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
- 2019/22	PhD in Physics (FRNS - FRIA) at IRMP, CURL, University of Louvain, Louvain-la-Neuve, Belgium. Thesis supervisors: Christophe Ringeval and Sebastien Clesse
- 2014/16	Master's degree in Physics, major in QFT and Gauge theories at RWTH Aachen University, Aachen, Germany. Thesis supervisor: Sebastien Clesse and Julien Lesgourgues
- 2009/13	Degree (EEES) in Physics, 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:

- 2023	Special NSFC Grant Num. T.0198.19 National Science Foundation of China, 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

- 2020/21	Co-I, PRACE Tier-0 No. 2018194669 (6 months), 30M CPU/hrs, Computational Grant
- 2019/22	FNRS - FRIA grant (bourse de doctorat, 4 years), Fonds de la Reserche Scientifique, FRS-FNRS , Belgium
- 2013/14	NII International Internship Program (6 month) National Institute of Informatics, Sokendai, Japan

TEACHING EXPERIENCE:

- 2019/20/21	Tutor in Quantum Mechanics II (UCLouvain)
- 2017/18	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, <i>Mathematica</i> TM , <i>LaTeX</i>
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 the Journal of Open Source Software (JOSS)

LIST OF PUBLICATIONS: (PUBLISHED)

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

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

INTERDICIPLINARY:

- 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.
- 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)

SELECTION OF ARTICLES IN PROGRESS: (IN PROGRESS)

- 10. C. Joana, S. Clesse, "Primordial black hole formation after collapse of asymmetric curvature perturbations", *(in progress)*
- 11. Turk, M., Joana, C., et. al [yt-project Collaboration] "Introducing yt 4.0: Analysis and Visualization of Volumetric Data", *(in progress)*
- 12. C. Joana, "Beginning inflation in non-conformally flat spacetimes", (in progress)

GIVEN TALKS:

- On Primordial Black Hole Formation <u>Cristian Joana</u> PCFT/ICTS seminars, USTC, Hefei, P.R. China, 19th October 2023
- Introduction to Numerical Relativity in Cosmology <u>Cristian Joana</u> College of Physics seminars, Chongqing U., P.R. China, 26^h April 2023
- GR-Simulations of the Early Universe <u>Cristian Joana</u> Chinese GW annual meeting, Chongqing, P.R. China, 24^h April2023
- Numerical relativity in Cosmology <u>Cristian Joana</u> Gravity-matters seminars, University of Oslo, Norway, 28th November 2022
- Visualitzation tools for GRChombo: Yt and Visit <u>Cristian Joana</u> GRChombo meeting '22 (I), Cambridge U., UK, 30th March 2022
- Dynamics of pre- and post- Higgs inflation

<u>Cristian Joana</u> GRChombo meeting '22 (I), Cambridge U., UK, 29th March 2022

- Gravitational dynamics of Higgs pre-inflation and preheating <u>Cristian Joana</u> Oxford gr-qc JC, Oxford U., UK 3th March 2022
- Simulations of the early Universe with numerical General Relativity <u>Cristian Joana</u> Tonale winter school of cosmology, Tonale, Italy, 8th December 2021
- Exploring the early Universe with numerical General Relativity <u>Cristian Joana</u> Belgian Gravitational Wave Seminars, ULB, Brussels, Belgium, 3rd November 2021
- The inhomogeneous pre-inflationary era: A numerical relativity approach <u>Cristian Joana</u> GRChombo workshop '20 II, Oxford U., Oxford, UK, 2nd December 2020
- Graviational waves from the inhomogeneous pre-inflationary era <u>Cristian Joana</u> Belgian Gravitational Wave Seminars, KU-Leuven, Leuven, Belgium, 25th November 2020
- The inhomogeneous pre-inflationary era <u>Cristian Joana</u> Advances in Computational Relativity, ICERM, Brown University, USA, 12th November 2020
- GR-Hidrodynamics (perfect fluid) simulations with GRChombo <u>Cristian Joana</u> GRChombo workshop '19 II, KCL, London, UK, 11th June 2019
- Inhomogeneous scalar field dynamics and backreactions in non-conformally flat spacetimes <u>Cristian Joana</u> GRChombo workshop '19 I, QMUL, London, UK, 19th February 2019
- Negative Wigner function distribution light generated by coherent excitation of polaritons <u>Cristian Joana</u>, 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