

# CFP Working Groups

# The Unit makes use of Working Groups that cater to general aspects of its operation

Several common areas of the Unit are covered by a dedicated committee.

The current areas covered by these working groups are:

- Education and Training
- Equal Opportunities
- Outreach
- Trainee Staff Office
- Technology Transfer

# Education and Training

<http://cfp.ciemat.es/training>

Objective: **train young (prospective) researchers** in the needed technical, scientific and personal **skills to succeed** in their future professional lives.

- Focused on attracting and retaining talent at PhD and postdoc level, with a gender and equal opportunities perspective.
- Coordinated with other Working Groups (Equal Opportunities, Outreach, Trainee Staff Office).
- Educational activities also towards other CIEMAT colleagues (computing courses)

# We promote a strong connection with universities

Cooperation agreement with Spanish Universities: science departments and technological colleges.

**Our Offer:** internships, Master Thesis, Particle Physics Summer School (Phy6cool), seminars

Teaching and **lecturing** activities: Master in Theoretical Physics in U.Complutense de Madrid (UCM) and U. Autónoma de Madrid (UAM);

Members of **management bodies at Master level in UCM:** Coordination committee of Theoretical Physics Master and External Member for Quality Assessment committee

Mentoring of high school students in their last year (IES Las Musas Bachillerato de Investigación)

**Phy6cool** is a relatively new initiative that has promoted the visibility of our department: a 1-2 week experience for undergraduate students to get in touch with actual scientific work...

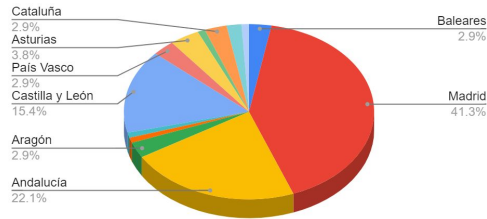
# Phy6cool has become a staple of our training activities



- Complementary education, a first glimpse on research on the field and projects we work on, motivating them for future involvement.
- On site hands-on and laboratory exercises, besides seminars on theoretical aspects and informal talks with doctoral students as well as experienced researchers.
- Receive applications from university students all over Spain



CCAA



# Training by immersion in international Collaborations

- Profit from **participation in international projects** at prestigious laboratories and facilities, with outstanding colleagues from most valuable universities and research centres: at scientific and technological level.
- PhD and young post-doc researchers:
  - support them in **taking responsibilities** according to their expertise in different aspects of scientific and technological work **in the collaborations**.
  - encourage participation in best specialized and up-to-date **schools and conferences** in the field.
- Our experienced researchers:
  - **mentor** foreign students
  - **lecture** in national and international Schools.
- Seminars Cycle: internal and external speakers

# Equal Opportunities

<http://cfp.ciemat.es/equality>

## Objectives:

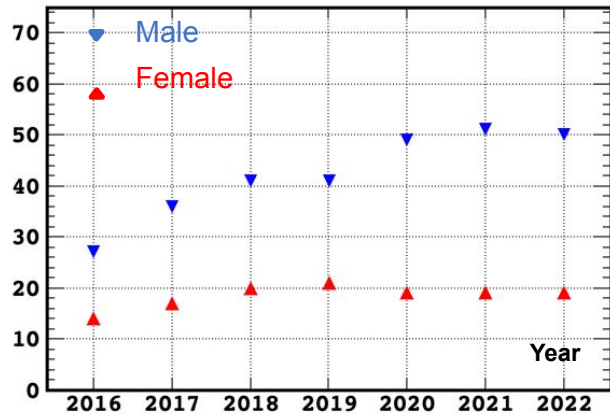
- **narrow the gender gap** in our Unit (fraction of female members, presence in governance boards, etc.)
- **promote gender equality** in STEM disciplines through institutional and cultural change (reducing gender bias, improving work-life balance, etc.)
- Tasks:
  - diagnosis and monitoring (collection of sex-disaggregated data and definition of gender equality indicators)
  - gender awareness-raising activities
  - promotion of STEM disciplines among school girls

