

#innovación
#ayudasCDTI
#asesoramiento
#internacionalización



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CDTI's role in fusion (R&D programmes)

Virtual Workshop Croatia-Spain (IFMIF-DONES)

Belén del Cerro
SP ILO for fusión nuclear projects
Large Scientific Facilities and Dual Programmes Dpt/
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CDTI – Spanish Innovation Agency

Public Entity (Ministry of Science and Innovation). Since 1977

Objetives:

- To foster the Spanish industrial competitiveness by funding national R&D projects
- To support to the creation and consolidation of technology-based companies
- To encourage the Spanish participation in international operation programs.
- To support technology transfer

Enhance Spanish companies' competitiveness and internationalization through innovation



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CDTI in Big Science

ASTRONOMY

PARTICLE PHYSICS

FUSION

• TOWARDS THE RESEARCH INFRASTRUCTURE (RI)

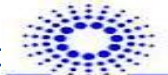
- **Nominated ILO for the Member State**
- Regular meetings between ILO-RI Procurement Office
- Advising Research Infrastructures on the national industrial capacities

• TOWARDS THE NATIONAL INDUSTRY

- Main point of contact for announcements of tenders & medium term plans
- Organisation of Industry Days, visits to the RI, etc.
- Supporting R&D projects
- Assisting companies in their understanding of the technical, contractual and financial requirement become a supplier and helping them to form consortium
- Following up of awarding contracts

• TOWARDS THE SPANISH ADMINISTRATION

- Advise the Spanish Delegation on industry-related matters
- Participation at the RI Finance Committees
- Advising national funding agencies in the definition of in-kind contributions
- Analysis of industrial capacities for Spanish Research Infrastructure proposals

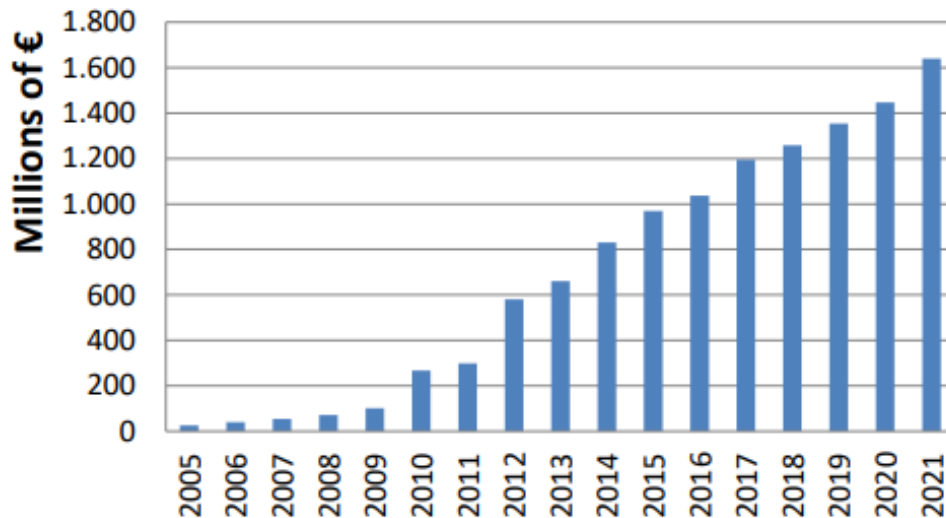


Big Science in Spain

During the last 16 years, the Spanish industry has been awarded with more than 1600M€ in a very challenging and competitive market

- CDTI hosts the Spanish Industrial Liason Officer network in Big Science (Astronomy, Particle Physics and Fusion energy)
- CDTI supports the Spanish industrial R&D in Big Science
- CDTI encourages the international cooperation

Accumulated industrial Return in Large Scientific Facilities
- Astronomy, Particle Physics and Fusion



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Big Science in Spain



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IFMIF-DONES, A KEY INFRASTRUCTURE IN THE ROADMAP TOWARDS FUSION ENERGY

The need of a fusion-like neutron source for the qualification of the materials to be used in a fusion power plant has been widely recognized since the beginning of the Fusion Programme. This Fusion Programme is based in three main pillars, ITER, DEMO and IFMIF-DONES, being this last one the fusion neutron source facility for materials development and qualification. This fusion relevant neutron source facility ("the Facility") will provide to DEMO the necessary data for material testing under similar irradiating conditions. Therefore, the Facility should be constructed and operated soon enough to obtain material information to meet DEMO and future power plants planned schedules in compliance with fusion roadmaps.

The Roadmap for the Fusion electricity production is summarized in the figure 1.

WHAT IS IFMIF-DONES?

The International Fusion Materials Irradiation Facility – Demo Oriented Neutron Source (IFMIF-DONES) is a single-sited novel research infrastructure for testing, validation and qualification of the materials to be used in future fusion power plants like DEMO (a demonstration fusion reactor prototype). In relation to this international project, in December 2017, Fusion for Energy (F4E) evaluated positively the joint Spain Croatia proposal to site the IFMIF-DONES in Granada.

The DONES Facility will be a Plant containing all the necessary buildings and systems to house and run an accelerator-based D-Li neutron source to produce high-energy neutrons at sufficient intensity and irradiation volume to simulate as closely as possible the first wall neutron flux and spectrum of future nuclear fusion reactors.

The facility will produce a 125 mA deuteron beam, accelerated up to 40 MeV and shaped to have a nominal cross section in the range from 100 mm x 50 mm to 200 mm x 50 mm, impinging on a liquid lithium target 25 mm thick cross-flowing at about 15 m/s in front of it. The stripping reactions generate a large number of neutrons that interact with the materials samples located immediately behind the Lithium Target, in the Test Modules.

