



CURRICULUM VITAE (CVA)

Part A. PERSONAL INFORMATION

CV date 12-10-2022

| | | | |
|--|-------------------------|----------------------------|---|
| First name | JOSE JUAN | | |
| Family name | BLANCO-PILLADO | | |
| Gender | MALE | Birth date (dd/mm/yyyy) | |
| e-mail | josejuan.blanco@ehu.eus | URL Web | http://tp.lc.ehu.es/earlyuniverse/ |
| Open Researcher and Contributor ID (ORCID) (*) | 0000-0003-2260-9047 | | |

A.1. Current position

| | | | |
|-------------------|--|----------------|--|
| Position | IKERBASQUE RESEARCH PROFESSOR | | |
| Initial date | 1/9/2012 | | |
| Institution | IKERBASQUE & UNIV. OF THE BASQUE COUNTRY (UPV/EHU) | | |
| Department/Center | DEPARTMENT OF PHYSICS | | |
| Country | SPAIN | Teleph. number | |
| Key words | Cosmology, Topological Defects, Cosmic Strings, String Theory, Inflation, Vacuum Decay | | |

A.2. Previous positions (research activity interruptions, art. 14.2.b))

| Period | Position/Institution/Country/Interruption cause |
|-------------|---|
| 2001 - 2003 | Research Associate/ DAMTP, Cambridge U./ UK |
| 2003 - 2006 | Postdoctoral Fellow/ New York Univ./ USA |
| 2006 - 2012 | Assistant Professor/ Tufts University/ USA |
| 2012 - 2012 | Associate Professor/ Tufts University/ USA |

A.3. Education

| PhD, Licensed, Graduate | University/Country | Year |
|---------------------------------|--|------|
| Undergraduate degree in Physics | Universidade de Santiago de Compostela (Spain) | 1995 |
| PhD | Tufts University | 2001 |

Part B. CV SUMMARY (max. 5000 characters, including spaces)

- Ph.D. thesis supervised and ongoing: 4 .

- Handhika Ramadhan, “*Higher dimensional defects in cosmology*”, Tufts Univ., 2011.
- Konstantinos Metallinos, “*Numerical Explorations of the String Theory Landscape*”, Tufts Univ., 2013.
- Mikel Urkiola, “*Characterisation of vacua of the String Theory Landscape*”, Nov. 2021.
- Daniel Jimenez-Aguilar, “*The dynamics of realistic Field Theory Solitons*”, 2023.

- Total number of papers: 69 total, 64 (published in Q1 journals).

- Total number of citations: 3025 (From Inspire-HEP).

- h-factor: 26 (From Inspire-HEP).

I obtained my B.Sc. in Physics from the University of Santiago de Compostela in 1995 obtaining the First National Physics Undergraduate Award (Primer Premio Nacional de Terminación de Estudios de Física) from the Ministry of Science and Education. I defended my undergraduate thesis (tesina) in Santiago under the supervision of Prof. Enrique Zas in



June 1997 obtaining as well the Outstanding Undergraduate Award (Premio Extraordinario de Licenciatura).

In 1997 I moved to Tufts University to complete my Ph.D. under the supervision of Prof. Alexander Vilenkin in May of 2001. Later that year, I obtained a Research Associate position at the Department of Applied Mathematics and Theoretical Physics at Cambridge University where I worked for 2 years before moving to NYU where I became a James Arthur Postdoctoral Fellow at the Center for Cosmological and Particle Physics for the next 3 years.

In 2006 I obtained a position at Tufts University as a tenure track Assistant Professor at the Institute of Cosmology.

In 2012 I was awarded tenure and became Associate Professor at Tufts.

In 2012 I obtained an Ikerbasque Professorship and moved to the Department of Theoretical Physics in the University of the Basque Country where I am currently located.

During my research career I have worked on several aspects of Cosmology of the Early Universe focusing on extracting the observational implications of some of the new ideas coming from Fundamental Physics models with the ultimate goal of learning something about the high energy physics frontier.

