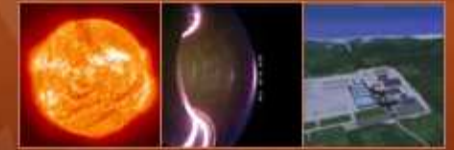




JOIN ITER, THE ULTIMATE PROJECT  
FOR FUSION POWER PLANTS



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## ITERBELGIUM NETWORKING EVENT 4th of March

# The world's most challenging energy project ever

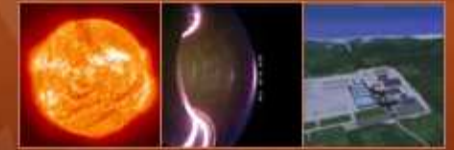
how can SME's get involved in the ITER project and  
develop business in the ITER industry network

[christian.dierick@agoria.be](mailto:christian.dierick@agoria.be)  
[www.iterbelgium.be](http://www.iterbelgium.be)



## Summary

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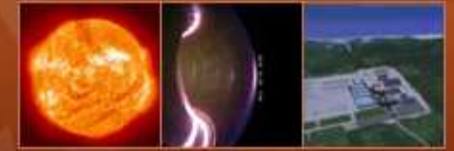
- fusion basics and challenges
- project status and organisation
- role of Iterbelgium
- Belgian competences in ITER
- how to get involved?



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# ITER Fusion project

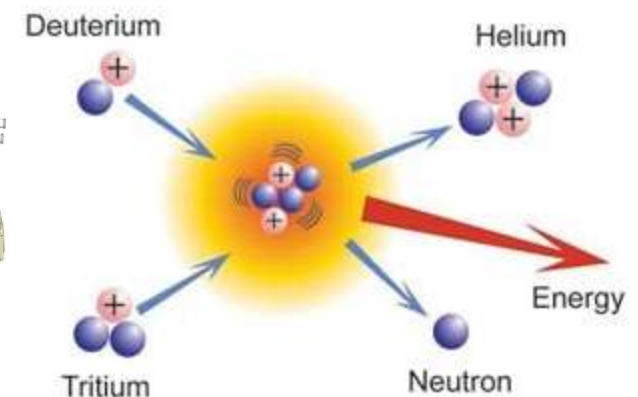
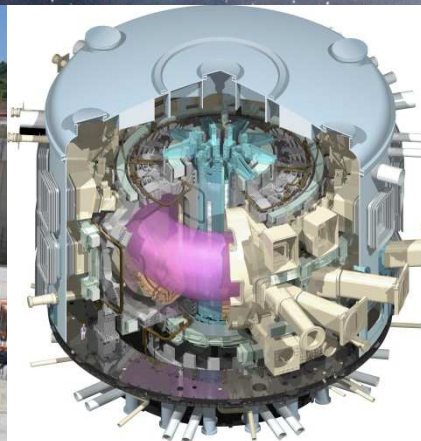
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- based on nuclear **fusion** between **deuterium** and **tritium**
- ITER = final proof of concept for fusion as an **energy source**
- machine of Tokamak type, 50 MW in; 500 MW out (first  $Q > 10$ )
- today under construction in Cadarache in France
- biggest experimental energy project in the world (15 billion €)

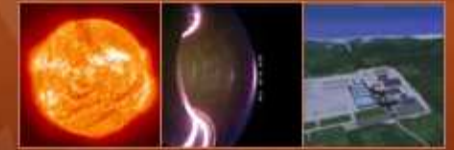
Energy from the stars







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## Advantages of fusion

- unlimited source of fuel (millions of years via fuel breeding)
- small fuel cost (3 % of total cost, cfr. 70 % for gas)
- no “operational” radwaste (only short-lived, afterwards)
- inherently safe (no chain reactions, no residual heat from reactions, only a few g of fuel in 800 m<sup>3</sup>)
- no evacuation needed, even in worst case

## But

a few serious challenges as well, such as ...





