



Part A. PERSONAL INFORMATION

CV date

19/01/2024

First and Family name	Francisco Rivas García		
Social Security, Passport, ID number	76439693K	Age	33
Researcher codes	Open Researcher and Contributor ID (ORCID**)	0000-0002-6664-4744	
	SCOPUS Author ID (*)		
	WoS Researcher ID (*)		

(*) Optional

(**) Mandatory

A.1. Current position

Name of University/Institution	Universidad Loyola		
Department	Department of Quantitative Methods		
Address and Country	Avda. de las Universidades s/n, Dos Hermanas, Sevilla, España, CP: 41704		
Phone number	+34 664401338	E-mail	frivas@uloyola.es
Current position	Personal Docente Investigador. Universidad Loyola Andalucía	From	10/01/2022
Key words	Physics, Mathematics, Data Analysis, Gravitational Waves		

A.2. Education

PhD, Licensed, Graduate	University	Year
University Degree in Physics	Universidad de Granada (Spain)	2014
Master's Degree in Physics and Mathematics	Universidad de Granada (Spain)	2015
Master's Degree in Teacher Training for ESO, Baccalaureate, FP and Language Teaching	Universidad Alfonso X el Sabio (Spain)	2020
PhD in Physics	Universidad Autónoma de Barcelona (Spain)	2019

A.3. General indicators of quality of scientific production (see instructions)

- Number of cites: 1032 (Web of Science).
- Total number of papers in first quartile (JCR): 22.
- h-index: 14 (Web of Science).
- **1 "Sexenio de investigación", 2023.**

Part B. CV SUMMARY (max. 3500 characters, including spaces)

The work at LISA Pathfinder and LISA as a member of the scientific team, together with the previous knowledge received during the Bachelor of Physics and the Master of Physics and Mathematics, have helped me to acquire skills in the field of scientific data analysis, as well as knowledge fundamentals in experimental research in Physics and technological development. During the operations phase of LISA Pathfinder, which had its epicenter at ESOC (European Space Operations Center) located in Darmstadt (Germany), I had a unique experience working with very high-level scientists and engineers. In addition, this allowed me to lead the development and analysis of various experiments, such as the thermal experiments of the optical window, or the analysis of thermomechanical distortions.

In addition, during my doctoral thesis I had the opportunity to spend three months at the Max Planck Institute for Gravitational Physics (Albert Einstein Institute). During this stay we carried

out, in their laser interferometry laboratories, experiments similar to those carried out in flight and that affected the LISA Pathfinder laser system and will affect LISA.

In the Department of Physics at the University of Trento, my activity as a postdoctoral researcher has focused on the study and development of key components for LISA. Using the torsion pendulum I have carried out experiments that validate several of the requirements established for LISA. In addition to the said pendulum, these facilities have a capacitive sensor similar to those that LISA Pathfinder contained and those that LISA will contain. This component is key to the observation of gravitational waves in space.

I am currently a member of the Department of Quantitative Methods at Loyola University, where I apply the experience gained in both data analysis and laboratory experimentation. I am still involved in various projects related to the development and study of LISA. I also teach Mathematics, Statistics, and Physics.

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

C.1. Publications (*selection*)

(25) "Tilt-to-length coupling in LISA Pathfinder: A data analysis", M. Armano et al., *Physical Review D* 108 (10), 102003 (2023).

(24) "Charging of free-falling test masses in orbit due to cosmic rays: Results from LISA Pathfinder", M. Armano et al., *Physical Review D* 107 (6), 062007 (2023).

(23) "Sensor noise in LISA Pathfinder: An extensive in-flight review of the angular and longitudinal interferometric measurement system", M. Armano et al., *Physical Review D* 106 (8), 082001 (2022).

(22) "Transient acceleration events in LISA Pathfinder data: Properties and possible physical origin", M. Armano et al., *Physical Review D* 106 (6), 062001 (2022).

(21) "Sensor Noise in LISA Pathfinder: In-Flight Performance of the Optical Test Mass Readout", M. Armano et al., *Physical Review Letters* 126 (13), 131103 (2021).

(20) "In-flight testing of the injection of the LISA Pathfinder test mass into a geodesic", D. Bortoluzzi et al., *Advances in Space Research* 67 (1), 504-520 (2021).

(19) "Spacecraft and interplanetary contributions to the magnetic environment on-board LISA Pathfinder", M. Armano et al., *Monthly Notices of the Royal Astronomical Society* 494 (2), 3014-3027 (2020).

(18) "Analysis of the accuracy of actuation electronics in the laser interferometer space antenna pathfinder", M. Armano et al., *Review of scientific instruments* 91 (4) (2020).