In particular, I have worked extensively on the idea of topological defects. These objects (domain walls, strings, monopoles, etc) could have been produced in the Early Universe in many extensions of the Standard Model or String Theory. As part of my work I have been involved in the development of a computer simulation for the evolution of a network of cosmic strings that has allowed us to reach a much larger dynamic range than any other study on this subject and hence we have obtained the most accurate picture of the network of strings to date. This has positioned us well to obtain new results that will have direct implications to the observational effects of these networks, in particular for the gravitational wave spectrum expected from these strings.

I have also been very interested in understanding the implications of an inflationary period and its connection to models of fundamental physics beyond the Standard Model. In particular, I have worked on cosmological scenarios inspired by String Theory where the existence of a multitude of vacua, the String Theory Landscape, can play a significant role. Finding observational consequences in this context is very challenging and in my view we still have a very limited knowledge of these new ideas in cosmology. My main interest in this field is focused in trying to uncover any phenomena in this context that could lead to any distinctive signatures of the Landscape.

Part C. RELEVANT MERITS (*sorted by typology*)

C.1. Publications

1. Exciting the Domain Wall Soliton

J.J. Blanco-Pillado, D. Jimenez-Aguilar and J. Urrestilla
JCAP 01 (2021) 027.

2. Towards a complete mass spectrum of type-IIB flux vacua at large complex structure

J.J. Blanco-Pillado, K. Sousa, M. Urkiola and J. Wachter
JHEP 04 (2021) 149.

3. Slepian models for Gaussian Random Landscapes

J.J. Blanco-Pillado, K. Sousa and M. Urkiola
JHEP 2005, (2020), 142.

4. Flyover vacuum decay

J.J. Blanco-Pillado, Heling Deng and A. Vilenkin
JCAP 1912, (2019), 001.

5. Gravitational back-reaction near cosmic string kinks and cusps

J.J. Blanco-Pillado, K. D. Olum and J. Wachter
Phys.Rev.D 98 (2018) 12, 123507 .

6. Inflation in Random Landscapes with two energy scales

J.J. Blanco-Pillado, A. Vilenkin and M. Yamada



JHEP 1802, (2018), 130.

7. New limits on cosmic strings from gravitational wave observation

J.J. Blanco-Pillado, X. Siemens, K. D. Olum
Phys. Lett. B778, (2018), 392.

8. Bubbles of Nothing and Supersymmetric Compactifications

J.J. Blanco-Pillado, B. Shlaer, K. Sousa, J. Urrestilla
JCAP 1610 (2016), 10, 002.

9. The number of cosmic string loops

J.J. Blanco-Pillado, K. D. Olum and B. Shlaer
Phys. Rev. D89 (2014) 2, 023512.

10. Large parallel cosmic string simulations: New results on loop production

J.J. Blanco-Pillado, K.D. Olum and B. Shlaer,
Phys. Rev. D83 (2011) 083514.

C.2. Congress

- Carguese School 22, Rethinking Beyond the Standard Model, Jul. 2022 (Lectures).
- Remnants of the Big Bang, Arizona State University, USA, Jan. 2020. (Invited talk).
- Topological Science Symposium, Keio University, Japan, Nov. 2019. (Invited talk).
- XI CPAN Days, Oviedo, Spain, Oct. 2019. (Invited talk).
- Cosmological Probes of BSM, Benasque, May, 2018. (Invited talk).
- Theoretical Cosmology Meeting, Leiden, April 2018. (Invited talk).
- Cosmic Strings @Brazil, Sao Carlos, Brazil, Feb., 2016. (Invited talk).
- IV Meeting on Fundamental Cosmology, Barcelona, June, 2016. (Invited talk).
- Fourth COSPA Meeting, University of Mons, Belgium, May, 2015. (Invited talk).
- Fine Tuning, Anthopics and the String Landscape, IFT, Spain, Oct. 2014. (Invited talk).
- Cosmic Strings 2014, Arizona, US, Feb., 2014. (Invited talk).

C.3. Research projects

Title: “Early Universe Cosmology and Fundamental Physics”

Funding Agency: Ministerio de Ciencia, Innovación y Universidades, PID2021-123703NB-C21.