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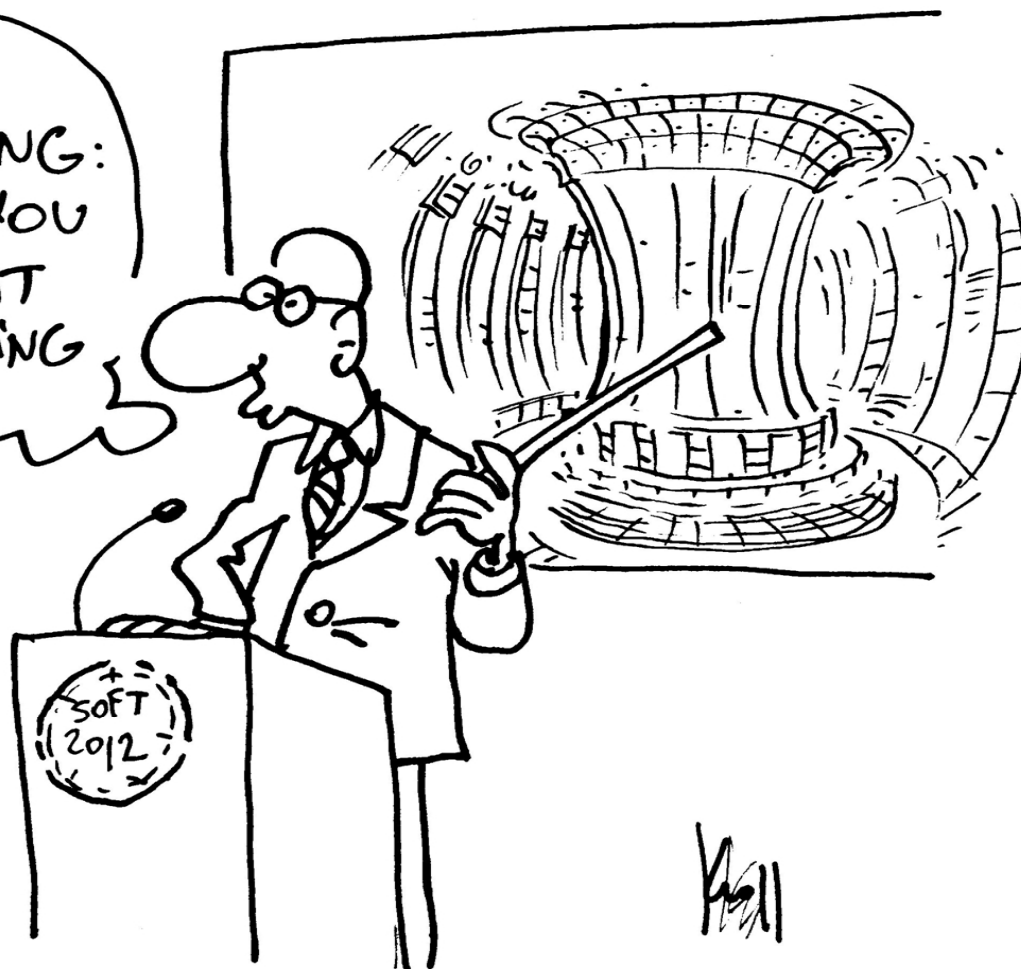
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## Challenge 1: science

LET'S START  
AT THE BEGINNING:  
HAS ANY OF YOU  
GOT ANY IDEA AT  
ALL WHAT THIS THING  
IS?



11



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## Challenge 2: complex technology



