

Part A. DATOS PERSONALES

Fecha del CVA 08/09/2025

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A.1. Situación profesional actual

Puesto	Doctor FC3		
Fecha inicio	2022		
Organismo/ Institución	Instituto de Física Corpuscular		
Departamento/ Centro	Física nuclear experimental/Instituto de Física Corpuscular		
País	España	Teléfono	+34658281997
Palabras clave	s-process; neutron capture; alpha induced reaction; detector development; Hadron-range verification		

A.2. Situación profesional anterior

Periodo	Puesto/ Institución/ País / Motivo interrupción
2025 - 2026	DOCTOR FC3 / Instituto de Física Corpuscular / España
2022 - 2025	Juan de la Cierva-Incorporación / Instituto de Física Corpuscular / España
2019 - 2022	DOCTOR FC3 / Instituto de Física Corpuscular / España
2018 - 2019	Postdoctoral Fellowship / Università degli Studi di Napoli, Federico II / Italia
2012 - 2016	Beca FPI / CIEMAT / España

A.3. Formación Académica

Grado/Master/Tesis	Universidad/Pais	Año
Doctor	Universidad Complutense de Madrid	2017
Master	Universidad de Granada	2012
Licenciado en Física	Universidad de Granada	2011

Parte B. RESUMEN DEL CV

Main Scientific Contributions

Throughout my research career as a nuclear physics scientist I have actively participated in several interrelated topics within international scientific collaborations such as [n_TOF](#), [LUNA](#), and MANY. My contributions are summarized in the following lines:

1. Time-of-flight (n, γ) Cross-section Measurements Relevant to the s- and r-Astrophysical Processes and Nuclear Technology

I am an active member of the CERN-[n_TOF](#) collaboration, serving as either a spokesperson or a key contributor to [high-impact](#) experiments for [nuclear astrophysics](#) and [nuclear energy](#) applications. My work also includes experimental [setup characterization](#), improvement, and [detector development](#)s. I have contributed to several cutting-edge technical developments necessary for accurate (n, γ) cross-section measurements, including novel [dead-time](#) and pile-up corrections, as well as the characterization and proposal of current and [future \(n, \$\gamma\$ \)](#) experimental setups. This research is supported by funded projects, including NAKT, *detCOM* (as Principal Investigator), and *BINGO* (as Principal Investigator). Additionally, I am

deeply involved in the *PRTR-CERN-n_TOF* funded project managed by César Domingo, which includes the acquisition and construction of a unique stilbene-d12 detector array for (n,γ) measurements. The design and PoC detector tests are summarized in my related [publication](#). In this line, I proposed and developed the first C_6D_6 [prototype](#) read by SiPM matrix for (n,γ) . I have contributed to innovative [ML](#) techniques for background suppression in (n,γ) cross-section measurements. I have also contributed to the fission tagging technique for measuring (n,γ) in fissile isotopes and the analysis of the $^{235}U(n,\gamma)$ measurement at *n_TOF*. The data from this work is included in ENDF/B-VIII as a collaboration with [IAEA-CIELO](#). In addition, I have proposed several experiments at other worldwide international facilities such as [NFS](#), [Gelina](#) and [Back-n](#).

2. (α,n) Cross-section Measurements Relevant to the s- Astrophysical Process

I have contributed to the key reactions measurement for the s-process, such as $^{13}C(\alpha,n)$ and $^{22}Ne(\alpha,n)$, within the framework of the [LUNA](#) collaboration. Specifically, for $^{13}C(\alpha,n)$, I was responsible for developing data processing and [background suppression](#) techniques in 3He counters—an essential step for reaching astrophysical energies. I participated in other technical aspects critical for the control of systematics such as [target degradation](#) and [setup characterization](#). For $^{22}Ne(\alpha,n)$, I worked developing a neutron tagging demonstrator as a preparatory step for the [SHADES](#)-ERC project, where I also participated in initial MC simulations. Currently, I am involved in the MANY collaboration, where I develop complementary detectors for measuring excited levels contributing to (α,n) reactions.

