

# Níckolas de Aguiar Alves

PhD candidate in physics

Federal University of ABC

Santo André, São Paulo, Brazil



alves.nickolas@ufabc.edu.br



alves-nickolas.github.io

## Education

- 2023–  **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   
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

- 1 N. Aguiar Alves. “Lectures on the Bondi–Metzner–Sachs group and related topics in infrared physics”. *The European Physical Journal C* (2025). arXiv: [2504.12521 \[gr-qc\]](#). Forthcoming.
- 2 N. Aguiar Alves and A. G. S. Landulfo. “Null infinity as a Killing horizon”. *Physical Review D* **112**, 065017 (2025). arXiv: [2504.12514 \[gr-qc\]](#).
- 3 N. Aguiar Alves and B. A. Costa. *The Measure of a Mass*. 2025. arXiv: [2503.18963 \[gr-qc\]](#).
- 4 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 \[gr-qc\]](#).
- 5 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

- 1 N. Aguiar Alves, C. C. Rodrigues, and G. J. Olmo. *Platypus stars: Exotic compact objects supported by vacuum pressure*. In preparation.

## Funding

- 2025–  PhD Scholarship  
The Sky as a Killing Horizon and Other Topics on the Infrared Structure of Gravity  
São Paulo Research Foundation (FAPESP) Grant No. [2025/05161-0](#)  
Advisor: André G. S. Landulfo 
- 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
- 2021–2023  MSc Scholarship  
The Functional Renormalization Group in Quantum Field Theory in Curved Spacetimes  
São Paulo Research Foundation (FAPESP) Grant No. [2021/07372-7](#)  
Advisor: André G. S. Landulfo 

## Funding (continued)

- 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  
Hyperbolic Equations  
[São Paulo Research Foundation](#) (FAPESP) Grant No. [2019/12158-4](#)  
Advisor: João C. A. Barata 

## 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 Research](#)
- 2023  Golden Wedding of Black Holes and Thermodynamics  
Main organizer

### Schools Organized

- 2024–  São Paulo School in Gravitational Physics  
Main organizer  
Part of [ICTP Physics Without Frontiers](#) (second edition onward)
- 2018–2021  Jayme Tiomno School in Theoretical Physics  
Founder and organizer of the first three editions

## Scientific Societies

- 2025–  Brazilian Physical Society
- 2024–  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
- 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 on group theory in physics for first-year undergraduate students
- 2020  An Introduction to L<sup>A</sup>T<sub>E</sub>X  
[XV Oceanography Thematic Week](#)  
Oceanographic Institute, University of São Paulo
- 2019  An Introduction to L<sup>A</sup>T<sub>E</sub>X  
[I Jayme Tiomno School in Theoretical Physics](#)

## Teaching Experience (continued)

### Teaching Assistant

- 2025  Topics in Celestial Holography  
Institute of Physics, University of São Paulo  
Graduate-level course
- 2025  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
- 2025  VICTP-SAIFR Summer School for Young Physicists  
Tutored a course on black hole physics for high school students
- 2018–  Physics Stack Exchange  
Active contributor to the Physics Stack Exchange Q&A website  
Most prolific contributor to the `qft-in-curved-spacetime` tag