

# IPARCOS: INSTITUTO DE FÍSICA DE PARTÍCULAS Y DEL COSMOS

Ignazio Scimemi



# FOUNDATION AND OBJECTIVES

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 **IPARCOS WAS ESTABLISHED IN LATE 2018, EVOLVING FROM THE UPARCOS UNIT FOUNDED IN 2016.**

AÑO XV 20 de diciembre de 2018 BOUC n.º 28

 **THE FOUNDING GROUPS**

**I. DISPOSICIONES Y ACUERDOS DE LOS ÓRGANOS DE GOBIERNO DE LA UNIVERSIDAD COMPLUTENSE**

 **GAE:** HIGH ENERGY PHYSICS (EXP)

I.2. CONSEJO DE GOBIERNO

 **GFN:** NUCLEAR PHYSICS

I.2.2. Vicerrectorado de Planificación y Evaluación Institucional

 **GUAIX:** EXTRAGALACTIC AND INSTRUMENTAL ASTROPHYSICS

Acuerdo del Consejo de Gobierno de 18 de diciembre de 2018, por el que se aprueba la propuesta de creación del Instituto de Física de las Partículas y del Cosmos (IPARCOS), en los términos que se detallan en su Reglamento de Régimen Interno.

 **SEEF:** STELLAR SYSTEMS, SPECTROSCOPY AND PHOTOMETRY

 **TEFM:** EFFECTIVE THEORIES, PARTICLE PHYSICS AND COSMOLOGY

 **CORE OBJECTIVES**

 **STRENGTHEN INTERNAL RESEARCH GROUPS**

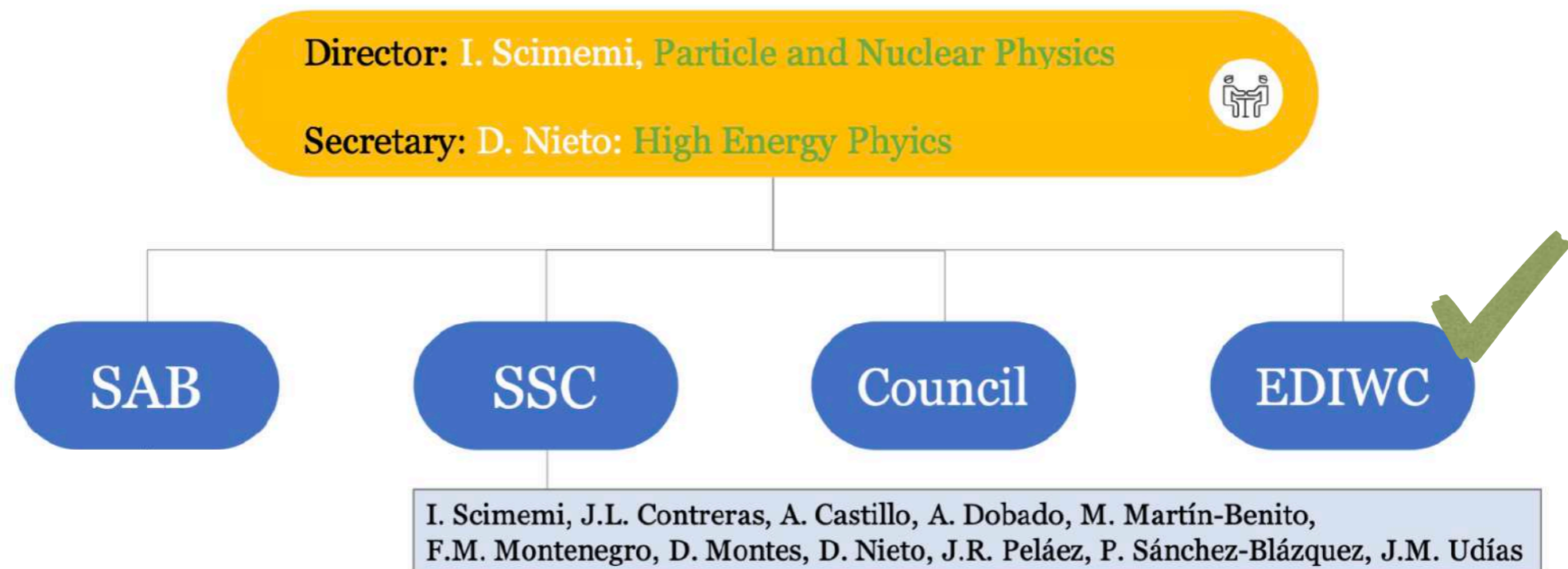
 **FOSTER SCIENTIFIC SYNERGIES AND COLLABORATION.**