3. Hadron Range Verification for Real-time In-beam Treatment Monitoring

I am currently developing a novel in-beam, hybrid [Prompt y-ray Imaging and PET](#) system with sub-millimetric precision derived from the [HYMNS](#)-ERC project. In addition of leading several experimental campaigns for such development, I have some of the specific technical contributions to the technique, mostly derived from HYMNS-ERC, are reflected on [GPU-based imaging](#) and ML algorithms for [background rejection](#), initially applied to the HYMNS-ERC project and later extended to this research line. I have led several experiments in this area at various facilities, including CNA-Seville in where a [PoC experiment](#) was carried out, HIT-Heidelberg using a Synchrotron, WPE-Essen with a Cyclotron, and IBA-Reading with a Superconducting Cyclotron. In this regard, I am also deeply involved in ERC-PoC/MICIN-PoC related projects to medical physics.

Contributions to Society

I am part of the invention team for a patent that has led to an ERC-PoC project. Additionally, our research team collaborates closely with UCIE-IFIC and CSIC to facilitate knowledge transfer to society, working with private LIDAX-EOS with a funded contract (As Principal Investigator). Along these lines, I serve as the technical lead for an agreement without funds between IMSKE, CANON, and CSIC to develop an AI application focused on the automatic detection of injuries in knee MRI scans.

Training of Young Researchers/Evaluation

During my recent postdoctoral years, I co-supervised Victor Babiano's Ph.D. thesis on $^{80}Se(n,\gamma)$ reactions and i-TED developments. He currently holds a Margarita Salas grant at UPC, and we maintain close collaboration on Compton imaging applications. At the same time, I supervised a JAE-Intro student, Sergio Morell, on AI algorithms. I co-supervised two Master's theses: Lucía Sánchez, who focused on detector developments for radiotracers and Bernardo Bernardino with iTED, currently an FPI-funded Ph.D. student in our research group. Since 2022, I am supervising a Ph.D. student (Gabriel de la Fuente) focuses on innovative (n,γ) setups and conducting analysis on high-precision $^{209}Bi(n,\gamma)$ and $^{209m}Bi(n,\gamma)/^{209}Bi(n,\gamma)$ measurements at *n_TOF*, JRC-Geel and J-PARC. Furthermore, I regularly participate as a referee for various scientific journals, including *NIM-A*, *NPA*, *PRC EPJ-P*, *NETJOURNAL*, and *EPJ-A*.

Other contributions important for the current call

I have consistently been shortlisted as a reserve candidate in all Ramón y Cajal grant calls to which I have applied, reaching my highest ranking last year with position 86th at the national level. In parallel, I have successfully secured two competitive research projects and a contract with a private company as Principal Investigator, demonstrating both scientific leadership and the ability to attract external funding.

Parte C. LISTADO DE APORTACIONES MÁS RELEVANTES

C.1. Publicaciones más importantes en libros y revistas con “peer review” y conferencias. AC: autor de correspondencia; (n° x / n° y): posición del investigador

