IFIC@FCC: some history

Vasiliki A. Mitsou

FUTURE CIRCULAR COLLIDER

FCC Open Day

IFIC, 16 April 2026

First MoU (2014)

- MoU signed by Michael Benedikt (CERN) and Juan Fuster (IFIC/CSIC)
- By IFIC directorate request (F. Botella)
- IFIC FCC contacts:
  - Juan Fuster (2014-2022)
  - Vasiliki Mitsou (2022-2026)
- Contacts participated in FCC Collaboration Board meetings

https://fcc-global-collaboration-working-group.web.cern.ch/Spain

- *IFIC CSIC-UV*, Paterna
  - Memorandum of Understanding signed on 07 September 2014

MoU Future Circular Collider

July 22, 2014

Memorandum of Understanding for the Future Circular Collider (FCC) Study hosted by CERN

THE INSTITUTES, LABORATORIES, UNIVERSITIES AND THEIR FUNDING AGENCIES AND OTHER SIGNATORIES OF THIS MEMORANDUM OF UNDERSTANDING AND CERN AS THE HOST LABORATORY ("the Participants")

Whereas

At a dedicated session of the CERN Council held on 30 May 2013, the Council adopted the Update of the European Strategy for Particle Physics which included *inter alia* the following statement:

"…Europe needs to be in a position to propose an ambitious post-LHC accelerator project at CERN by the time of the next Strategy update, when physics results from the LHC running at 14TeV will be available. CERN should undertake design studies for accelerator projects in a global context, with emphasis on proton-proton and electron-positron high-energy frontier machines. These design studies should be coupled to a vigorous accelerator R&D programme, including high-field magnets and high-gradient accelerating structures, in collaboration with national institutes, laboratories and universities worldwide."

Some recent IFIC contributions to reports

"Future Circular Collider Feasibility Study Report: Physics, Experiments, Detectors" (PED), vol. 1, *Eur.Phys.J.C* 85 (2025) 1468

- leptophilic *Z'* bosons
- FCC note on BSM in angular correlations
- QCD with τ leptons
- high-order calculations
- …

Important contributions to:

- **Accelerator R&D** → talk by Daniel Esperante
- **Detector R&D** → talk on detector EoI for FCC (submitted to ESPPU)

"ECFA Higgs, electroweak, and top Factory Study," Yellow Report, CERN-2025-005 (2025), *input to European Strategy for Particle Physics Update*

- Editor Section 5 *EW/QCD* – Adrián Irles
- Editor Section 6 *Top Physics* – Marcel Vos
- Contributions to top, BSM, …
  - quantum information meets HEP *Eur.Phys.J.Plus* 140 (2025) 855
  - ttbar threshold scan *JHEP* 11 (2025) 020
  - leptophilic *Z'* bosons *Phys.Rev.D* 111 (2025) 035029
  - constraints on top-quark operators *JHEP* 10 (2025) 156
  - gauge-Higgs unification models *Eur.Phys.J.C* 84 (2024) 537
  - search for hidden sectors in angular correlations *MDPI Physics* 7 (2025) 3, 30
  - …

Addendas to MoU

- Procedure intitiated in Feb 2026 for Feasibility Phase – through Direction & Gerencia
- For IFIC, will be signed by the Vice Presidency of International Affairs (VRI) of CSIC
- Documents being prepared for the new Reference Design Phase (aka pre-TDR)

Memorandum of Understanding for the Future Circular Collider (FCC) Feasibility Study hosted by CERN

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Whereas

At a dedicated session of the CERN Council held on 19 June 2020, the Council updated the European Strategy for Particle Physics, according to which, following on from the FCC conceptual design study performed in the implementation of the 2013 Strategy Update, an FCC feasibility study (the "Feasibility Study") should be undertaken, based on the following principles:

"…the particle physics community is ready to take the next step towards even higher energies and smaller scales. The vision is to prepare a Higgs factory, followed by a future hadron collider with sensitivity to energy scales an order of magnitude higher than those of the LHC, while addressing the associated technical and environmental challenges."

