

CURRICULUM VITAE

CRISTIAN JOANA

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PROFILE:

I am cosmology PhD student at UCLouvain 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 originated backreactions from inhomogeneities in 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), a open source numerical relativity code that I use for my simulations. I am also a member of the LISA working group for primordial black holes.

In the past, from 2016 to 2019, I engaged in Neuroscience research in Prof. S. Gruen lab (INM-6) in the Juelich Research center. I contributed the data analysis of the Active-Vision project (collaboration still ongoing).

ACADEMIC RECORDS:

- **2019/22** **PhD in Physics (FRNS - FRIA)**
at IRMP, CP3/CURL, University of Louvain, 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 Physics, mention in Fundamental Physics**
at Autonomous University of Barcelona (UAB), Catalonia.

SCIENTIFIC GRANTS AND AWARDS:

- **2020** **ICERM visiting grant** (3 months),
National Science Foundation and ICERM's Federal funds, NSF, USA
- **2019/21** **FRIA grant** (bourse de doctorat),
Fonds de la Reserche Scientifique, FRS-FNRS, Belgium

RESEARCH EXPERIENCE:

- **2019/22** **PhD in Physics (FRNS - FRIA) at Cosmology, Universe and Relativity at Louvain (CURL), University of Louvain (Belgium)**
Supervisors: **Christophe Ringeval** (UCLouvain), **Sebastien Clesse** (ULB)
- **2016/19** **Research assistant at the Institue of Neuroscience and Medicine (INM-6), Juelich Research Centre (Germany)**
Lab PI: **Sonja Gruen** (FZ-Juelich)
Topic: *Neuronal activity during active visual sensing: latency shortening with enhanced sparseness and responsiveness.*
Keywords: Neural data analysis, Macaque electrophysiology, spike-sorting

- **2013/14** **Internship researcher at the National Institute Informatics, Tokyo, (*Japan*)**
 Lab PI: **Prof. Tim Byrnes** (currently at NYU Shanghai)
 Topic: *Steady-state generation of negative Wigner function light using feedback in exciton-polariton systems.*
 Keywords: Continuous-Variables Quantum Computing, Quantum optics

TEACHING EXPERIENCE:

- **2020** **Tutor in Quantum Mechanics II** (UCLouvain)
- **2019** **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** **Advanced Neural Data Analysis (ANDA'17) summer school**
 at Juelich Research Center, Juelich (Germany)
- **2016** **Workshop ‘Cosmology after Planck: what is next?’**
 at Ecole de Physique des Houches (*France*)
- **2015** **WE-Heraeus-Seminar: Continuous Variable Entanglement in**
 Atomic Systems: Fundamentals and Applications at Bad Honnef
 (*Germany*)
- **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
- ICT Skills: Debian GNU/Linux based Operative Systems, Microsoft Windows.
 Programming in C/C++ and Python, *Mathematica*TM, *LaTeX*
- Hobbies: Reading, playing chess, traveling and hiking.

LIST OF PUBLICATIONS:

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

- *The inhomogeneous pre-inflationary era: A numerical relativity approach*
Cristian Joana, Sebastien Clesse
GRChombo workshop '20, Oxford University, Oxford, 2nd December 2019
- *Graviational waves from the inhomogeneous pre-inflationary era*
Cristian Joana, Sebastien Clesse
Belgian Graviational Wave Seminars, KU-Leuven, Leuven, 25th November 2019
- *The inhomogeneous pre-inflationary era*
Cristian Joana, Sebastien Clesse
Advances in Computational Relativity, ICERM, Brown University, US, 12th November 2019
- *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 viewin*
Junji Ito, Cristian Joana, Yukako Yamane, Pedro Maldonado, Sonja Grün
ECVP, Leuven, Belgium, 28th August 2019
- *Inhomogeneous scalar field dynamics and backreactions in non-conformally flat spacetimes*
Cristian Joana, Sebastien Clesse
GRChombo workshop '19, Queen Mary University of London, London, 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 11th May 2015