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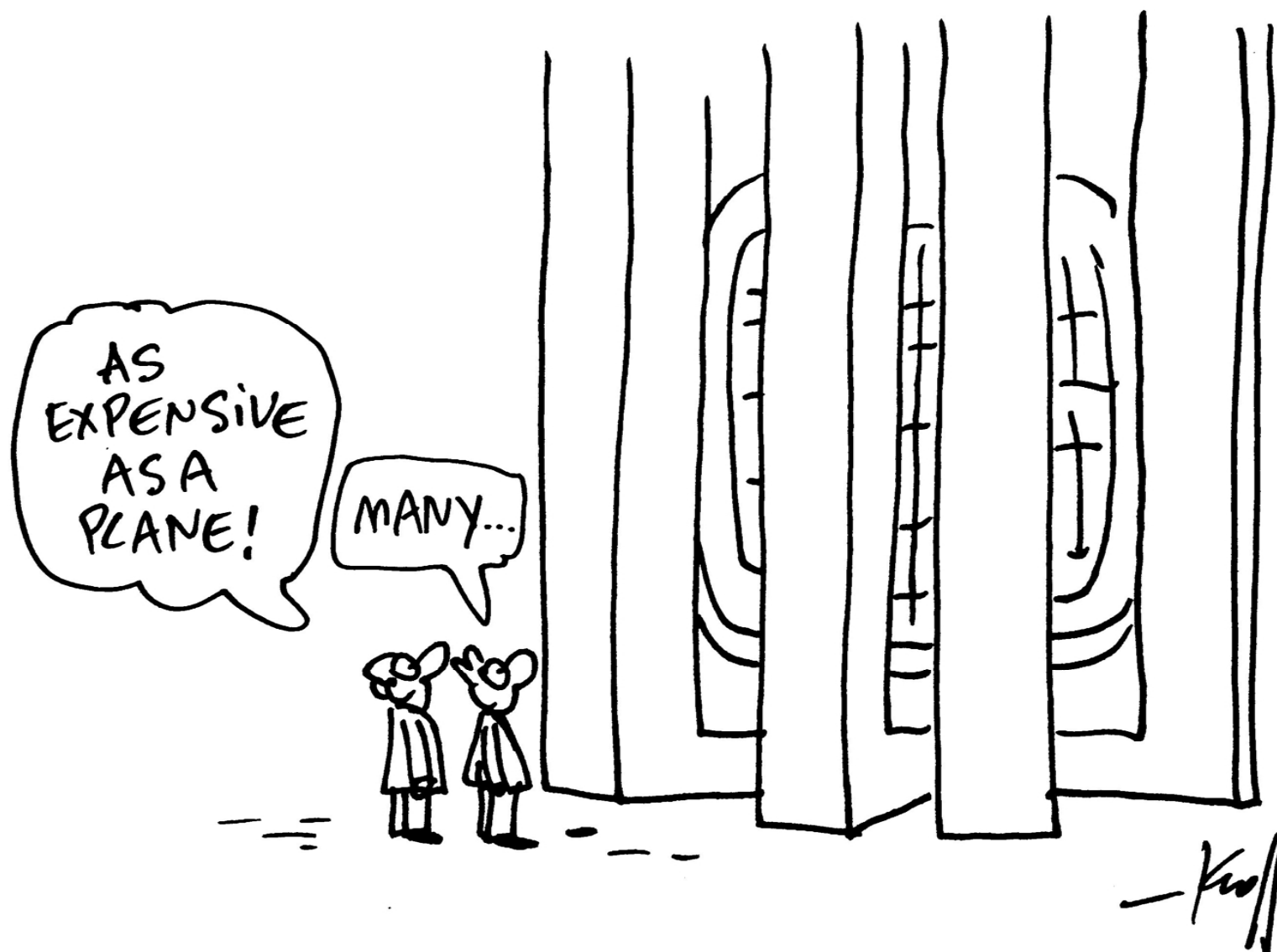
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## Challenge 3: cost for infrastructures



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SOMETIMES, I WONDER  
WHAT HE'S  
THINKING ABOUT...

WHEN I'M  
GROWN UP  
NUCLEAR FUSION  
WILL BE  
EVERYWHERE!