CERN Grey Book

After prompted by International Forum of FCC national contacts presentation (see backup) in Jan 2026 **IFIC contacts** formally appointed and included in grey book

The CERN Experimental Programme

Grey Book database

FCC

Future Circular Collider

Approved:

Beam:

Status: Preparation

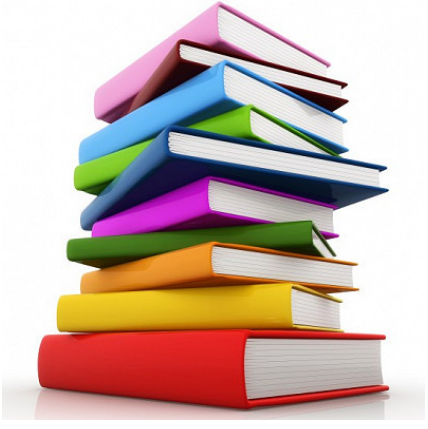
Overview | Teams | Participations

Search criteria: valencia Search

Institute Name	Institute Parent Name	Town	Country	Team Leader & Deputy Team Leader(s)
Instituto de Fisica Corpuscular (IFIC)	Univ. of Valencia and CSIC	Paterna (Valencia)	Spain	(TL) IRLES QUILES, ADRIAN (DTL) RUIZ MARTINEZ, MARIA ARANZAZU (DTL) ESPERANTE PEREIRA, DANIEL

https://greybook.cern.ch/experiment/detail/teams?q=valencia&id=FCC

Further reading



FCC-Spain meetings & Red Española de Futuros Aceleradores

- **FCC day - Spain** 7 October 2024, CIEMAT
  - notable participation from IFIC
- Recent meetings of Spanish Network for Future Colliders
  - 23-24 September 2025, CIEMAT https://indico.ific.uv.es/event/8184/
  - 1-2 July 2024, Valencia https://indico.ific.uv.es/event/7605/
  - …
  - *see also talk by Marcel Vos*

International Forum of FCC national contacts

FUTURE CIRCULAR COLLIDER

Next Steps in FCC Collaboration building, from the PED side

So far, we have National Contacts (informally also Regional Contacts), Institute contacts in some countries like the larger European countries and US, but not in all. We have to extend this scheme to all countries.

We have now the possibility to register for the PED activities the institutes under the FCC collaboration, to appear in the CERN Grey book, with a Team Leader (and possibly one or two Deputy Team Leader). That's the scheme that we are developping now.

So, regarding collaboration building in the post-FS phase, the goals are to

1) To have the current PED institutes register in the **Grey Book**, with a TL and a DTL. At least one of the two, but preferably both, must be active in FCC-PED

2) Obtain from the TL the status of the expertise of the lab, and the activities in which the institute is involved and/or wants to be involved

3) With the help of the National/Institute Contacts/TL/DTL, contact more LHC teams (there are 244 in ATLAS, 257 in CMS, 98 in LHCb..) to invite them to join FCC, starting from the countries already active in FCC.

Jan 2026

talk by G. Bernardi

International Forum of FCC national contacts

FCC PED activities in Spain

- Current structure: Spanish Future Collider Network, including the most relevant institutes of particle physics and technological centers for accelerator and detectors.
- Specific projects currently running and budgeted, with clear FCC involvement (e.g. coordinated IFIC-CIEMAT project)
- Many phenomenological/theoretical contributions from different Spanish groups on FCC physics
- FCC: MoU signed by several institutions, strong involvement in FCC-hh magnet/accelerator developments. Participation of a fraction of the community in the FCC Feasibility report.
- 2025: efforts focused on the discussions and preparation of the European Strategy (Spain clearly supporting FCC as the next flagship project at CERN)
- **Plan to evolve to a structure specifically focused on FCC in the next months, involving already existing partners and aiming for a significant increase of the contribution from industry and the community currently involved in running experiments (LHC, …)**

Jan 2026

talk by J. Alcaraz (Spanish national contact)

FCC Feasibility Study

- “Physics, Experiments, Detectors” (PED), vol. 1
  Eur.Phys.J.C 85 (2025) 1468 [DOI: 10.1140/epjc/s10052-025-15077-x]
- “Accelerators, Technical Infrastructure and Safety,” vol. 2
  Eur.Phys.J.Spec.Top. 234 (2025) 5713 [DOI: 10.1140/epjs/s11734-025-01967-4]
- “Civil Engineering, Implementation and Sustainability,” vol. 3
  Eur.Phys.J.Spec.Top. 234 (2025) 5113 [DOI: 10.1140/epjs/s11734-025-01958-5]