, arXiv:1609.02544.

Participation in Events and Talks

Invited Talks

- 04/2022 **The Hybrid Bias Expansion,**
Talk to the cosmology group at TUM,
TUM, Munich, Germany.
- 03/2022 **Responses of Halo Occupation Distributions: a new ingredient in the halo model & the impact on galaxy bias,**
Talk to the cosmology group at Queen Mary University,
Online.
- 12/2020 **Responses of Halo Occupation Distributions: a new ingredient in the halo model & the impact on galaxy bias,**
Talk to the cosmology group at University of Arizona,
Online.
- 12/2020 **Responses of Halo Occupation Distributions: a new ingredient in the halo model & the impact on galaxy bias,**
Talk to the Institute for Advanced Study (IAS) of Princeton,
Online.

02/2020 **The Halo–Void Model: An Effective Description of the Large Scale Structure of the Universe,**
Meeting at the Astronomy Department (USM) of the University of Munich,
LMU, Munich, Germany.

Talks in Events

07/2024 **Steerable Continuous Normalizing Flows,**
Cosmology in the Adriatic – From PT to AI,
Split, Croatia.

06/2024 **Effective Field Theory of Large-Scale Structure and Multi-tracer,**
Theoretical Modeling of Large-Scale Structure of the Universe,
Edinburgh, Scotland.

07/2022 **The Bispectrum in the Hybrid Bias Expansion,**
Summer Workshop Vipolze 2022,
Vipolze, Slovenia.

10/2013 **Galaxy Cluster Finders,**
XXI Simpósio Internacional de Iniciação Científica da USP,
University of São Paulo, São Paulo, Brazil.

Posters

12/2020 **The Halo Void (Dust) Model of Large Scale Structure,**
Latin American Workshop on Observational Cosmology,
Online.

12/2019 **ExSHalos: A New Parameter Free Method for Fast Generation of Halo Catalogues,**
XIII Tonale Winter School on Cosmology: Theory for Observer, Observations for Theorists,
Passo del Tonale, Italy.

04/2018 **A fast generator of nonlinear catalogs,**
VI La Plata International School of Astronomy and geophysics: Cosmology in the era of large surveys,
Universidad Nacional de La Plata, La Plata, Argentina.

08/2016 **Modeling the Void Abundance in Modified Gravity,**
IV Jayme Tiomno School of Cosmology,
National Observatory, Rio de Janeiro, Brazil.

11/2012 **The Mass Function of Galaxy Clusters,**
XVII Simpósio de Iniciação Científica do IAG/USP,
University of São Paulo, São Paulo, Brazil.

10/2012 **Galaxy Clusters: The Mass Function,**
XX Simpósio Internacional de Iniciação Científica da USP,
University of São Paulo, São Paulo, Brazil.

Participations

11/2019 **Invited Visit to the Cosmology Group at DESY,**
DESY, Hamburg, Germany.

02/2019 **JSPS-FAPESP Workshop on dark energy, dark matter, and galaxies,**
University of São Paulo, São Paulo, Brazil.

03/2018 **SPANET Workshop on Clusters of Galaxies and the Large-Scale Structure of the Universe,**
University of São Paulo, São Paulo, Brazil.

06/2016 **School on Dark Matter,**
IFT-ICTP, São Paulo, Brazil.

- 02/2016 **School on Effective Field Theory across Length Scales**,
IFT-ICTP, São Paulo, Brazil.
- 12/2014 **School and Workshop on Observational Cosmology of ICTP-SAIFR**,
IFT-ICTP, São Paulo, Brazil.
- 01/2014 **Minicourse on Data Analysis in Cosmology**,
IFT-ICTP, São Paulo, Brazil.
- 07/2013 **XXVIII Jornada de Física Teórica**,
IFT-ICTP, São Paulo, Brazil.

Fellowships

- 2022–present **Postdoctoral Fellowship**, *Juan de La Cierva*,
Donostia International Physics Center, Spain,
Project: The Hybrid Bias Expansion.
- 2017–2021 **Graduate Fellowship**, *FAPESP*,
University of São Paulo, Brazil,
Project: Constraining Modified Gravity with Cosmic Voids.
Supervisor: Marcos Lima
- 2019–2020 **Graduate Fellowship Overseas**, *FAPESP*,
Institute Max Planck for Astrophysics (MPA), Germany,
Project: A New Method for the Fast Generation of Halo Catalogues in Modified Gravity.
Supervisor Abroad: Fabian Schmidt
- 2016–2017 **Graduate Fellowship**, *CNPq*,
University of São Paulo, Brazil,
Project: Constraining Modified Gravity with Cosmic Voids.
Supervisor: Marcos Lima
- 2014–2016 **Graduate Fellowship**, *FAPESP*,
University of São Paulo, Brazil,
Project: Properties of Cosmic Voids and Modified Gravity.
Supervisor: Marcos Lima
- 2013–2014 **Undergraduate Fellowship**, *CNPq*,
University of São Paulo, Brazil,
Project: Galaxy Cluster Finders.
Supervisor: Marcos Lima
- 2012–2013 **Undergraduate Fellowship**, *CNPq*,
University of São Paulo, Brazil,
Project: The Mass Function of Galaxy Clusters.
Supervisor: Laerte Sodré Jr.

Awards

- 03/2022 **Honorable Mention in the "Best Scientific Publication of 2021" Award of the Physics Institute of the University of São Paulo**, *University of São Paulo, Brazil.*
- 07/2014 **Second Place in IFT-ICTP Young Physics Award**, *IFT-ICTP, Brazil.*
- 07/2013 **Second Place in IFT-ICTP Young Physics Award**, *IFT-ICTP, Brazil.*

Teaching

- 2021 **Teaching Assistant**,
Physical Cosmology I,
University of São Paulo, Brazil.

- 2016 **Teaching Assistant**,
Introduction to Cosmology,
University of São Paulo, Brazil.
- 2015 **Teaching Assistant**,
Physics IV (Electromagnetism),
University of São Paulo, Brazil.
- 2015 **Teaching Assistant**,
Physics III (Electromagnetism),
University of São Paulo, Brazil.

TM: Led weekly discussion sessions; held office hours; graded homeworks.

References

Raul Angulo,
Donostia International Physics Center,
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Department of Mathematical Physics, University of São Paulo, Brazil,
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Luis Raul Abramo,
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Fabian Schmidt,
Max-Planck-Institut für Astrophysik (MPA), Germany,
e-mail: fabians@mpa-garching.mpg.de.
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University of Oslo, Norway,
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