1. (1/11-AC) J. Balibrea-Correa et al., EPJ-P 140, 870 (2025).
[10.1140/epjp/s13360-025-06817-9] Proof-of-concept experiment results from PET-PGI hybrid system using protons, C, and alpha ions at HIT.
2. (1/136-AC) J. Balibrea-Correa et al., NIM-A 1072, 17010 (2025).
[10.1016/j.nima.2024.170110]. Design and commissioning of the state-of-the-art high sensitivity (n,γ) experimental setup at n_TOF EAR2 and future developments.
3. (1/135-AC) J. Balibrea-Correa et al., NIM-A 1064, 169385 (2024).
[10.1016/j.nima.2024.169385]. New methodology for dead time and pile-up corrections for Pulse Height Weighting technique, essential ingredient for (n,γ) cross-section determination.
4. (1/135-AC) J. Balibrea-Correa et al., EPJ WoC 279, 06004 (2023).
[10.1051/epjconf/202327906004]. Partial experimental results from the first measurement of ⁹⁴Nb(n,γ) cross-section measurement.
5. (2/5) J. Lerendegui, J. Balibrea-Correa et al., NSR 12, 2735 (2022).
[10.1038/s41598-022-06126-6]. Feasibility MC study of real-time proton range verification via Prompt-γ imaging using Compton Cameras.
6. (1/8-AC) J. Balibrea-Correa et al., EPJ-P 137, 1258 (2022).
[10.1140/epjp/s13360-022-03414-y] Experimental results from the first in-beam hybrid Compton/PET setup for hadron range verification experiments.
7. (1/135-AC) J. Balibrea-Correa et al., NIM-A 958, 164709 (2021).
[10.1016/j.nima.2020.164709] First C₆D₆ read using SiPM prototype for (n,γ) cross-section measurements.
8. (1/8-AC) J. Balibrea-Correa et al., NIM-A 1001, 16249 (2021).
[10.1016/j.nima.2021.165249] Development of position reconstruction algorithms in large monolithic LaCl₃(Ce) read by SiPM matrix aided by ML algorithms.
9. (1/8-AC) J. Balibrea-Correa et al., 2021 IEEE NSS/MIC 1 (2021).
[10.1109/NSS/MIC44867.2021.9875637] Development of ML algorithms to enhance Prompt-γ ray signal and background suppression for hadron therapy range verification.
10. (1/135) J. Balibrea-Correa et al., PRC 102, 044615 (2020).
[10.1103/PhysRevC.102.044615] Experimental results from the ²³⁵U(n,γ) cross section measurement at n_TOF.
11. (1/8-AC) J. Balibrea-Correa et al., NIM-A 906, 103 (2018).
[10.1016/j.nima.2018.07.086] Development of a novel pulse shape discrimination algorithm for high pressure ³He counters, essential ingredient for ¹³C(α,n) at astrophysical energies.

C.2. Congresos *CI* :conferencia invitada, *PO* :presentación oral, *P*: póster

1. [PO Nuclear Data for Science and Technology \(2025\)](#): “First $^{94}\text{Nb}(n,\gamma)$ cross-section measurement at the CERN nTOF facility”.
2. [PO 9th ANIMMA \(2025\)](#): “Hybrid Compton/PGL imaging for ion range monitoring in hadron therapy”.
3. [CI. EURO-LABS 3rd Annual Meeting \(2024\)](#): “High precision $^{209}\text{Bi}(n,\gamma)$ cross section measurement at n_TOF EAR2”.
4. [PO. Applied Nuclear Physics \(2024\)](#): “Radiotracers for the study of Marine and Oceanic Ecosystems. The REMO project”.
5. [PO. IV Jornadas RSEF/IFIMED de Física Médica \(2023\)](#): “First experimental hybrid Compton-PET imitating for ion-range monitoring in hadron therapy”.
6. [PO. Nuclear Physics in Astrophysics X \(2022\)](#): “First measurement of the ^{94}Nb neutron capture cross-section at the CERN n_TOF facility”.
7. [PO. IEEE Nuclear Science Symposium and Medical Imaging Conference \(2021\)](#): “Hadron Therapy Range Verification via Machine-Learning Aided Prompt-Gamma Imaging”.
8. [PO. Applied Nuclear Physics Conference \(2021\)](#): “First in-beam tests on simultaneous PET and Compton imaging aimed at quasi-real-time range verification in hadron therapy”
9. [PO 27th International nuclear physics conference \(2019\)](#): “Direct cross-section measurement of $^{13}\text{C}(\alpha,n)^{16}\text{O}$ in the s-process Gamow peak”.
10. [PO. Nuclear Data for Science and Technology \(2016\)](#): “Measurement of the neutron capture cross section of the fissile isotope ^{235}U with the CERN n_TOF total absorption calorimeter and a fission tagging based on micromegas detectors”.

C.3. Proyectos o líneas de investigación en los que ha participado, (*Proyecto (P)*, *Contrato (C)*, *Investigador principal (IP)*, *Equipo de Investigación (EI)*, *Equipo de Trabajo (ET)*, *Lugar (L)*).

