CRISTIAN JOANA -- CURRICULUM VITAE

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RESEARCH EXPERIENCE:

- 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

SCIENTIFIC GRANDS AND AWARDS:

- 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** – 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 month) National Institute of Informatics, **Sokendai**, Japan

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)

OTHER EDUCATION AND TRAINING:

- 2021	**Tonale winter school of cosmology 2021** at Paso del Tonale, (Italy), organized by Heidelberg University (Germany)
- 2020	**Advances in Computational Relativity workshop (online)** at ICERM, Brown University, Providence (USA)
- 2019	**Gravitational wave astronomy summer school** at ICTS, Bangalore (India)
- 2017	**(Tutor) Advanced Neural Data Analysis 2017 summer school** at Juelich Research Center, Juelich (Germany)
- 2016	**Workshop 'Cosmology after Planck: what is next?'** at Ecole de Physique des Houches (France)
- 2014	**ESI-EMS-IAMP Summer school on Mathematical Relativity** Erwin Schrödinger Institute, Vienna (Austria)

PERSONAL DETAILS AND SKILLS:

Nationality:	Catalan, Spanish
Date of birth:	01-05-1990
Languages:	Native in Catalan and Spanish, Proficiency in English Intermediate level in French Beginner in Chinese 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.

RESEARCH ACHIEVEMENTS:

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.
- Reviewer for PRD, JOSS, elsevier

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

8. Joana, C, "Beginning inflation in conformably curved spacetimes", ***(accepted at PRD)*** 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)***

INTERDICIPLINARY:

10. 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.

11. 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 PROGRESS:

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

13. Turk, M., Joana, C., et. al [yt-project Collaboration] "Introducing yt 4.0: Analysis andVisualization 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

- The inhomogeneous pre-inflationary era
  Cristian Joana
  Advances in Computational Relativity, ICERM, Brown University, USA, 12th November 2020

- Inhomogeneous scalar field dynamics and backreactions in non-conformally flat spacetimes
  Cristian Joana
  GRChombo meetings '19 I, QMUL, London, UK, 19th February 2019

- Negative Wigner function distribution light generated by coherent excitation of polaritons
  Cristian Joana, Peter van Loock, Hui Deng, Tim Byrnes
  WE-Heraeus-Seminar: Continuous Variable Entanglement in Atomic Systems: Fundamentals and Applications, Bad Honnef, Germany, 11th May 2015