 **COMPETE AND LEAD WITHIN THE INTERNATIONAL SCIENTIFIC COMMUNITY**

# RESEARCH AREAS AND ORGANIZATION

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- ◆ ASTROPHYSICS AND COSMOLOGY
- ◆ PARTICLE AND NUCLEAR PHYSICS
- ◆ SCIENTIFIC INSTRUMENTATION

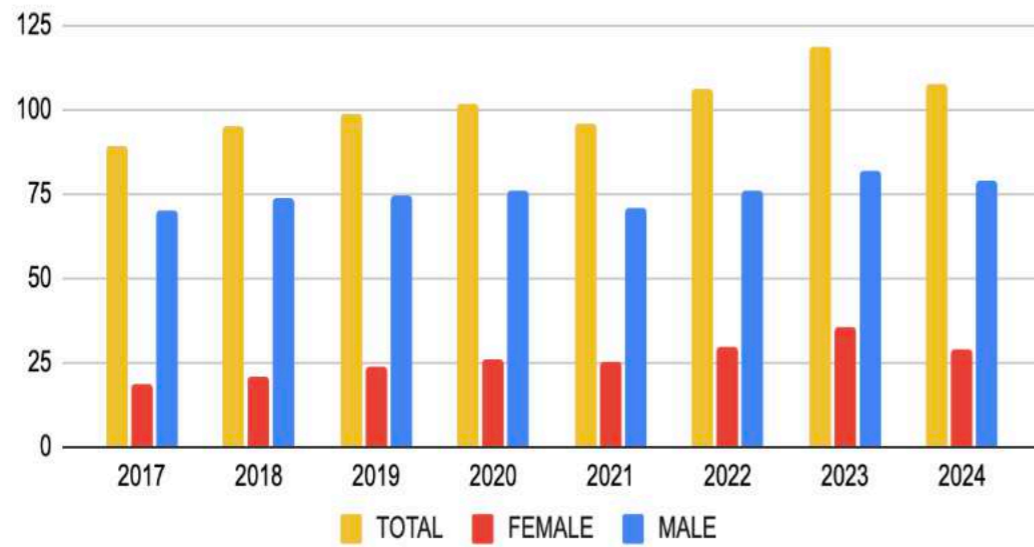


New entries: J.A. Barrio, J. Rubio

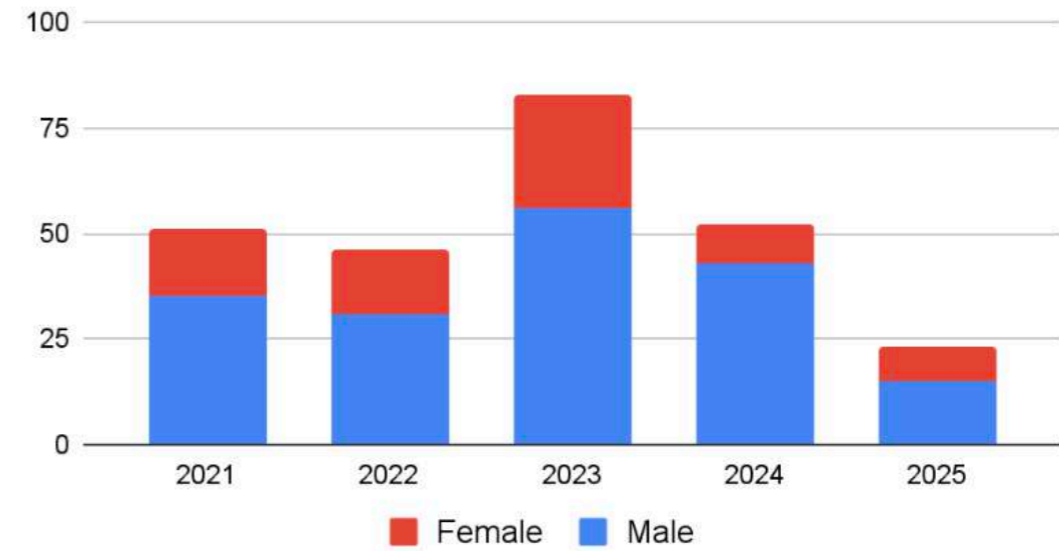
End of service: J. L. Contreras

# EQUALITY DIVERSITY INCLUSION WELFARE

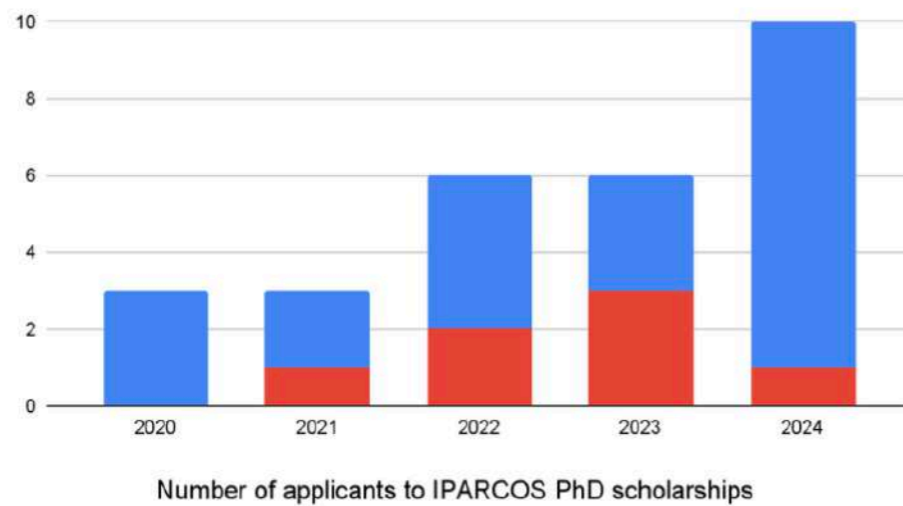
Evolution of the total number of IPARCOS members



Seminars / Colloquia

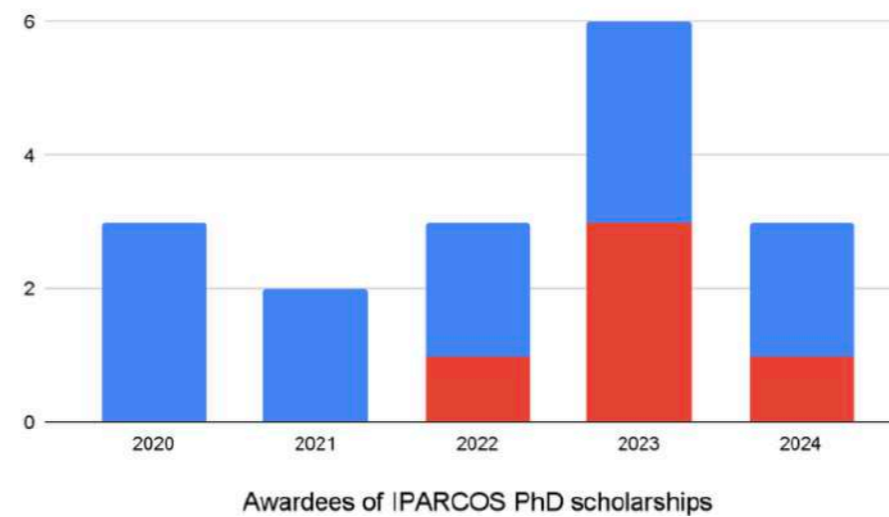


Male applicants Female applicants



Number of applicants to IPARCOS PhD scholarships

Male recipients Female recipients



Awardees of IPARCOS PhD scholarships

# EQUALITY DIVERSITY INCLUSION WELFARE

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6/5/26, 23:13



Safe Point of Contact | Instituto de Física de Partículas y del Cosmos



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## Institutos Universitarios

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### Safe Point of Contact

The current members in our Safe Point of Contact are Patricia Andrea Gutiérrez García, Paula Macías Pardo and María del Prado Martín Moruno.

