CRISTIAN JOANA -- CURRICULUM VITAE

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Research Experience & Education Background:

- 2023-present **Postdoctoral researcher**
at Institute of Theoretical Physics, Chinese Academy of Science (ITP-CAS), Beijing, P. R. China.
Group Leader: Shi Pi

- 2019-2022 **PhD in Physics (FRNS - FRIA)**
at IRMP, CURL, University of Louvain, Louvain-la-Neuve, Belgium.
Thesis supervisors: Christophe Ringeval and Sebastien Clesse

- 2014-2016 **Master's degree in Physics, major in QFT and Gauge theories**
at RWTH Aachen University, Aachen, Germany.
Thesis supervisor: Sebastien Clesse and Julien Lesgourgues

- 2009-2013 **Degree (EEES) in Physic**s, **mention in Fundamental Physics**
at Autonomous University of Barcelona, Catalonia/Spain.
Thesis supervisor: Rafel Escribano

Other Research Experience:

- 2016/19 **Research assistant at the Institute of Neuroscience and Medicine (INM-6), Juelich Research Centre** ***(Germany)***
Group Leader: **Sonja Gruen** (FZ-Juelich)
Keywords: Neural data analysis, visual cortex, electrophysiology, spike-sorting

- 2013/14 **Internship researcher at the National Institute Informatics, Tokyo**, ***(Japan)***
Group Leader: **Tim Byrnes** (currently at NYU Shanghai)
Keywords: Continuous-Variables Quantum Computing, Quantum optics

TEACHING EXPERIENCE:

- 2019-2021 **Tutor** in **Quantum Mechanics II** (UCLouvain)

- 2017-2018 **Tutor** in **Computational Neuroscience** (RWTH Aachen)

- 2017 **Tutor** in the **Advanced Neural Data Analysis '17** school (FZ-Juelich)

Scientific Grands and Rewards:

- 2024-2025	**NSFC Research Fund for International Scientist, Grant Num. W2433007** National Natural Science Foundation of China, **NSFC**, RFIS I, P.R.China.
- 2023-2024	**NSFC Special Fund for Theoretical Physics. Grant Num. 12347132** National Natural Science Foundation of China, **NSFC**, P.R.China.
- 2022	**ICERM visiting grant, Brown University (Rhode Island)** National Science Foundation and ICERM's Federal funds, **NSF,** USA
- 2020	**ICERM visiting grant** (3 months) – cancelled due to Covid-19, National Science Foundation and ICERM's Federal funds, **NSF,** USA
- 2020-2021	**Co-I, PRACE Tier-0 No. 2018194669** (6 months), 30M CPU/hrs, Computational Grant
- 2019-2022	**FNRS - FRIA grant** (*bourse de doctorat*, 4 years), Fonds de la Reserche Scientifique, **FRS-FNRS,** Belgium
- 2013-2014	**NII International Internship Program** (6 months) National Institute of Informatics, **Sokendai**, Japan

Research Activities:

- Member of the GRTL Collaboration (previously known as the GRChombo Collaboration), and developer and user of the GRChombo numerical relativity code.
- Member and contributor of the yt-project code (astrophysical python analysis toolkit).
- Member of the LISA Cosmology Gravitational Wave working group.
- Member of the LISA Primordial Black Hole working group.
- Associate member for the TAIJI gravitational wave experiment at ITP.
- Journal referee for PRD, JOSS, elsevier

Personal details:

Nationality:	Catalan, Spanish
Date of birth:	01-05-1990
Languages:	Native in Catalan and Spanish, Proficiency in English Intermediate level in French Basics in Chinese, Japanese and German.
ICT Skills:	Debian GNU/Linux based Operative Systems, Programming in C/C++ and Python, *Mathematica™, LaTeX*
Hobbies:	Reading, playing chess, traveling and hiking.

List of Publications:

GR-QC, ASTRO-CO, HEP-Th, COND-MAT:

1. Joana, C., van Loock, P., Deng, H., Byrnes, T. (2016). “Steady-state generation of negative-Wigner-function light using feedback”. Phys. Rev. A, 94, 063802 (2016). arXiv:1612.00629

2. Joana, C., Clesse, S. "Inhomogeneous pre-inflation accross Hubble scales in full general relativity", Phys. Rev. D 103, 083501 (2021). arXiv:2011.12190

3. Joana, C. "Gravitational dynamics of Higgs inflation: Preinflation and preheating with an auxiliary", Phys. Rev. D, vol. 106, pp. 023504 (2022). arXiv:2202.07604

4. Andrade, T., Joana C. et, al. "GRChombo: An adaptable numerical relativity code for fundamental physics", Journal of Open Source Software (JOSS), 6(68), 3703, arXiv:2201.03458