# We have put emphasis on diagnosing and monitoring

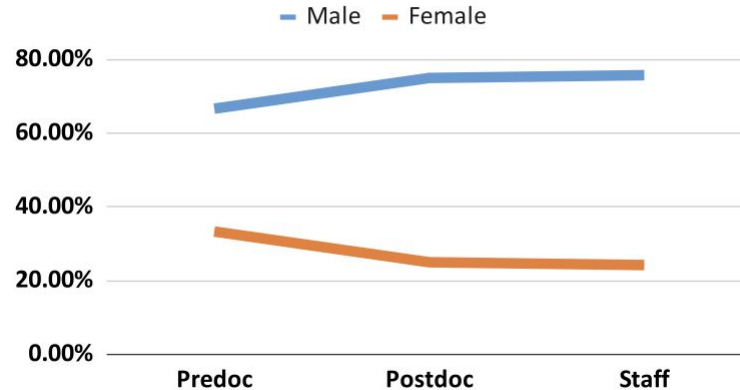
## Collecting sex-disaggregated data from 2016

- **Diagnosis of the gender gap**
- **Monitoring the effect of our activities and cultural and institutional situation**

Research personnel (number)



Research personnel (2022)

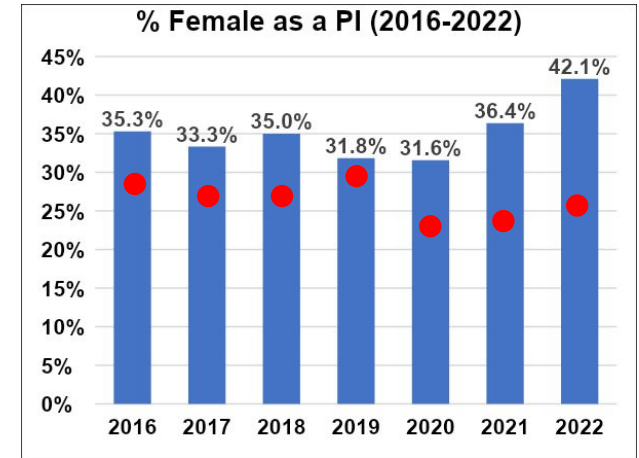
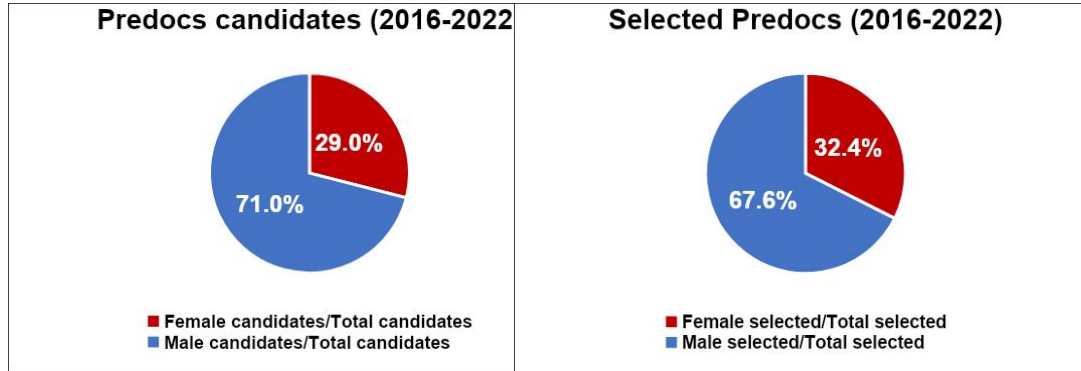




# We have put emphasis on diagnosing and monitoring

## Development of effective gender-equality indicators:

- Improved diagnosis and monitoring of the gender gap (measuring gender gap in access to resources and opportunities)
- Conducting assessment of procedures and practices to identify gender bias



We have identified the need of **attracting female researchers to our Unit.** The proposed programme to tackle this issue will be based on direct actions but also showing our good practices in the field.

● % of PhD female researchers

# Several gender awareness-raising activities have been promoted in 2021-23

Seminars, workshops and roundtables providing:

- **New perspectives**
- **Discussion fora**
- **Gender sensitive data and indicators**

Training of group members



# Outreach activities serve to change stereotypes

## Radio interviews



**Visibility of women researchers  
from primary school to university**



# Outreach

Objective: to serve as a channel for **transmitting scientific knowledge to the public.**

- Vocations: help shaping the scientists of tomorrow
- Scientific Culture: promote a society knowledgeable about the science that surrounds them
- Support for Educators: collaborate with the educational community to foster high-quality scientific education