Use this confidential form to contact the **Safe Point of Contact** for any issues related to Equity, Diversity, Inclusion, and Welfare (EDIW). We are committed to maintaining a safe environment for all members of IPARCOS. All submissions are **strictly confidential**, ensuring your privacy is protected. It can be submitted anonymously (while registration requires a valid email address for authentication purposes, we do not have access to it).

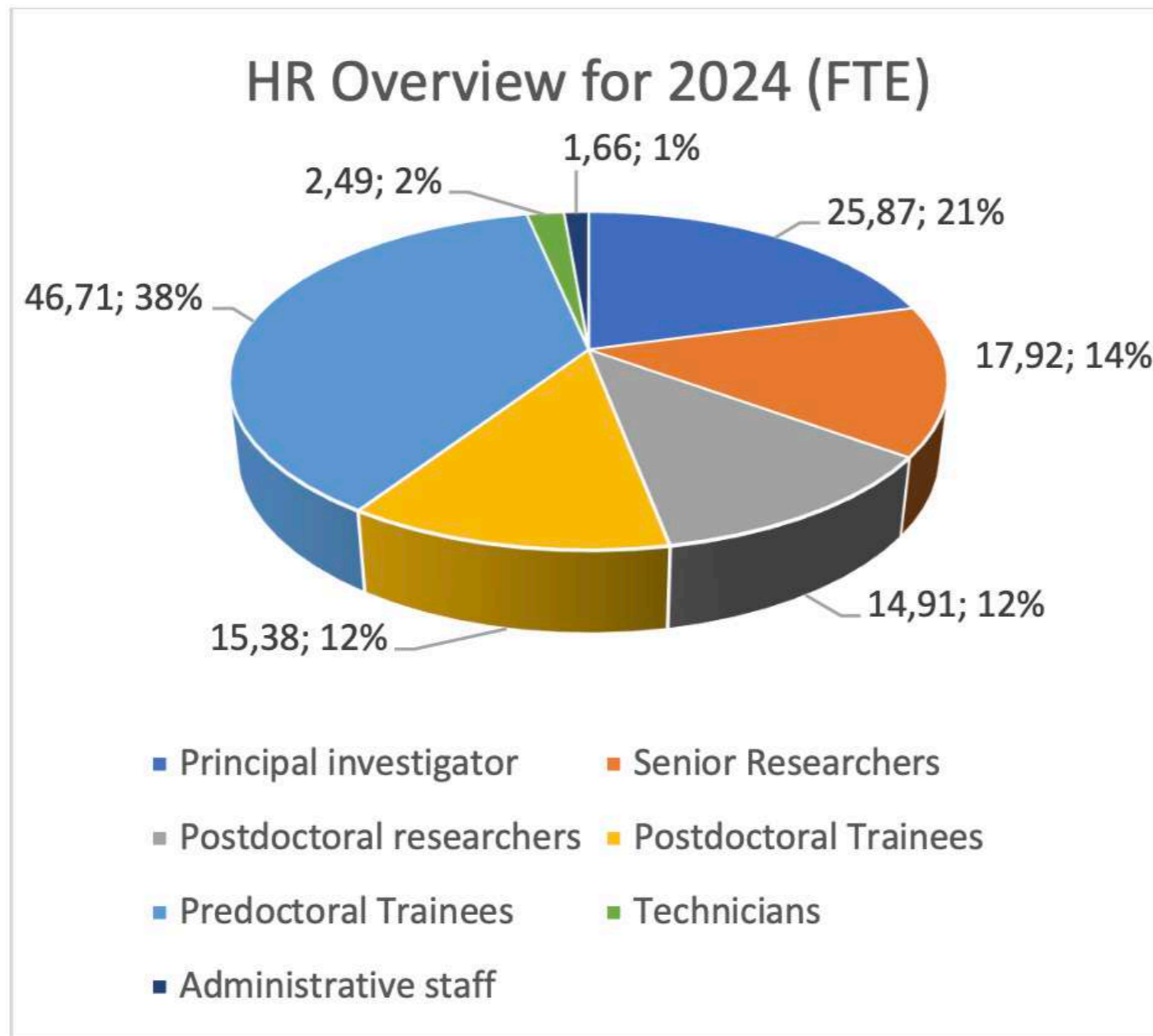
Para poder ver y enviar este formulario es necesario estar identificado en la Web.  
- Identificarse -