- (17) "Temperature stability in the sub-milliHertz band with LISA Pathfinder", M. Armano et al., *Monthly Notices of the Royal Astronomical Society* 486 (3), 3368-3379 (2019).
- (16) "Novel methods to measure the gravitational constant in space", M. Armano et al., *Physical Review D* 100 (6), 062003 (2019).
- (15) "Micrometeoroid events in LISA Pathfinder", JI Thorpe et al., *The Astrophysical Journal* 883 (1), 53 (2019).
- (14) "LISA Pathfinder Performance Confirmed in an Open-Loop Configuration: Results from the Free-Fall Actuation Mode", M. Armano et al., *Physical Review Letters* 123 (11), 111101 (2019).
- (13) "LISA Pathfinder micronewton cold gas thrusters: In-flight characterization", M. Armano et al., *Physical Review D* 99 (12), 122003 (2019).
- (12) "Forbush Decreases and <2 Day GCR Flux Non-recurrent Variations Studied with LISA Pathfinder", M. Armano et al., *The Astrophysical Journal* 874 (2), 167 (2019).
- (11) "LISA Pathfinder Platform Stability and Drag-free Performance ", M. Armano et al., *Physical Review D* 99 (8), 082001 (2019).
- (10) "Experimental results from the ST7 mission on LISA Pathfinder ", G. Anderson et al., *Physical Review D* 98 (10), 102005 (2018).
- (9) "Precision Charge Control for Isolated Free-Falling Test Masses: LISA Pathfinder Results", M. Armano et al., *Physical Review D* 98 (6), 062001 (2018).
- (8) "Calibrating the system dynamics of LISA Pathfinder ", M. Armano et al., *Physical Review D* 97 (12), 122002 (2018).
- (7) "Characteristics and energy dependence of recurrent galactic cosmic-ray flux depressions and of a forbush decrease with LISA Pathfinder ", M. Armano et al., *The Astrophysical Journal* 854 (2), 113 (2018).
- (6) "Measuring the Galactic Cosmic Ray flux with the LISA Pathfinder radiation monitor", M. Armano et al., *Astroparticle Physics* 98, 28-37 (2018).
- (5) "Beyond the Required LISA Free-Fall Performance: New LISA Pathfinder Results down to 20 μ Hz", M. Armano et al., *Physical Review Letters* 120 (6), 061101 (2018).

(4) "Capacitive sensing of test mass motion with nanometer precision over millimeterwide sensing gaps for space-borne gravitational reference sensors", M. Armano et al., *Physical Review Documents* 96, 062004 (2017).

(3) "Charge-Induced Force Noise on Free-Falling Test Masses: Results from LISA Pathfinder", M. Armano et al., *Physical Review Letters* 118, 171101 (2017).

(2) "Constraints on LISA Pathfinder's self-gravity: design requirements, estimates and testing procedures", M. Armano et al., *Classical and Quantum Gravity* 33, 235015 (2016).

(1) "Sub-femto-g Free Fall for Space-Based Gravitational Wave Observatories: LISA Pathfinder Results", M. Armano et al., *Physical Review Letters* 116, 231101 (2016).

C.2. Research projects

Project "Development of sub-millihertz magnetic sensing techniques and in-orbit operations of the MELISA-III experiment in the first nanosatellite of the H2020 IOD/IOV programme."

Financ. entity Ministry of Science and Education

Length //2023 to

PI Dr. Ignacio Mateos

Project "Contribución española a LISA: desarrollo del sistema de diagnóstico y explotación científica."

Financ. entity Ministry of Science and Education

Length //2023 to

PI Dr. Miquel Nofrarias

Project "Disorders of Consciousness (DoC): enhancing the transfer of knowledge and professional skills on evidence-based interventions and validated technology for a better management of patients" (Ref. F62F17000290005)

Financ. entity European Commission

Length 01/01/2018 to 31/12/2021

PI Prof. Alejandro Galvao Carmona

Funds 78850 €

Project "ASI LISA PF fase A" (Ref. F62F17000290005)

Financ. entity Agenzia Spaziale Italiana (ASI)

Length 25/11/2019 to 10/01/2022

PI Prof. William Joseph Weber & Prof. Rita Dolesi

Project "Gravitational Wave Astronomy - LISA Group" (Ref. 2017-SGR-1469)

Financ. entity AGAUR, Catalan Government

Length 01/01/2018 to 30/09/2021

PI Dr. Carlos F. Sopuerta

Funds 20 000 €

Project "Spanish Contribution to LISA, ESA's L3 mission" (Ref. ESP2017-90084-P)

Financ. entity Ministry of Economy, Industry and Competitiveness of Spain

Length 01/01/2018 to 31/12/2020

PI Dr. Carlos F. Sopuerta

Funds 302 000 €

Project "From LISA Pathfinder to ESA's L3 mission: Towards the Gravitational Waves Astronomy from Space" (Ref. ESP2015-67234-P)

