CURRICULUM VITAE:

CRISTIAN JOANA

IRMP, Chemin du Cyclotron 2,
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PROFILE:

I am third year PhD student in theoretical physics and cosmology at the University of Louvain, under the supervision of Prof. C. Ringeval (UCLouvain) and Prof. S. Clesse (ULB).

I am involved in the use and development of numerical relativity tools to study the non-linear dynamics and backreactions of the Early Universe. My research focus are in inflation, reheating and formation of primordial black holes.

I am part of the developing team of GRChombo (www.grchombo.com), an open source numerical relativity code that I use for my simulations. I am also a member of the LISA-PBH working group.

In the past, I also worked as an intern researcher in quantum information systems (in 2013), and as an assistant researcher in computational neuroscience (from 2016-2018).

ACADEMIC RECORDS:

- **2019/22** **(Candidate for) PhD in Physics (FRNS - FRIA)**
  at IRMP, CURL, University of Louvain*, Louvain-la-Neuve, Belgium*

- **2014/16** **Master's degree in Physics, major in QFT and Gauge theories**
  at RWTH Aachen University*, Aachen, Germany.*

- **2009/13** **Degree (EEES) in Physic**s, **mention in Fundamental Physics**
  at Autonomous University of Barcelona, *Catalonia.*

SCIENTIFIC GRANDS AND AWARDS:

- **2020** **ICERM visiting grant** (3 months),
  National Science Foundation and ICERM's Federal funds, ***NSF,*** *USA*

- **2019/21** **FNRS - FRIA grant** (bourse de doctorat, 4 years),
  Fonds de la Reserche Scientifique, ***FRS-FNRS,*** *Belgium*

- **2013** **NII International Internship Program** (6 month)
  National Institute of Informatics, ***Sokendai****, Japan*

RESEARCH EXPERIENCE:

- **2019/22** **(Candidate) PhD in Physics at CURL, University of Louvain** ***(Belgium)***
  Supervisors: **Christophe Ringeval** (UCLouvain), **Sebastien Clesse** (ULB)
  Topic: *Inhomogeneous Early Universe cosmology*
  Keywords: Inflation, Reheating, Primordial black holes, Numerical-GR

- 2016/19	**Research assistant at the Institute of Neuroscience and Medicine (INM-6), Juelich Research Centre** ***(Germany)***
	Lab PI: **Sonja Gruen** (FZ-Juelich)
	Topic: *Neuronal activity during active visual sensing*
	Keywords: Neural data analysis, visual cortex, electrophysiology, spike-sorting
- 2013/14	**Internship researcher at the National Institute Informatics, Tokyo**, ***(Japan)***
	Lab PI: **Tim Byrnes** (currently at NYU Shanghai)
	Topic: *Negative Wigner function light from exciton-polariton systems.*
	Keywords: Continuous-Variables Quantum Computing, Quantum optics

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:

- 2020	**Advances in Computational Relativity workshop**
	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
Status:	Single
Languages:	Native in Catalan and Spanish, Proficiency in English
	Intermediate level in French 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:

1. Joana, C. (2021) "Higgs inflation in full general relativity: Preinflation and preheating with auxiliary field coupling", *(in-progress)*

2. LISA Collaboration (2021), "Recent Primordial Black Hole scenarios and their gravitational-wave signatures", *(in-progress)*

3. Ito, J., Joana, C., Yamane, Y. Fujita, I., Tamura, H, Maldonado, P., Gruen, S. (2021), "Neuronal activity during active visual sensing: latency shortening with enhanced sparseness and responsiveness", *(in-progress)*

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

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

GIVEN AND CONTRIBUTED TALKS:

***** (Underline names refers to the author who gave the talk)

- *The inhomogeneous pre-inflationary era: A numerical relativity approach*
  Cristian Joana, Sebastien Clesse
  GRChombo workshop '20, Oxford University, Oxford, UK, 2nd December 2020

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

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

- *Layer specific modulation of response latency in V1 under active and passive viewing conditions*
  Junji Ito, Cristian Joana, Yukako Yamane, Pedro Maldonado, Sonja Grün
  EITN workshop, Paris, France, 26th November 2019

- *Activity of visual cortex neurons differs between passive stimulation and active free viewing*
  Junji Ito, Cristian Joana, Yukako Yamane, Pedro Maldonado, Sonja Grün
  ECVP, Leuven , Belgium, 28th August 2019

- *GR-Hidrodynamics (perfect fluid) simulations with GRChombo*
  Cristian Joana
  GRChombo workshop '19, KCL, London, UK, 11th June 2019

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

- *Neural correlates in macaque V1 and IT during active and passive vision*
  Cristian Joana, Junji Ito, Yukako Yamane, Pedro Maldonado, Sonja Grün
  Universidad de Chile, BNI - Neurosistemas, Santiago de Chile, Chile

- *Steady-state generation of negative Wigner function light with exciton-polaritons*
  Cristian Joana, Peter van Loock, Hui Deng, Tim Byrnes
  Quantum Manipulations of Atoms and Photons 2015, Shanghai, China, 27th Oct 2015

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