AND IFMIF-DONES IS FINALLY BECOMING A REALITY IN GRANADA...

In 2018, promoted by Spanish and Croatian governments as well as F4E and EUROfusion, the IFMIF-DONES facility has been included in the European Strategy Forum on Research Infrastructures (ESFRI) Roadmap showing up the strategic interest of the facility for the EU scientific community.

SPANISH CAPACITIES IN LARGE SCIENTIFIC FACILITIES



-104 companies currently working in Big Science

-Capacities roadmaps in Astronomy, Particle Physics and Fusion

-The most relevant research entities also included

<https://www.cdti.es/index.asp?MP=35&MS=0&MN=1&TR=A&IDR=120&iddocumento=806&xtmc=&xtr=2>



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Big Science in Spain-BSBF22

Big Science Business Forum (BSBF) congregates the main European Research Infrastructures, focused on technology and with a Market opportunities worths in more than 37.700 M€ in the period 2022-2026. The event was organized in support of DONES in Granada

Attendees : 1148

Big Science Facilities represented: 19

More than 500 European companies

120 Stands with 200 exhibitors

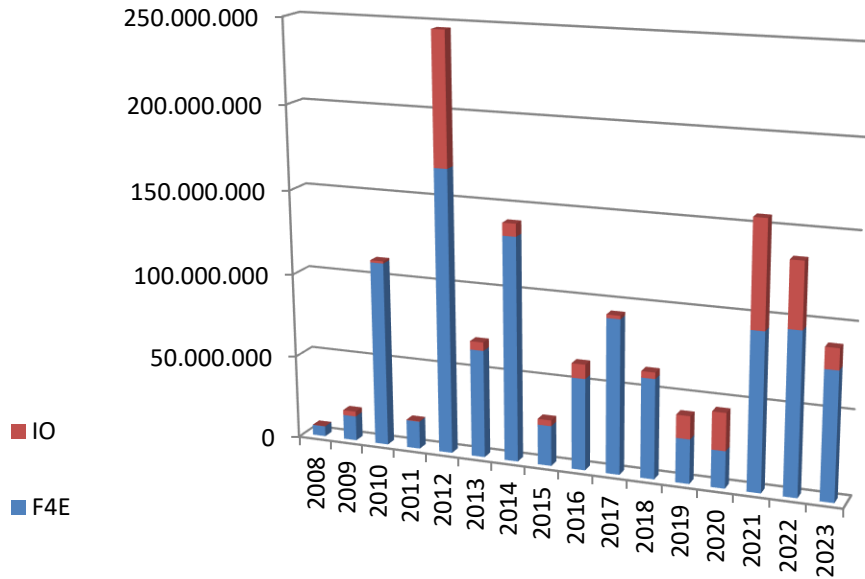
More than 1000 B2B meetings



Big Science in Spain -ITER



~370 contracts awarded to SP companies worth 1391 M€
 Third position in F4E and 2nd position in IO awarding ranking



Buildings



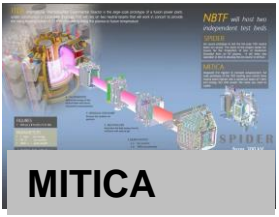
Superconducting Magnets



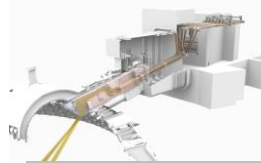
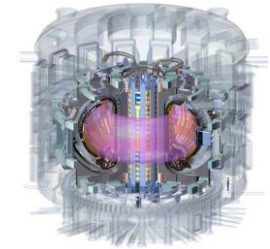
FW Panels



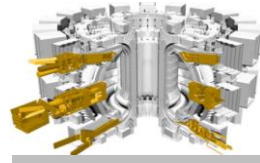
Vacuum Vessel



MITICA



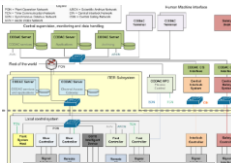
Upper Launchers



Diagnostics



Assembly



I&C



Power Supplies



CDTI R&D Tools

CDTI supports the technological development of Spanish companies participating in Large Scientific Facilities

Loans with 33% non-refundable
NEOTEC, CIEN, MISIONES, CPP

EUROSTARS



Specific agreements -PRISMAC
with CIEMAT/CERN

Specific R&D programmes
(PNE,SAE, Industria de la
ciencia)

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R&D Cooperation on fusion

- Since 2007, CDTI has funded R&D projects for fusion energy, developing technologies for ITER, IFMIF- DONES and even DEMO ~ 63.5M€
- **Some examples**
 - CIEN “Accelerators and other Big Science technologies”, mainly focused on DONES.
 - “Misiones Fusion Future”; critical aspects in the way to fusion energy and focused on DONES and DEMO
 - “Industrial research on neutron technologies applicable to the IFMIF-DONES test cell “
 - “Industrial research in technologies and processes for IFMIF-DONES”
 - NEURON-DONES- Critical technologies for the operation and maintenance of RIS (IFMIF-DONES)
 - Advance fabrication for the development of critical technologies for DEMO and the EU Fusion roadmap
 - Technological research for optimizing the efficiency of IFMIF-DONES



Spanish- Croatian cooperation

- CDTI can help you to find a Spanish partner in Big Science
- R&D cooperation focused on Big Science- fusion
- Technological missions visiting Spanish companies
- Big Science Industrial events/webinars jointly organized



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Conclusions

- CDTI hosts the Spanish ILOs network and has accumulated experience for over 25 years as ILOs for Big Science
- Spanish industry is developing very challenging and added value technologies in fusion
- CDTI can help you to cooperate with Big Science Spanish industry



¡Thanks for your attention!

+info sobre programas y ayudas CDTI
para
proyectos de I+D empresarial e innovación



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