Financ. entity Ministry of Economy and Competitiveness of Spain

Length 01/01/2016 to 31/12/2017

PI Dr. Carlos F. Sopuerta & Dr. Miquel Nofrarias

Funds 264 600 €

Project "Topical Network on Gravitational Waves" (Ref. FPA2015-69815-REDT)

Financ. entity Ministry of Economy and Competitiveness of Spain

Length 01/01/2016 to 31/12/2017

PI Dr. Carlos F. Sopuerta

Funds 25 000 €

Project "Development and Exploitation of the LISA Pathfinder mission and contributions to The Gravitational Universe and STE-QUEST" (Ref. ESP2013-47637-P)

Financ. entity Ministry of Economy and Competitiveness of Spain

Length 01/10/2014 to 31/12/2016

PI Prof. Jordi Isern & Dr. Carlos F. Sopuerta

Funds 440 000 €

C.3. Contracts, technological or transfer merits

C.4. Software registration

C.5. International conferences

Talk "2nd International Forum on Physics and Astronomy (AstronomyForum2022)", November 14-15, 2022, Valencia (Spain).

-Given talk: "Preparing LISA with Flight Tests and the Torsion Pendulum".

Talk "The 14th International LISA Symposium", July 25-29, 2022, Virtual conference.

-Given talk: "Thermo-elastic and thermo-optical effect on-board LISA Pathfinder".

Talk "Gravitational Wave Next", January 12-14, 2022, Peking University.

- Given talk: "Preparing LISA with LISA Pathfinder and the torsion pendulum".

Poster "22nd International Conference on General Relativity and Gravitation and 13th Edoardo Amaldi Conference on Gravitational Waves", July 8-12, 2019, Valencia (Spain).

- Contributed poster: "Temperature-induced effects on LISA Pathfinder: Thermoelastic and thermo-optical effects".

Talk "9th Iberian Gravitational Wave Meeting", June 3-5, 2019, Santiago de Compostela (Spain).

- Given talk: "Data and Diagnostics Subsystem onboard the LISA Pathfinder mission".

Talk "LISA Consortium Meeting", from April 29 to May 1, 2019, Gainesville (Florida).

- Given talk: "Thermo-elastic and thermo-optical effects on LTP's IFO".

Talk "LISA Pathfinder Results", September 11-13, 2018, Trento (Italy).

- Given talk: "Thermo-elastic and thermoo-ptical effects on LTP's IFO".

Poster "12th International LISA Symposium", July 8-13, 2018, Chicago (United States).

- Contributed poster: "Thermo-elastic and thermo-optical effects on LTP's IFO".

Talk "7th Iberian Gravitational Wave Meeting", May 15-17, 2017, Bilbao (Spain).

- Given talk: "Thermal effects onboard the LISA Pathfinder mission".

Poster "11th International LISA Symposium", September 5-9, 2016, Zurich (Switzerland).

- Contributed poster: "Optical Window thermal experiment onboard LISA Pathfinder".

Talk "6th Iberian Gravitational Wave Meeting", April 11-14, 2016, Madrid (Spain).

- Given talk: "Thermal Experiments in LISA Pathfinder".

C.8. Research stays (selection)

Stay at Università degli Studi di Trento, Dipartimento di Fisica, Trento (Italy). Dates: 05/07/2023 – 26/07/2023.

Stay at g.tec medical engineering GmbH, Schiedlberg (Austria). Dates: 01/01/2023 – 31/01/2023

ERASMUS+ Stay Grant, Università degli Studi di Trento, Dipartimento di Fisica, Italy. Dates: 08/07/2022 – 22/07/2022.

Postdoctoral position (Assegno di ricerca), Università degli Studi di Trento, Dipartimento di Fisica, Italy. Dates: 25/11/2019 – 09/01/2022.

Stay at the Max Planck Institute for Gravitational Physics, Albert Einstein Institute, AEI, Hannover (Germany). Dates: 17/07/2017 – 17/10/2017.

M. Armano et al. (2019). Temperature stability in the sub-milliHertz band with LISA Pathfinder. *Monthly Notices of the Royal Astronomical Society*, 486 (3), 3368-3379. Q1

M. Armano et al. (2019). LISA Pathfinder Performance Confirmed in an Open-Loop Configuration: Results from the Free-Fall Actuation Mode. *Physical Review Letters* 123 (11) , 111101. Q1

M. Armano et al. (2020). Spacecraft and interplanetary contributions to the magnetic environment on-board LISA Pathfinder. *Monthly Notices of the Royal Astronomical Society* 494 (2), 3014-3027. Q1

M. Armano et al. (2021). Sensor Noise in LISA Pathfinder: In-Flight Performance of the Optical Test Mass Readout. *Physical Review Letters* 126 (13), 131103. Q1

M. Armano et al. (2023). Charging of free-falling test masses in orbit due to cosmic rays: Results from LISA Pathfinder. *Physical Review D* 107 (6), 062007. Q1