Carlos Roberto de Melo Carneiro

Email: carlos.melo@ufrgs.br
Alternative contact: crmc.melo@gmail.com
Page: https://carlosrmelo.github.io/

RESEARCH INTERESTS

My research interests span the areas of strong gravitational lensing, stellar dynamics, galaxy evolution, and cosmology. I am particularly focused on combining strong gravitational lensing and stellar dynamics to probe the mass structure of the lens galaxy, and how can we use this information to learn about galaxy evolution and cosmology. I am also interested in learning new methodologies that can help with this task, such as new statistical tools and the use of hydrodynamical simulations.

EDUCATION

Universidade Federal do Rio Grande do Sul — Porto Alegre, RS
PhD in Astrophysics — August/2021 - Current
Strong Gravitational Lensing and Stellar Dynamics: A Tale
Advisor: Cristina Furlanetto & Ana Chies Santos

Institute of Cosmology and Gravitation — Portsmouth, PO
PhD internship in Astrophysics — April/2024 - September/2024
Advisor: Thomas Collett

Universidade Federal do Rio Grande do Sul — Porto Alegre, RS
MSc in Astrophysics — August/2019 - August/2021
Testing General Relativity at Galactic Scales
Advisor: Cristina Furlanetto & Ana Chies Santos

Universidade Federal de Juiz de Fora — Juiz de Fora, MG
BSc in Physics — March/2015 - July/2019
Advisor: Gil de Oliveira Neto

ACADEMIC HONOURS

2022-Current PhD research fellowship granted by CNPq

2024/04-2024/10 PDSE-Print research fellowship granted by CAPES for international internship

2019-2021 Master research fellowship granted by CNPq

2018-2019 Undergraduate research fellowship for scientific initiation granted by UFJF

2016-2017 Undergraduate research fellowship for scientific initiation granted by FAPEMIG

PUBLICATIONS

1. **Melo-Carneiro C. R.**, et al., *Unveiling a 30 Billion Solar Mass Black Hole at the Centre of the Cosmic Horseshoe Gravitational Lens* - to be submited.
2. **Melo-Carneiro C. R.**, Furlanetto C., Chies-Santos A. L., *Systematics in ETG Mass Profile Modelling: Strong Lensing & Stellar Dynamics*, arXiv e-prints (2024), p.arXiv:2407.02297 - submited to ApJ.
3. **Melo-Carneiro C. R.**, Furlanetto C., Chies-Santos A. L., *Probing general relativity in galactic scales at* $z \sim 0.3$, MNRAS (2023), 520, 1613.
4. **Melo-Carneiro C. R.**, Furlanetto C., Chies-Santos A. L., *Constraining general relativity at* $z \sim 0.3$*: MUSE Kinematics of SDP.81*, Proceedings of the International Astronomical Union 359: Galaxy Evolution and Feedback across Different Environments (2019), pp. 260–261.

SUCCESSFUL PROPOSALS

- **Testando a Relatividade Geral em escala de galáxias (Testing General Relativity in Galaxy Scales),** April 2021–April 2023. Allocation time for the supercomputer Santos Dumont (SDumont) at the National Laboratory of Scientific Computation (Laboratório Nacional de Computação Científica - LNCC). Our proposal was accepted for the Standard program with a total of 2073600 AUs. This program was extended for one more year until April 2024.
- **Testando a Relatividade Geral em escala de galáxias (Testing General Relativity in Galaxy Scales),** April 2024–Current. Allocation time for the supercomputer Santos Dumont (SDumont) at the National Laboratory of Scientific Computation (Laboratório Nacional de Computação Científica - LNCC). Our proposal was accepted for the Standard program with a total of 2073600 AUs. This accepted proposal is a continuation of the previous project.

SCIENTIFIC TALKS and POSTERS

2024 **Measures of Luminous and Dark Matter in Galaxies Across Time at XXXII IAU General Assembly**
Oral. Title: Self-consistent Modelling of Strong Gravitational Lensing and Stellar Dynamics

2024 **Strong Gravitational Lensing Science with LSST**
Poster. Title: Self-consistent Modelling of Strong Gravitational Lensing and Stellar Dynamics

2023 **European Astronomical Society Annual Meeting**
Poster. Title: Probing General Relativity in galactic scales at $z \sim 0.3$

2023 **IAUS 381: Strong Gravitational Lensing in the Era of Big Data**
Poster. Title: Probing General Relativity in galactic scales at $z \sim 0.3$

2022 **25th annual International Conference on Particle Physics and Cosmology (COSMO'22)**
Oral. Title: Does General Relativity hold in galactic scales? A test at a $z \sim 0.3$ elliptical lens galaxy.

2022 **XLV SAB virtual meeting**
Oral. Title: Does General Relativity hold in galactic scales? A test at a $z \sim 0.3$ elliptical lens galaxy.

2020 **IAUS 359: Galaxy Evolution and Feedback Across Different Environments (GALFEED)**
Poster. Title: Constraining General Relativity at $z < 0.3$

SCHOOLS and WORKSHOPS

2024 **III Workshop on Lensing by Galaxies and Clusters**
Workshop held by the Brazilian Center for Research in Physics (CBPF, Brazil). Workshop on waek and strong lensing studies on galaxy and galaxy cluster scales; applications to cosmology and modified gravity tests.

2022 **DYNAMITE (DYnamics, Age and Metallicity Indicators Tracing Evolution)**
Workshop held by University of Western Australia (UWA, AUS). Workshop on triaxial Schwarzschild orbit-based dynamical models.

2022 **Summer School in Statistics for Astronomers XVII**
School held by Pennsylvania State University (PSU, US). Summer school on astrostatistics.

2020 **Partículas, AStropartículas, Campos e COsmologia - PASCCO**
School held by International Institute of Physics (IIP, Brazil). School of Particles, Astroparticles, Fields and Cosmology.

2020 **JWST-UFRGS Workshop**
Workshop held by Universidade Federal do Rio Grande do Sul (UFRGS, Brazil). JWST writing proposal workshop.

TEACHING EXPERIENCE

2020 Teaching assistant at undergraduate Astrophysics course: Fundamentals of Astronomy and Astrophysics, UFRGS

2018 Mentoring at undergraduate Physics course: Physics III - Electromagnetism (UFJF)

2017 Mentoring at undergraduate Mathematics course: Calculus II (UFJF)

SKILLS and LANGUAGES

Computer Skills: Python, `LaTeX`

Astronomy tools: DS9, QFitsView, `pPXF`, `MgeFit`, `JamPy`, `PyAutoLens`, `MPDAF`, `Astropy`

Other useful tools: `SciPy`, `NumPy`, `dynesty`, `emcee`, `Jupyter`, `VSCode`

Languages: Proficient in Portuguese and English.