# CFP has carried out a vast array of activities reaching thousands of people

IPPOG Particle Physics Masterclasses

CIEMAT / CPAN Series of High Schools Seminars

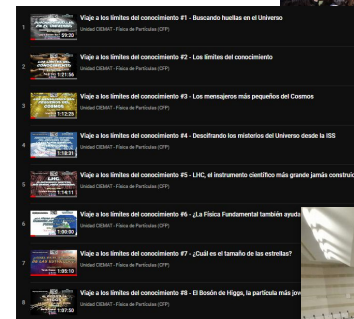
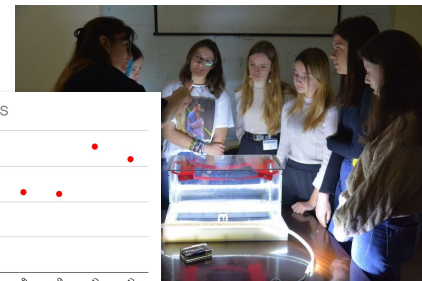
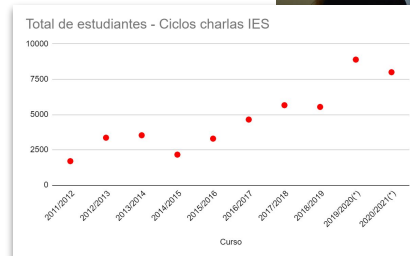
International Day of Women and Girls in Science (Feb 11th)

Science Week (November)

Journeys to the Frontiers of Knowledge

Phy6cool

Higgs10



# CFP has carried out a vast array of activities reaching thousands of people

Activities coordinated by CFP Outreach Group at national scale

CIEMAT / CPAN Researchers Night 2020 (online)  
Avenue of Physics (online)

## Other achievements

- Participation in other events organised by CIEMAT / CPAN etc, such as exhibits, 4<sup>o</sup>ESO + Empresa programme, fairs, etc.)
- Coordination and participation in CERN Training programmes for teachers
- Members of the Core team for the organisation of the CERN Open Days in 2019.
- Regular presence in media. Collaborators in radio programmes in the main radio stations in Spain (RNE / A hombros de Gigantes . SER / Serendipias etc.)



CERN - Martes 25/Ene/22

La vida en el más importante laboratorio de Física de Partículas al alcance de todos



Observatorio Astrofísico Roque de los Muchachos - NUEVA FECHA: 3/Feb/22

Pasea por uno de los observatorios astronómicos más importantes del mundo en la isla de La Palma



Experimento CMS - Jueves 27/Ene/22

Desciende con nosotros al experimento CMS del gran acelerador LHC, el mayor proyecto científico de la historia



Experimento AMS - Martes 1/Feb/22

Visita la sala de control del experimento AMS en la Estación Espacial Internacional y sísteme astronauta por un día



Plataforma de neutrinos del CERN - Miércoles 2/Feb/22

Descubre los últimos avances tecnológicos en desarrollo para futuros experimentos de neutrinos



Laboratorio Subterráneo de Canfranc - Jueves 3/Feb/22

Conoce desde dentro una de las instalaciones singulares de investigación en España, bajo los Pirineos



# CFP has taken the lead of outreach activities

**CFP has taken the leadership** at CIEMAT in the creation of initiatives that have been later used at a CIEMAT level.

CIEMAT since then has instituted a Scientific Outreach Unit, with the mandate to oversee the outreach policies and activities for all CIEMAT Departments and Territorial Centres. **The head of this Unit is a CFP member**, and other CFP researchers are taking leading roles in the coordination of numerous activities.

- a) Since November 2021 the **Spanish representative in the International Particle Physics Outreach Group (IPPOG) is a CFP researcher.**
- b) In 2022, **following our initiative, a Spanish Network for Particle Physics Outreach was created** in coordination with CPAN. Currently this network is serving as a forum for information exchange and sharing of resources.