# PERSONNEL (DATA REFER TO 2024, LATEST UCM REPORT)

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◆ RESEARCHERS: 58 SENIORS, 48 PHD, ~20 TRAINEES/POSTDOCS

◆ WE TRACK THE NUMBERS

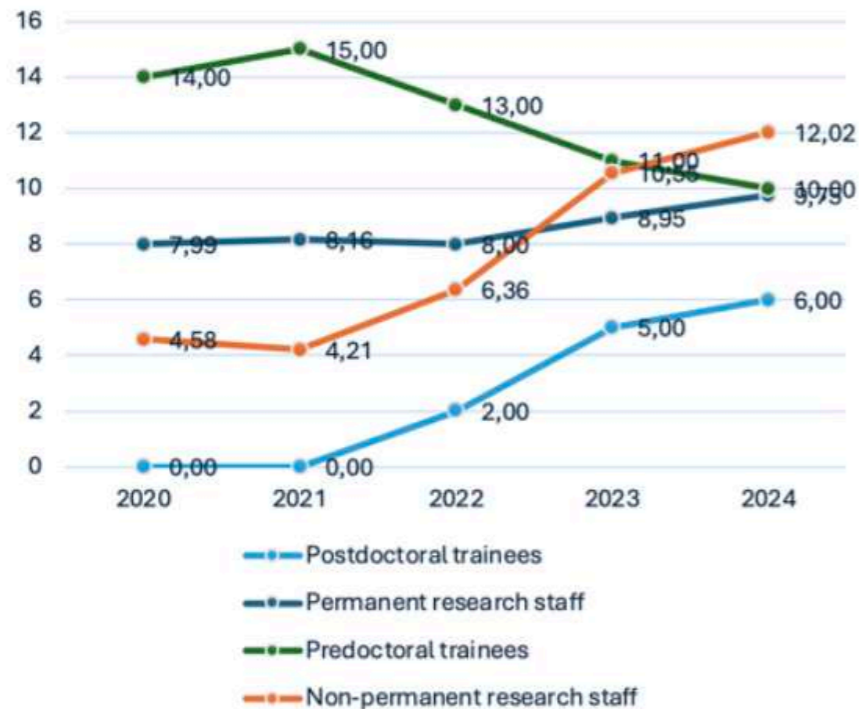


# PERSONNEL

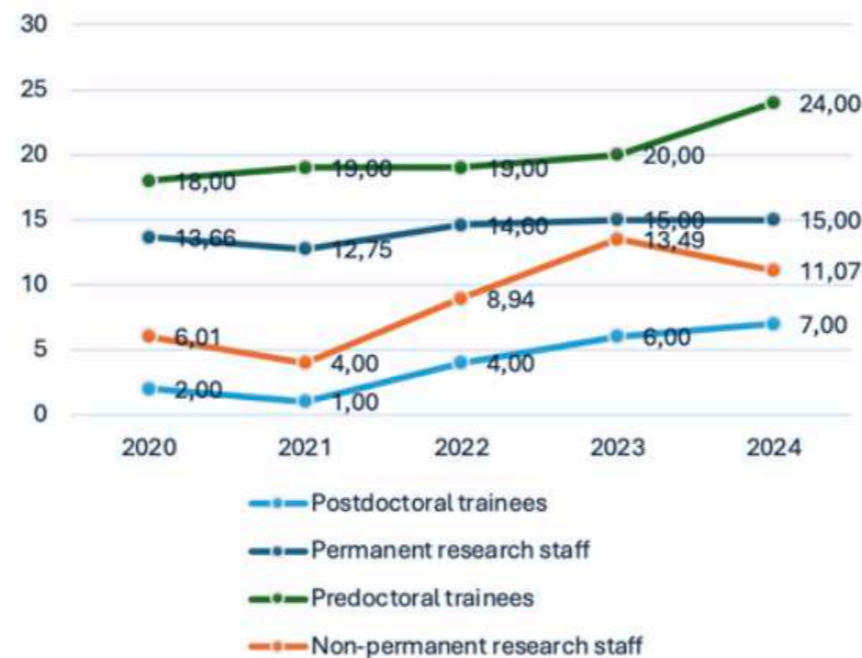
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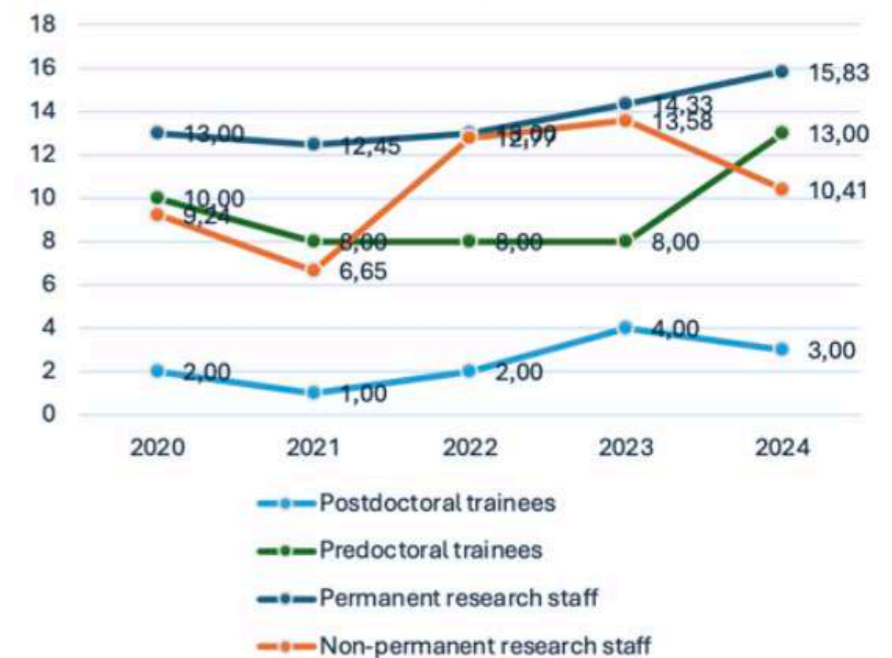
**Research staff evolution  
Area A: Cosmology & Gravitation**



