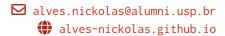
Níckolas de Aguiar Alves 💿

PhD student in theoretical physics Federal University of ABC Santo André, SP, Brazil



Education

2023 – Ongoing **Doctor in Physics**

Federal University of ABC (UFABC), SP, Brazil

Advisor: Prof. André G. S. Landulfo @

2021 – 2023 **Master in Physics**

Federal University of ABC (UFABC), SP, Brazil

Advisor: Prof. André G. S. Landulfo @

Thesis: Nonperturbative Aspects of Quantum Field Theory in Curved Spacetime

2017 – 2021 **Bachelor in Physics**

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

Advisor: Prof. João C. A. Barata @

Academic Publications

Journal Articles

N. de Aguiar Alves, A. G. S. Landulfo, and B. A. Costa. "Positive Mass in General Relativity Without Energy Conditions". *Physical Review D* (2025). arXiv: 2408.00154 [gr-qc]. Forthcoming.

Theses

N. de 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. de Aguiar Alves**. Lectures on the Bondi-Metzner-Sachs Group and related topics in infrared physics. In preparation.
- N. de Aguiar Alves. Measurements Are Never Relative. Submitted.
- **N. de Aguiar Alves**, A. G. S. Landulfo, and A. D. Pereira. *Nonperturbative Renormalization Group Flow for a Particle Detector*. In preparation.

Funding

2023 – Ongoing

PhD Scholarship

Coordenação de Aperfeiçoamento do Pessoal de Ensino Superior (CAPES)

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

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: Prof. André G. S. Landulfo @

2021 MSc Scholarship

Coordenação de Aperfeiçoamento do Pessoal de Ensino Superior (CAPES)

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

Funding (continued)

2019 - 2020

BSc Scholarship

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

Project: Hyperbolic Equations Advisor: Prof. João C. A. Barata ©

Academic Service

Conferences Organized

2023 Golden Wedding of Black Holes and Thermodynamics

Main organizer

Schools Organized

2024

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

2017 - Ongoing

Organized several other events, seminars, and colloquia

Scientific Societies

2025 - Ongoing

Brazilian Physical Society

2024 - Ongoing

■ International Society for Quantum Gravity

Teaching Experience

Minicourses and Workshops

2024 Infrared Symmetries of General Relativity

I São Paulo School in Gravitational Physics

10-hour-long minicourse for advanced undergraduate and early graduate students

2023 Quantum Field Theory in Curved Spacetime

Golden Wedding of Black Holes and Thermodynamics

12-hour-long minicourse for early graduate students

2021 Algebraic Methods of Theoretical Physics

III Jayme Tiomno School in Theoretical Physics

10-hour-long minicourse for first-year undergraduate students on the basics of group theory and its applications to physics

2020 An Introduction to Large X

XV Oceanography Thematic Week

Oceanographic Institute, University of São Paulo

2019 An Introduction to LaTeX

I Jayme Tiomno School in Theoretical Physics

Teaching Experience (continued)

Teaching Assistant

2024 Electromagnetic Phenomena

Federal University of ABC, SP, Brazil

Undergraduate-level course covering introductory electrodynamics

Hosted office hours twice a week

2021 Classical Mechanics II

Federal University of ABC, SP, Brazil

Undergraduate-level course covering analytical mechanics

Hosted office hours twice a week

2019 Mathematical Physics I

Institute of Physics, University of São Paulo, SP, Brazil

Undergraduate-level course covering introductory Fourier analysis

Hosted office hours twice a week

Outreach and Miscellanea

2023 – Ongoing 📕 gravitonick

https://www.youtube.com/@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

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

Research Presentations

Contributed Talks

2024 Positive mass in general relativity without energy conditions

• XLVII Paulo Leal Ferreira Congress (São Paulo State University, São Paulo, Brazil)

Nonperturbative renormalization group flow for a particle detector

• Golden Wedding of Black Holes and Thermodynamics (online conference)

Poster Presentations

Negative masses are unstable and we don't need energy conditions to prove it

• Witnessing Quantum Aspects of Gravity in a Lab (Principia Institute, São Paulo, Sep. 23–27, 2024)

2023 Nonperturbative aspects of quantum field theory in curved spacetime

- Interfaces Between Quantum and Classical Statistical Mechanics (University of São Paulo's Institute of Mathematics and Statistics, Jul. 24–28 2023)
- V Jayme Tiomno Physics School (University of São Paulo's Institute of Physics, Sep. 4–8, 2023)
- XLVI Paulo Leal Ferreira Congress (São Paulo State University's Institute of Theoretical Physics, Oct. 24–27, 2023)

Research Presentations (continued)

Flash Talks

2023 - 2024

- Nonperturbative renormalization group flow for a particle detector
 - School on Phase Transitions and Gravitational Waves (Federal University of Rio Grande do Norte's International Institute of Physics, Mar. 4–8, 2024)
 - Quantum Spacetime and the Renormalization Group 2023 (Sant'Elmo Beach Hotel, Oct. 2–6, 2023)