# Trainee Staff Office

Objective: to welcome and **support new staff in training positions.**

- This office was **created in 2022, in response to the last review** from the Panel.
- Composed of **five rotating members** (2 from the trainee personnel, 1 administration representative, 2 from the Unit's permanent staff).
- **Modeled after successful implementations** and experience in international collaborations we participate in.
- Committee meets monthly, or more often as needed



# The Trainee Staff Office has carried out several initiatives since its inception

- Establishment of confidential communication channels, including anonymous forms
- Creation of a welcoming process for new training personnel
- Creation of Best Practices recommendations for students and advisors
- Annual survey passed to trainees
- Addressing and discussing general requests from the trainee personnel
- Address advisor-student conflicts with a tiered strategy

# The Trainee Staff Office has run two annual surveys to date

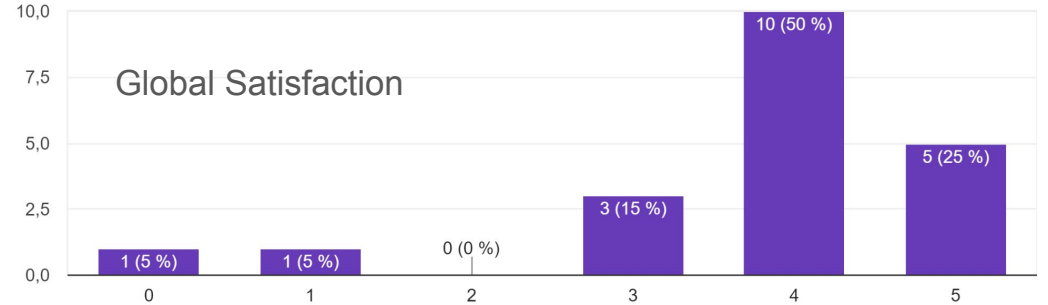
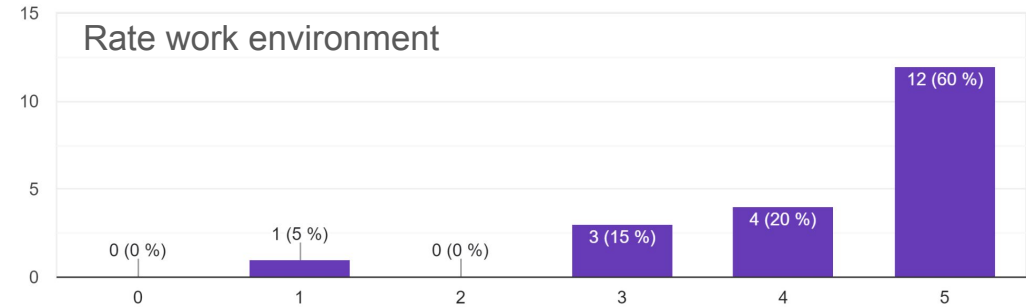
Very good participation  
(~90%)

Moderate general  
satisfaction with results

Specific cases being  
addressed

Identified needs, concerns  
(training, hiring process)

2022 results



# Technology Transfer

<http://cfp.ciemat.es/transferecia-de-tecnologia>

Objective: pursue intensively the **potential industrial returns** of the activities we work on, being actively in contact with private companies.

We conduct Technology Transfer in **all our technological areas**:

- detector construction,
- mechanical and electronic designs,
- online software or computing infrastructure

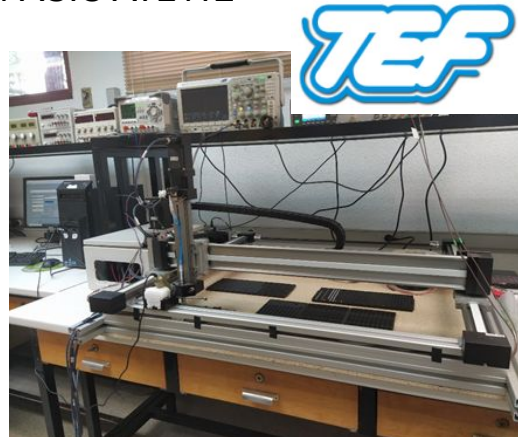
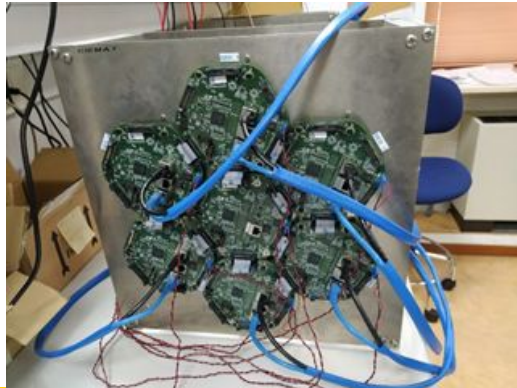


+ Open Hardware initiative to disseminate engineering knowhow openly to the society

# Scientific service provision contracts

Active technology and knowledge transfer to industries in the construction of CTA