Koll



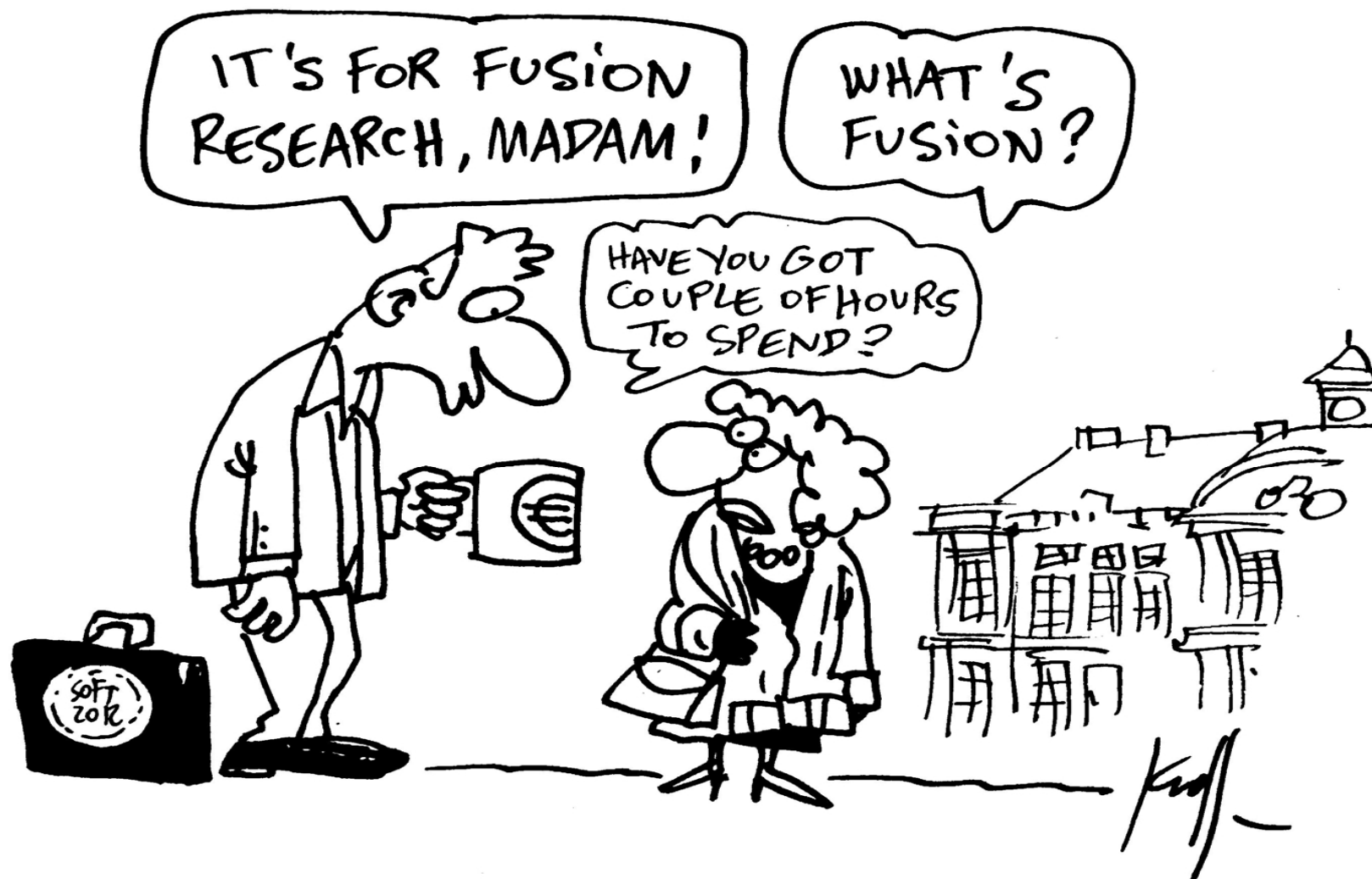
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## Challenge 5: public funding





