JAIME REDONDO-YUSTE

(+34) 628679595 ◇ jaime.redondo.yuste@nbi.ku.dk ◇ jredondoyuste.github.io

Gravitation, in the strong field regime, is a non–linear theory. However, the gravitational waves (GWs) emitted during and after the merger of two black holes follow a seemingly simple pattern. I am pursuing a PhD with the aim of understanding the reason behind this: where are the non–linearities one would expect from Einstein's equations?

In order to do so, combining analytical methods from Black Hole Perturbation Theory with numerical simulations is key to provide better models, accounting for several non–linear effects. I am interested on understanding how to improve our models of the post–merger signal with the aim of enhancing our GW data analysis capabilities.

A major interest of mine is the nonlinear stability of black hole spacetimes. The correspondance between the dynamics of horizons and null hydrodynamics is a valuable tool at providing novel insights in this aspect. I am also interested in the relativistic interaction between GWs and matter, properly accounting for dissipative effects.

Current Position

Niels Bohr Institute *PhD Fellow* **2022–now**
↪ Prof. Vitor Cardoso *University of Copenhagen*

- PhD student in the Strong group, working on understanding the role of nonlinearities in General Relativity.

Princeton Gravity Initiative *Visiting Student* **May–July 2024**
↪ Prof. Frans Pretorius *Princeton University*

- Visiting research student collaborator in the Princeton Gravity Initiative, working with members of the group on aspects of turbulence of gravitational waves.

Education

Perimeter Institute & University of Waterloo **2021 – 2022**
M. Sc. in Theoretical Physics under the Perimeter Scholars International program.
Master thesis: Dynamics of black hole horizons *Advisor: Luis Lehner*

Universidad Complutense de Madrid **2016 – 2021**
B. Sc. in Fundamental Physics & Pure Mathematics
Physics thesis: Gravitational waves production during stellar collapse
Math thesis: Fiber bundles and gauge theories.

Universidad Francisco de Vitoria **2016 – 2020**
Minor in Liberal Arts

Teaching Experience

Teaching Assistant, Niels Bohr Institute

Analytical Mechanics	**Fall 2023**
Numerical Methods for Physics	**Summer 2023**
Computational Ocean and Atmosphere Dynamics	**Spring 2023**

Awards

La Caixa Inphinit Doctoral Fellowship **2022**
[*Rejected*]. Highly competitive scholarship to fully fund the PhD studies in Spanish universities. 100000€

Perimeter Scholars International Award **2021**
Scholarship to fully fund the Perimeter Scholars International masters program. 45000 $ CA

Max Mazin prize **2017, 2018, 2020**
Prize awarded by the CEIM foundation to recognize excellent achievements by undergraduate students. 6000 €

Excellence Scholarship **2017-2021**
Performance based scholarship to cover tuition fees granted by the public funding agency. 10000 €

Publications

1. V. Cardoso *et al.*, (Hushing black holes: tails in dynamical spacetimes) *2024* Phys.Rev.D 109 (2024) 12, L121502 [arXiv:2405.12290]
2. **JRY**, D.Pereñiguez and V.Cardoso, (2024) *Ringdown of a dynamical spacetime* Phys.Rev.D 109 (2024) 4, 044048 [arXiv:2312.04633]
3. C. Dyson, **JRY**, M. van de Meent and V. Cardoso, (2024) *Relativistic aerodynamics of spinning black holes.* Phys.Rev.D 109 (2024) 10, 104038 [arXiv:2402.07981]
4. **JRY**, G. Carullo, J.L.Ripley, E.Berti and V.Cardoso, (2024) *Spin dependence of black hole ringdown nonlinearities* Phys.Rev.D 109 (2024) 10, L101503 [arXiv:2308.14796]
5. D. Gaiotto, J. Hilburn, **JRY**, B.Webster and Z.Zhou, (2023) *Twisted traces on abelian quantum Higgs and Coulomb branches* [arXiv:2308.15198]
6. **JRY**, V.Cardoso, C.F.B.Macedo and M. van de Meent, (2023) *Eternal binaries* Phys. Rev. D 107, 124025 [arXiv:2212.06175]
7. A.Platania and **JRY**, (Diverging black hole entropy from quantum infrarred nonlocalities) *2023* [arXiv:2303.17621]
8. **JRY** and L.Lehner, (2023) *Non-linear black hole dynamics and Carrollian fluids* JHEP 02 240 [arXiv:2212.06175]
9. F. Gray, D.Kubiznak, T. Rick Perche and **JRY**, (2023) *Carrollian motion in magnetized black hole horizons* Phys. Rev. D 107, 064009 [arXiv:2211.13695]
10. **JRY**, M. Blanco de Paz, P.A. Huidobro and A. Gonzalez Tudela, (2021) *Quantum electrodynamics in anisotropic and tilted Dirac lattices* New J. Phys. 23 103018 [arXiv:2106.10743]
11. C. Barceló, L.J.Garay and **JRY**, (2020) *Interpretations and naturalness in the radiation–reaction problem* Symmetry 13 4, 658 [arXiv:2005.08725]

Conferences

Organization

Ringdown: Inside and Out — **August 2024**
Member of LOC — *Copenhagen*

Kavli–Villum Summer School on Gravitatonal Wave Physics — **September 2023**
Member of LOC — *Corfu (GR)*

Invited Talks

Carrollian insights for Gravitational Wave Physics — **October 2023**
3rd Carroll Workshop — *Thessaloniki (GR)*

Black Holes and Carrollian fluids — **March 2023**
SXS Webinar — *Online*

Contributed Talks

Spin dependence of ringdown nonlinearities — **September 2023**
Numerical Relativity Community Calls — *Online*

Eternal Binaries — **July 2023**
26th Capra meeting — *Copenhagen (DK)*

Black Holes and Carrollian fluids — **January 2023**
Nordic Gravitational Wave Winter School — *Skeikampen (NO)*

Eternal and chaotic binaries — **December 2022**
XV Black Hole Workshop — *Lisbon (PT)*

Dynamics of black hole horizons — **September 2022**
Spanish–Portuguese Relativity Meeting (EREP) — *Salamanca (ES)*

Skills

Programming Languages	Proficient in Python, Julia & Mathematica, experience in C/C++ & Fortran.
Software	Co-Author of `bayRing`: a *Python* bayesian inference package for ringdown modelling.
Relevant Coursework	Strong gravity, Advanced Gravitation, Quantum Gravity, Computational Astrophysics