**Research staff evolution  
Area B: Particle and Nuclear  
Physics**

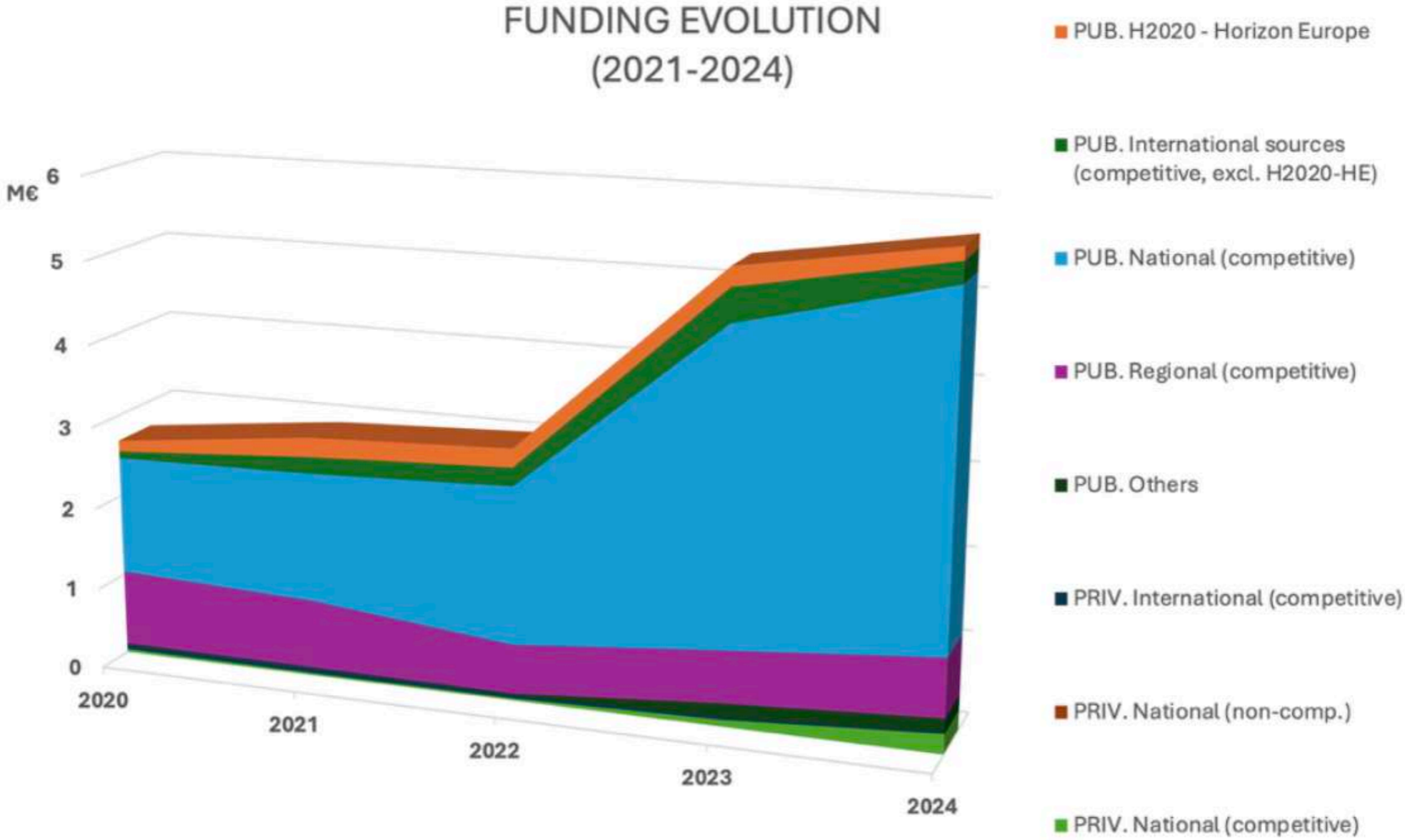


**Research staff evolution  
Area C: High Energy and  
Astrophysics**



# FUND RAISING, PUBLICACIONES, BENCHMARK

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# FUND RAISING, PUBLICACIONES, BENCHMARK

Comparison with institutes included in the MdM program

| Table 18: BENCHMARKING RESULTS           |                   |                   |                 |             |              |            |             |
|--|-------------------|-------------------|-----------------|-------------|--------------|------------|-------------|
|  | IPARCOS<br>(2023) | IPARCOS<br>(2024) | IGFAE<br>(2023) | IFAE (2023) | ICCUB (2021) | IAA (2023) | AVERA<br>GE |
| <b>INPUT</b>                             |                   |                   |                 |             |              |            |             |
| <b>Funding [M€]</b>                      | 5,2               | 5,6               | 5,2             | 12,1        | 4            | 8,85       | 7,5         |
| <b>Permanent staff</b>                   | 38                | 39                | 41              | 44          | 61           | 59         | 51          |
| <b>Total staff *</b>                     | 123               | 115               | 122             | 174         | 172          | 232        | 175         |
| <b>Women / Men</b>                       | 0,43              | 0,35              | 0,22            | 0,25        | 0,21         | 0,36       | 0,26        |
| <b>OUTPUT</b>                            |                   |                   |                 |             |              |            |             |
| <b>Publications</b>                      | 219               | 223               | 147             | 372         | 295          | 386        | 300         |
| <b>Q1 (%)</b>                            | 78%               | 92%               | 85%             | 82%         | 89%          | 87%        | 86%         |
| <b>D1 (%)</b>                            | 4%                | 32%               | 69%             | n/a         | 17%          | 6%         | 31%         |
| <b>Number of Ph.D theses presented</b>   | 17                | 9                 | 12              | 8           | 16           | 8          | 11,0        |
| <b>Ratios</b>                            |                   |                   |                 |             |              |            |             |
| <b>Publications / permanent staff</b>    | 5,8               | 5,7               | 3,6             | 8,5         | 4,8          | 6,5        | 5,9         |
| <b>Publications / total staff</b>        | 1,8               | 1,9               | 1,2             | 2,1         | 1,7          | 1,7        | 1,7         |
| <b>Funding / total staff [k€/person]</b> | 42                | 49                | 43              | 70          | 23           | 38         | 43          |
| <b>Publications / M€ funding</b>         | 42                | 40                | 28              | 31          | 74           | 44         | 40          |
| <b>Theses / permanent staff</b>          | 0,45              | 0,23              | 0,29            | 0,18        | 0,26         | 0,14       | 0,21        |