# Tokamak concept

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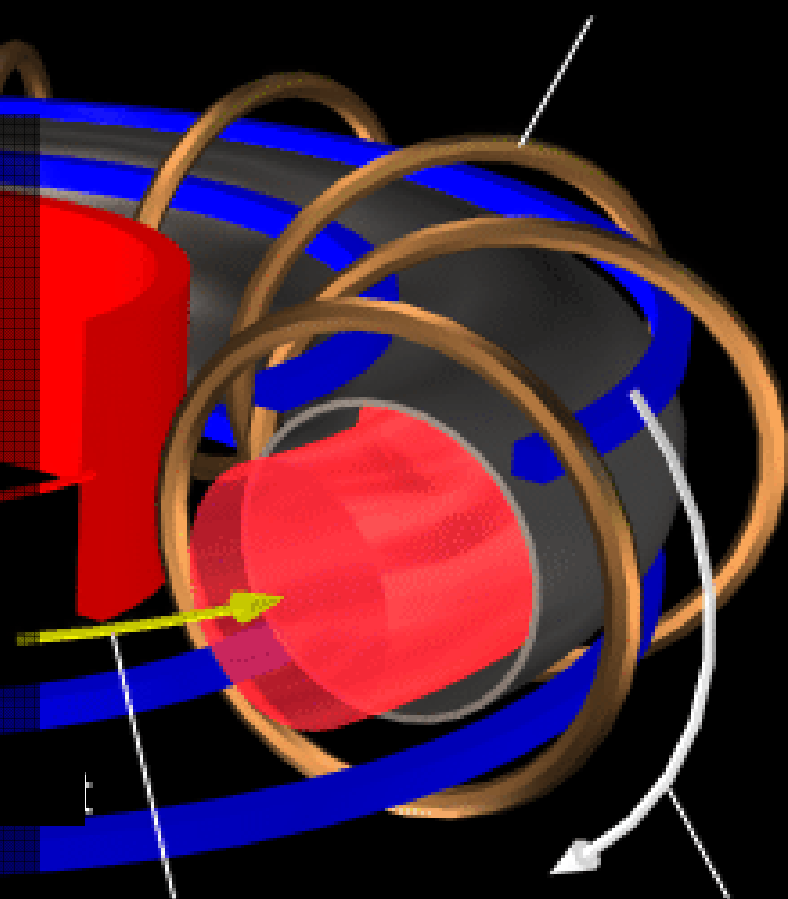
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Position control coils

Primary coil

Toroidal field coil

- heat a D-T plasma at 150 to 250 million °C to create 17 MeV neutrons from fusion (density,  $t$ ,  $T$ )
- create huge magnetic fields with superconductive coils to keep the plasma confined and isolated
- inject fuel into the plasma through the magnetic field and get energy out of the system via the neutrons
- keep the plasma and the system in steady state operation