Principal Investigator: J.J. Blanco-Pillado (UPV/EHU).

Level of funding: 257.730 euros.

Duration: 2022-2025.

Role: Principal Investigator.

Title: “Early Universe Cosmology and High Energy Physics”

Funding Agency: Ministerio de Ciencia, Innovación y Universidades, PGC2018-094626-B-C21.

Principal Investigator: J.J. Blanco-Pillado (UPV/EHU).

Level of funding: 124.630 euros.

Duration: 2019-2021.

Role: Principal Investigator.

Title: “Early Universe Cosmology probes to high energy physics and quantum field theory methods”

Funding Agency: Ministry of Economy and Competitivity, FPA2015-64041-C2-1-P

Principal Investigator: J.J. Blanco-Pillado (UPV/EHU).

Level of funding: 53.361 (44.100) euros.

Duration: 2016-2018.

Role: Principal Investigator.

Title: “Aspects of String Theory Cosmology”

Funding Agency: U.S. National Science Foundation (NSF), 0969910

Principal Investigator: J.J. Blanco-Pillado (Tufts University).

Level of funding: \$60.000

Duration: 2010-2013.

Role: Principal Investigator.



Title: “String Theory Cosmology”

Funding Agency: U.S. National Science Foundation (NSF), 0653361

Principal Investigator: J.J. Blanco-Pillado (Tufts University).

Level of funding: \$60.000

Duration: 2007-2010.

Role: Principal Investigator.

Title: “Cosmic String Network Simulation and Analysis”

Funding Agency: U.S. National Science Foundation (NSF), 1213930.

Principal Investigator: Ken D. Olum (Tufts University).

Level of funding: \$50.000

Duration: 2012-2015.

Role: co-Principal Investigator.

C.4. Contracts, technological or transfer merits

Institutional responsibilities, memberships of scientific societies...

- Editor for Journal of Cosmology and Astroparticle Physics (JCAP).
- Referee for PRL.; PRD, JHEP, JCAP, PL B and Classical and Quantum Gravity.
- Reviewer for the National Science Foundation (NSF) in the US; the Spanish National Evaluation Agency (ANEP, Spain) and INFN (Italy).
- Member of TheoryNet, an outreach program that pairs physics faculty in the Boston Area with High School teachers to organize a series of lectures for the students. (2006-2012).
- Member of the Ph. D. Committee for M. Frob (Barcelona), 2013, C. Asensio (Zaragoza), 2014, J. Wachter (Tufts), 2017, H. Deng (Tufts), 2019, M. Jain (2020), N. Triantafyllou (Barcelona), 2021, Feng Low, Auckland, New Zealand (2021).
- Director of the Academic Steering Committee of the Masters Program, UPV/EHU.

Postdocs supervised (last few years): V. Atal, J. Frazer, S. Kanno, K. Sousa, J. Wachter, A. Marcos-Caballero, J. M. Queiruga, B. Shlaer.

Outreach:

- “La Energía Oscura”, contribution to the book entitled “50 años divulgando Ciencia y Tecnología”, UPV/EHU, Bilbao, 2020.
- Popular talks on Relativity and Gravitational Waves, Zientziateka Series, Bilbao, 2015 -16.
- “A Orixe do Big Bang”, popular talk, Facultade de Ciencias, Univ. de A Coruña, 2014.
- Organizer of popular talks in Bilbao by Roberto Emparan (2019), Alexander Vilenkin (2017), Lisa Randall (2014).

Awards:

- **First National Physics Undergraduate Award** (*Primer Premio Nacional de Terminación de Estudios de Física*), Spanish Ministry of Science, 1995.
- **Outstanding Undergraduate Award** (*Premio Extraordinario de Licenciatura*), University of Santiago de Compostela, 1997.
- **Outstanding Academic Achievement Award**, Tufts University, 2000.

Other comments:

- Associate Member of NANOGrav.
- Member of the OSB for the Einstein Telescope.
- Member of LISA Consortium and the LISA cosmology working group.
- Member of the theory group for JPAS experiment.
- Member of the Foundational Questions Institute (FQXi).