- **Ramem-Arquimea:** technical advice for the construction of the camera mechatronics, cooling system and electronics for clock distribution and trigger for LST
- **TEF:** technical assistance and automatic testbench for the quality control of the trigger ASIC ATL1v2



# Knowledge transfer around SiPMs for cryogenic operation



## SiPM development in collaboration with Hamamatsu and FBK:

- New cryogenic sensors fulfilling the DUNE requirements
- Appropriate to be used in X-ARAPUCAs

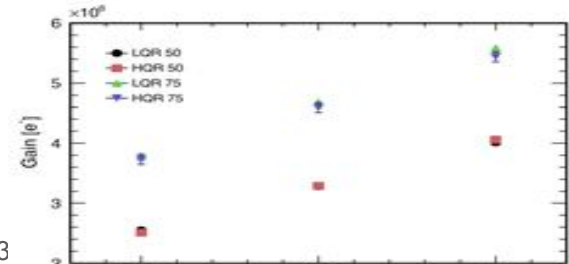
## Characterization and cryo reliability tests of standalone SiPMs and groups of 6 sensors per PCB (ganging mode):

- ✓ At room T and after 20 thermal cycles in LN<sub>2</sub>
- ✓ IV-curves, gain, S/N, DCR, cross-talk, afterpulses
- ✓ Individual and ganged tests

Improvement of the performance of SiPMs in collaboration with Hamamatsu Photonics K. K. (HPK) and Fondazione Bruno Kessler (FBK)

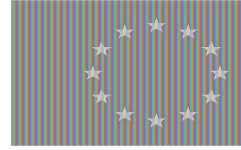


Agreement prepared with Hamamatsu to carry out a specific measurement of the detection efficiency of HPK SiPMs under ultraviolet light and cryogenic temperatures in the CIEMAT laboratories.



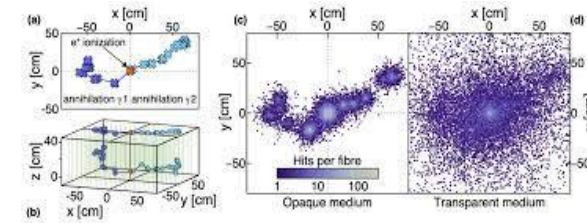
# Innovation projects

## EIC-PathFinder: AM-OTech 800 k€



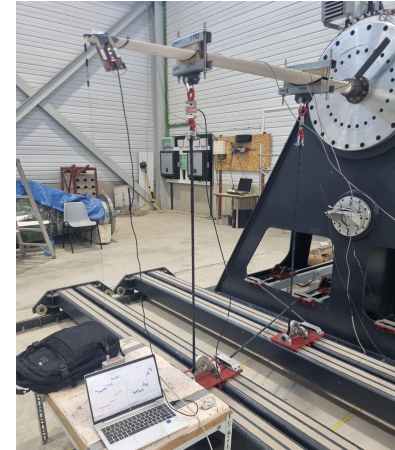
Co-funded by  
the European U

- European Innovation funding for breakthrough technology
- Collaboration with the nuclear industry, partnership with EDF (Électricité de France S.A.)
- Antineutrinos as a direct probe into the functioning of industrial nuclear reactors



## Proof of Concept AEI: Fibrometer 80 k€

- Instrumentation for civil engineering: innovative system based on optical fibers for measuring large structures deformation.
- Exploration of several forms of licensing. Non disclosure agreement signed with Fiberco
- Collaborations with CIEMAT's Eolic Unit and IMDEA materials



# Artificial Intelligence Technology Transfer

Collaboration with companies and centers for applying Machine Learning algorithms to the optimization of different processes

- **GREENFIELD:** Olive oil production predictions for the olive oil production with the company Greenfield
- **CONAFE:** phenotype and genotype in Holstein Friesian cattle raising.
- Oncology unit from the **Hospital 12 de Octubre** AI and XAI for phenotypes in ovarian cancer. New PhD student in 2024.
- “Proyectos de Transición Ecológica y Transición Digital» with the **University of Seville:** prediction of charging stations distribution on traffic congestion, air-quality, carbon footprint and electric grid usage.



Collaboration agreement with **Aerin S.L.** for the validation of their Machine Learning software (AITENEA) using as metrics parts of our CMS Muon Trigger algorithm



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- Outreach
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- Technology Transfer

**CFP has taken the initiative and leadership at CIEMAT on these items.**

**The activities of these WGs have improved our working environment and our visibility.**