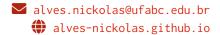
# Níckolas de Aguiar Alves 💿

PhD candidate in physics
Federal University of ABC
Santo André, São Paulo, Brazil



#### **Education**

2023 – Ongoing **Doctor in Physics** 

Federal University of ABC (UFABC), Santo André, São Paulo, Brazil

Advisor: André G. S. Landulfo @

2021 – 2023 **Master in Physics** 

Federal University of ABC (UFABC), Santo André, São Paulo, Brazil

Advisor: André G. S. Landulfo (1)

Thesis: Nonperturbative Aspects of Quantum Field Theory in Curved Spacetime

2017 – 2021 **Bachelor in Physics** 

Institute of Physics, University of São Paulo (IFUSP), São Paulo, São Paulo, Brazil

Advisor: João C. A. Barata 💿

### **Academic Publications**

#### **Papers and Preprints**

- N. Aguiar Alves and A. G. S. Landulfo. "Null infinity as a Killing horizon". *Physical Review D* 112, 065017 (2025). arXiv: 2504.12514 [gr-qc].
- N. Aguiar Alves, A. G. S. Landulfo, and B. A. Costa. "Positive mass in general relativity without energy conditions". *Physical Review D* 111, 044027 (2025). arXiv: 2408.00154 [gr-qc].

#### Other Works

- 1 N. Aguiar Alves. Lectures on the Bondi–Metzner–Sachs group and related topics in infrared physics. 2025. arXiv: 2504.12521 [gr-qc]. Submitted.
- N. Aguiar Alves and B. A. Costa. *The Measure of a Mass*. Essay written for the Gravity Research Foundation 2025 Awards for Essays on Gravitation. 2025. arXiv: 2503.18963 [gr-qc].
- N. Aguiar Alves. "Nonperturbative Aspects of Quantum Field Theory in Curved Spacetime". MSc thesis. Santo André, Brazil: Federal University of ABC, 2023. xxiv, 152 pp. arXiv: 2305.17453 [gr-qc].

#### To Appear

**N. Aguiar Alves**, C. C. Rodrigues, and G. J. Olmo. *Platypus stars: Mimicking black holes through DEC violations*. In preparation.

## **Funding**

2025 - Ongoing

PhD Scholarship

São Paulo Research Foundation (FAPESP) Grant No. 2025/05161-0

Project: The Sky as a Killing Horizon and Other Topics on the Infrared Structure of Gravity

Advisor: André G. S. Landulfo (1)

2023 - 2025

PhD Scholarship

Coordenação de Aperfeiçoamento do Pessoal de Ensino Superior (CAPES)

Granted to pursue my PhD after placing first in UFABC's admission ranking

# **Funding (continued)**

2021 – 2023 MSc Scholarship

São Paulo Research Foundation (FAPESP) Grant No. 2021/07372-7

Project: The Functional Renormalization Group in Quantum Field Theory in Curved

**Spacetimes** 

Advisor: André G. S. Landulfo (1)

2021 MSc Scholarship

Coordenação de Aperfeiçoamento do Pessoal de Ensino Superior (CAPES)

Granted to pursue my MSc after placing first in UFABC's admission ranking

2019 – 2020 | BSc Scholarship

São Paulo Research Foundation (FAPESP) Grant No. 2019/12158-4

Project: Hyperbolic Equations Advisor: João C. A. Barata <sup>10</sup>

#### **Academic Service**

### **Conferences Organized**

2026 (scheduled) Thermality in Quantum Field Theory in Curved Spacetimes

Main organizer. Supported by the ICTP South American Institute for Fundamental Re-

search.

2023 Golden Wedding of Black Holes and Thermodynamics

Main organizer

### **Schools Organized**

2025 II São Paulo School in Gravitational Physics

Main organizer. Part of ICTP Physics Without Frontiers.

I São Paulo School in Gravitational Physics

Main organizer

2018 – 2021 Jayme Tiomno School in Theoretical Physics

Founder and organizer of the first three editions

#### Miscellaneous

2018 Dead Physicists Society

 $Founded\ a\ student-driven\ organization\ still\ responsible\ for\ the\ organization\ of\ schools\ and$ 

seminars at IFUSP

#### Scientific Societies

2025 – Ongoing Rrazilian Physical Society

2024 – Ongoing International Society for Quantum Gravity

## **Teaching Experience**

#### Minicourses and Workshops

2025 Introduction to Black Hole Physics

II São Paulo School in Gravitational Physics

Minicourse for early undergraduate students

2024 Infrared Symmetries of General Relativity

I São Paulo School in Gravitational Physics

Minicourse for advanced undergraduate and early graduate students

## **Teaching Experience (continued)**

2023 Quantum Field Theory in Curved Spacetime

Golden Wedding of Black Holes and Thermodynamics

Minicourse for early graduate students

2021 Algebraic Methods of Theoretical Physics

III Jayme Tiomno School in Theoretical Physics

Minicourse for first-year undergraduate students on the basics of group theory and its applications to physics

2020 An Introduction to LaTeX

XV Oceanography Thematic Week

Oceanographic Institute, University of São Paulo

2019 An Introduction to LaTeX

I Jayme Tiomno School in Theoretical Physics

### **Teaching Assistant**

2025 Topics in Celestial Holography

Institute of Physics, University of São Paulo

Graduate-level course

Advanced Topics in General Relativity

Institute of Physics, University of São Paulo

Graduate-level course

2024 Electromagnetic Phenomena

Federal University of ABC

Undergraduate-level course covering introductory electrodynamics

2021 Classical Mechanics II

Federal University of ABC

Undergraduate-level course covering analytical mechanics

2019 Mathematical Physics I

Institute of Physics, University of São Paulo

Undergraduate-level course covering introductory Fourier analysis

#### Outreach and Miscellanea

2025 International Young Physicists Tournament (Brazil)

Juror for the final stage of the 2025 edition of the IYPT Brazil.

■ VICTP-SAIFR Summer School for Young Physicists

Tutored a course on black hole physics for high school students

2023 – Ongoing gravitonick

YouTube channel discussing advanced physics topics aimed at undergraduate students

2018 – Ongoing Physics Stack Exchange

Active contributor to the Physics Stack Exchange Q&A website

Most prolific contributor to the qft-in-curved-spacetime tag

2018 – 2020 Informal office hours

Institute of Physics, University of São Paulo

Hosted "informal office hours" twice a week for first-year students