1. **P. APRENDE-BINGO (IP)**: “ $^{209}\text{Bi}(n,\gamma)$ cross section measurement at n_TOF”. HORIZON-EUROATOM-2023-NRT-01-06. **IP**: J. Balibrea. **L**: IFIC. 01/10/2023 - 01/10/2026. Cuantía: 20.000 €. Responsibility: Supervision of the full project.
2. **P. AEI-NAKT (EI)**: “Nuclear Structure, Astrophysics and Knowledge Transfer”. **IP**: A. Tarifeño & C. Domingo. **L**: IFIC. 01/06/2023-01/06/2026. Cuantía: 470.250 €. Responsibility: (n,γ) cross section measurements at n_TOF and ML algorithms development.
3. **P. ERC-AMA (EI)**: “Advanced imaging system for Medical Applications”. ERC PoC #101137646. **IP**: C. Domingo. **L**: IFIC. 01/10/2023-01/10/2025. Cuantía: 150.000 €. Responsibility: Compton Imaging and ML algorithms development and implementation.
4. **P. ERC-GNVISION (EI)**: “Gamma-Neutron Vision aimed at improved cancer treatments in Hadron Therapy”. ERC-PoC #101113330 01/10/2023-01/10/2025. **IP**: C. Domingo. **L**: IFIC. Cuantía: 150.000 €. Responsibility: Compton Imaging and ML algorithms development and implementation.
5. **P. GVA-REMO (EI)**. “Radiotrazadores para el estudio de Ecosistemas Marinos y Oceánicos”. GVA-THINKINAZUL/2021/036. **IP**: B. Rubio. **L**: IFIC.01/01/2022 - 30/09/2025. Cuantía: 205.000 €. Responsibility: Detector prototype development and student supervision.
6. **P. GVA-DETCOM (IP)**. “Detectores complementarios modulares de nueva generación”. ASFAE/2022/027. **IP**: J. Balibrea & A. Algora. **L**: IFIC. 01/09/2022 - 01/09/2025. Cuantía: 299.586,5 €. Responsibility: Supervision of the full project.
7. **P. AEI-SINERGY4HT (EI)**. “Cámara Compton para verificación de rango en hadronterapia”. PDC2021-121536-C21. **IP**: C. Domingo. **L**: IFIC. 01/11/2021-01/11/2023. Cuantía: 150.000 €. Responsibility: Detector development, Compton Imaging algorithms and ML algorithms development.



8. **P. ERC-HYMNS (EI)**. “High-sensitivity Measurements of key stellar Nucleo-Synthesis reactions”.ERC-2015-CoG #681740. **IP**: C. Domingo. **L**: IFIC. 01/09/2019-31/05/2022.

Cuantía: 1.886.558 €. Responsibility: Detector prototype development and GPU-data processing.

9. **P. STAR (EI)**. “Development of a novel energy-sensitive, high efficiency neutron detector. Compagnia di San Paolo. **IP**: Andreas Best. **L**: Università degli studi di Napoli, Federico II.

01/01/2018-30/04/2019. Cuantía: 200.000 €. Responsibility: Detector prototype development.

10. **C. SISTAM**

(**IP**).”Sistema Avanzado de Monitorización de Infraestructuras Civiles”

15/04/2024-15/04/2025. **IP**: **J. Balibrea**. **L**: IFIC. Cuantía: 21.000 €. Responsibility:

Supervision of the full project.

C.4. Participación en actividades de transferencia de tecnología/conocimiento y explotación de resultados

1. **COCREA 2024**: “Sistema Avanzado de Monitorización Disruptivo de Estructuras Civiles basado en Radiación Ionizante (SISTAM)” Empresa: LiDAX-EOS. 1/01/2025 **IP**: C.Domingo.

2. **Contrato**: “NBLINA”: Access agreement for three years to the JRC-Geel. **IP**: **J. Balibrea**.

3. **Patente**: Jorge Lereñegui Marco; Javier Balibrea Correa; César Domingo Pardo; Luis Caballero Ontanaya; Víctor Babiano Suarez; Ion Ladarescu Paliván. P202030443.

DISPOSITIVO DE DETECCIÓN, IDENTIFICACIÓN, CUANTIFICACIÓN Y/O

LOCALIZACIÓN SIMULTÁNEA DE FUENTES DE RADIACIÓN GAMMA Y DE

NEUTRONES España. 21/12/2022. Consejo Superior de Investigaciones Científicas.