# ACTIVITIES



## ★ CICLES OF SEMINARS (MORE THAN 80 EACH YEAR)

- COLLOQUIA: MONTHLY
- SPECIALITY SEMINARS: WEEKLY
- JOURNAL CLUB: BI-WEEKLY, ALSO DONE BY SEVERAL GROUPS SEPARATELY

## ★ EVENTS (WORKSHOP, CONGRESS,...): 7-8 EACH YEAR (INCLUDING NATIONAL AND INTERNATIONAL)

## ★ DIVULGATION (SCIENCE WEEK, EVENTS, SOME PUBLICATIONS,...)



# ACTIVITIES

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\* **MASTER PRIZE**

\* **PHD PRIZE**

\* PHD CAMP IPARCOS

\* PARTICIPATION IN INTERNATIONAL NETWORKS FOR PHD SCHOOLS (IDPASC AND INTERNATIONAL COLLABORATION)

\* SOCIAL MEDIA (YOUTUBE, X, INSTAGRAM, LINKEDIN)

\* IPARCOS CONGRESS

\* ZENODO: PUBLIC CODES FOR SCIENCE

\* ACQUISITION OF SOFTWARE LICENSES FOR RESEARCH



# TAU-CM PROJECT (2021-25)

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- TAU-CM (TECNOLOGÍAS AVANZADAS PARA LA EXPLORACIÓN DEL UNIVERSO Y SUS COMPONENTES): THIS IS A PNRR PROJECT WHICH HAS INVOLVED ALL EXPERIMENTAL GROUPS OF THE INSTITUTE (356.097,50€+132.652,50€)
- LOOKING FOR NEW OPPORTUNITIES

# IPARCOS Strategic Plan (2026-2029)

## Cultivate a Vibrant and Inclusive Research Environment

### G1: Gravitational Waves & Multi-Messenger Astronomy

- CG1: GW generation in alternative gravity
- HE2: High-energy EM counterparts
- HE2: Binary black holes & GW background
- **B2.G3 AST3 – Cosmic Magnetism**
- Theoretical predictions + RM grid analysis with SKA/LOFAR
- **B2.G4 HEA2/AST5 – Dark Matter**
- HEA2: Indirect DM detection with CTAO
- AST5: Axion-like particle search via radio polarization
- **B2.G5 – AI for Theoretical Physics**
- CG2 & CG4: Solve non-perturbative equations with neural networks
- **B2.G6 PNP4 – Exotic Nuclear Structure**
- A1: Laser-polarized beta-decay spectroscopy
- A2: Shape coexistence in neutron-rich isotopes (ISOLDE@CERN)
- **B2.G7 PNP1 – QCD and Hadronic Structure**
- EFT-based factorization, Artemide code, ML-enhanced TMD fits

### AST4 Astrophysics Instrumentation

- A1. ELT MOSAIC, A2: TARSIS CAHA A2: TARSIS<sup>®</sup> CAHA
- A3: ARRAKIHS
- HE1 – High Energy-Instrumentation**
- PNP5 - Nuclear Instrumentation**
- HISTARS<sup>®</sup> CERN
- B2.G5 - Medical Instrumentation**
- A1: Photocoustic Intaging
- A3: Gamma MRITor brain Imaging

- **Human Resources & Governance**
- Open, merit-based hiring; EDIW-compliant
- Gender-balanced selection committees
- Resource allocation coordinated by Scientific Steering Committee
- **Infrastructure & Equipment**
- Upgrade CPU/GPU capacity
- Invest in edgeML hardware (FPGAs, NPUs, etc.)
- **Outreach & Training**
- Science outreach (media, public events, YouTube)
- IPARCOS Camp, scientific meetings, interdisciplinary seminars

Excelling in Scientific Discovery through Multidisciplinary Collaboration

Strengthen International Leadership in Technological Developments

Enhance Knowledge Transfer and Societal Impact

# THE LAST SLIDE

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My personal considerations:

- *Activities, funding and institutional structures has strengthened, although still improvable*
- *The research strategy of the institute should go beyond the MdM*
- *All initiatives are currently supported by a reasonably large set of people in the institute. This should be continued and reinforced.*

**THANKS**