5. Auclair, P., Bacon, D., Joana, C, et. al. [LISA Collaboration], "Cosmology with the Laser Interferometer Space Antenna", Living Rev Relativ 26, 5 (2023). arXiv:2204.05434

6. Bagui, E., Clesse, S., Joana, C., et. al. [LISA Collaboration], "Primordial black holes and their gravitational wave signatures", arXiv:2310.19857 ***(accepted at Liv Rev Relativ)***

7. Dumpui, E., Joana, C., Clesse, S., Escriva A., "Baryogenesis from sub-threshold *curvature perturbations",* arXiv:2401.09408 ***(Submitted to PRL)***

8. Joana, C. “Beginning inflation in non-conformally flat spacetimes”, Phys.Rev.D 110 (2024) 6, 063534, arXiv:2406.00811

9. Yuwen, Z-Y., Joana, C, Wang S-H, Cai R-G., "Bubbles kick off primordial black holes to form more binaries***",*** arXiv: 2406.05838 ***(Submitted to PRL)***

10. Inui, R., Joana, C. Motohashi, H., Pi, S., Tada, Y., Yokoyama, S., “Primordial black holes and induced gravitational waves from logarithmic non-Gaussianity”, arXiv:2411.07647 ***(Submitted to JCAP)***

INTERDISCIPLINARY:

11. Yamane, Y., Ito, J., Joana, C., Fujita, I., Tamura, H, Maldonado, P., Gruen, S., "Neuronal population activity in macaque visual cortices dynamically changes through repeated fixations in active free viewing", eNeuro 5 October 2023, ENEURO.0086-23.2023; doi:10.1523/ENEURO.0086-23.2023.

12. Ito, J., Joana, C., Yamane, Y., Fujita, I., Tamura, H, Maldonado, P., Gruen, S. (2022), "Latency shortening with enhanced sparseness and responsiveness in V1 during active visual sensing", Sci Rep **12,** 6021 (2022

Articles in Preparation:

13. Joana, C., Clesse, C., Pi S., "Primordial black hole formation after collapse of asymmetric curvature perturbations***", (in progress)***

14. Bagui, E., Clesse, S., Joana, C., et. al. [LISA Collaboration], "PrimBHoles: an analysis toolkit for primordial black hole research", ***(in progress)***

15. Turk, M., Joana, C., et. al [yt-project Collaboration] "Introducing yt 4.0: Analysis and Visualization of Volumetric Data", ***(in progress)***

Given Talks:

- Beginning inflation from inhomogeneous initial conditions
  Cristian Joana
  Majorana-Raychaudhuri Seminars, INFN, Italy & PAMU, India, 09h August 2024

- Starting inflation from conformally curved initial conditions
  Cristian Joana
  GRTL meetings, Cambridge U., UK, 23h June 2024

- Generating Chombo checkpoint files using pyhton.
  Cristian Joana
  GRTL meetings, Cambridge U., UK, 22h June 2024

- PrimBHoles: a pythonic toolkit to compute PBH signatures
  Cristian Joana, LISA Collaboration
  11th LISA CosGW workshop, Porto U., Portugal, 18th June 2024

- On Primordial Black Hole Formation
  Cristian Joana
  PCFT/ICTS seminars, USTC, Hefei, P.R. China, 19th October 2023

- Introduction to Numerical Relativity in Cosmology
  Cristian Joana
  College of Physics seminars, Chongqing U., P.R. China, 26h April 2023

- GR-Simulations of the Early Universe
  Cristian Joana
  Chinese GW annual meeting, Chongqing, P.R. China, 24h April2023

- Numerical relativity in Cosmology
  Cristian Joana
  Gravity-matters seminars, University of Oslo, Norway, 28th November 2022

- Visualitzation tools for GRChombo: Yt and Visit
  Cristian Joana
  GRChombo meetings ‘22 (I), Cambridge U., UK, 30th March 2022

- Dynamics of pre- and post- Higgs inflation
  Cristian Joana
  GRChombo meetings ‘22 (I), Cambridge U., UK, 29th March 2022

- Gravitational dynamics of Higgs pre-inflation and preheating
  Cristian Joana
  Oxford gr-qc JC, Oxford U., UK 3th March 2022

- Simulations of the early Universe with numerical General Relativity
  Cristian Joana
  Tonale winter school of cosmology, Tonale, Italy, 8th December 2021

- Exploring the early Universe with numerical General Relativity
  Cristian Joana
  Belgian Gravitational Wave Seminars, ULB, Brussels, Belgium, 3rd November 2021

- The inhomogeneous pre-inflationary era: A numerical relativity approach
  Cristian Joana
  GRChombo meetings ‘20 II, Oxford U., Oxford, UK, 2nd December 2020

- Graviational waves from the inhomogeneous pre-inflationary era
  Cristian Joana
  Belgian Gravitational Wave Seminars, KU-Leuven, Belgium, 25th November 2020