Toroidal  
magnetic  
field

Toroidal field  
coil current





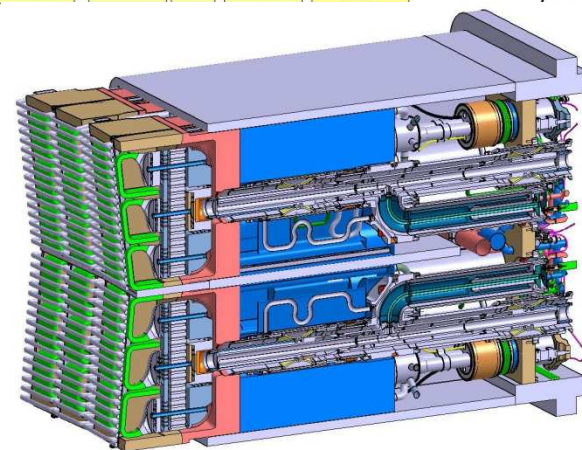
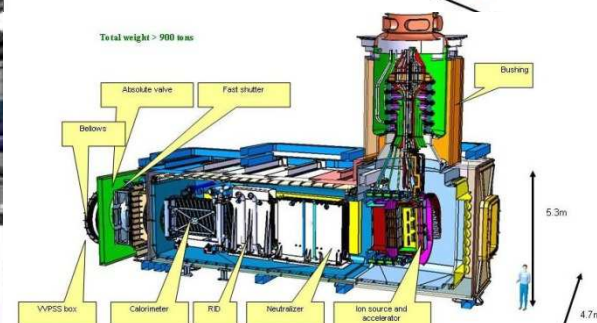
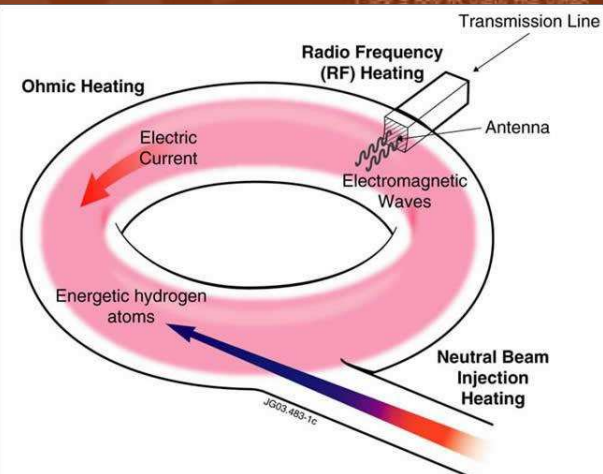
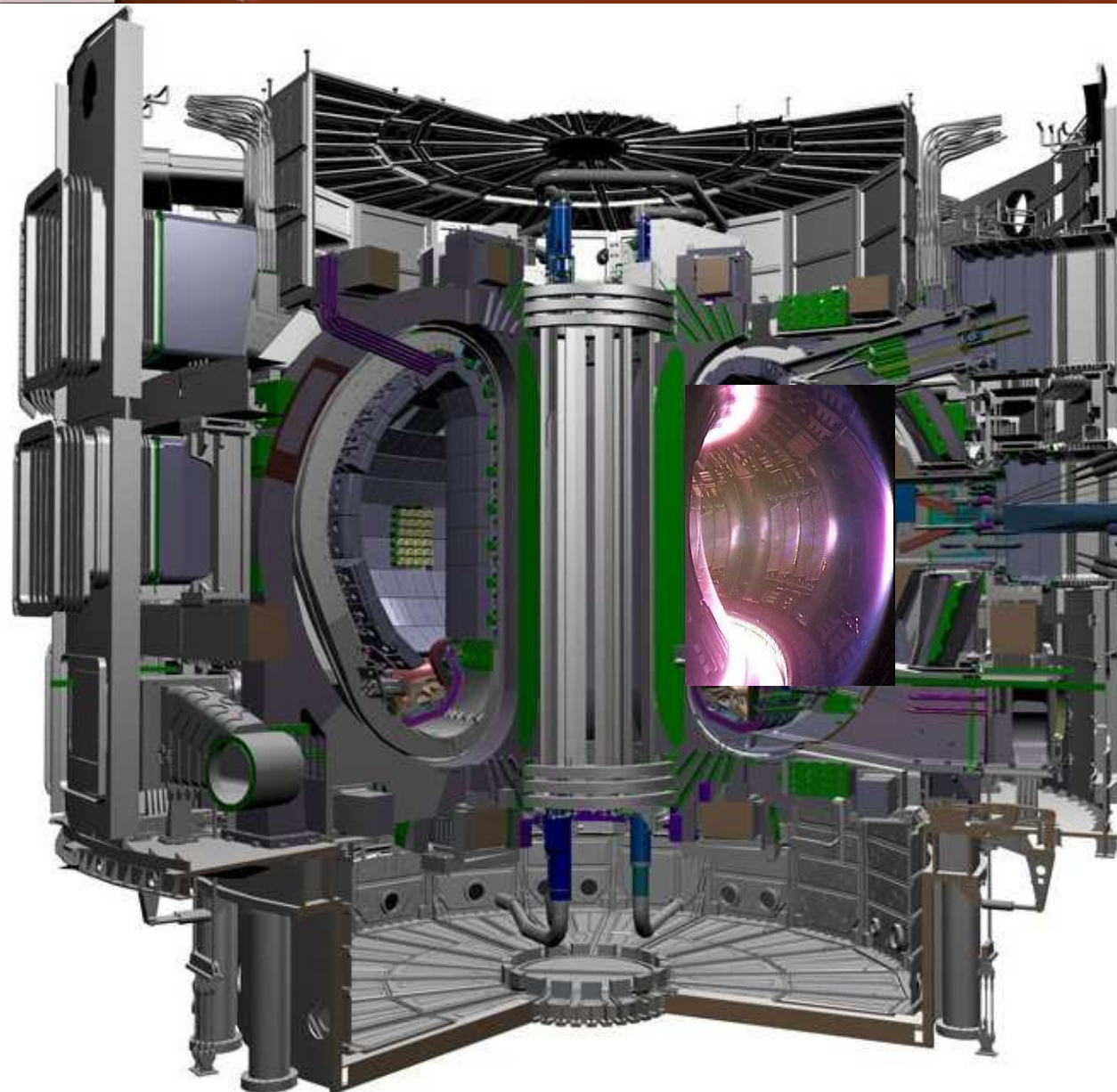
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# ITER reactor design and heating



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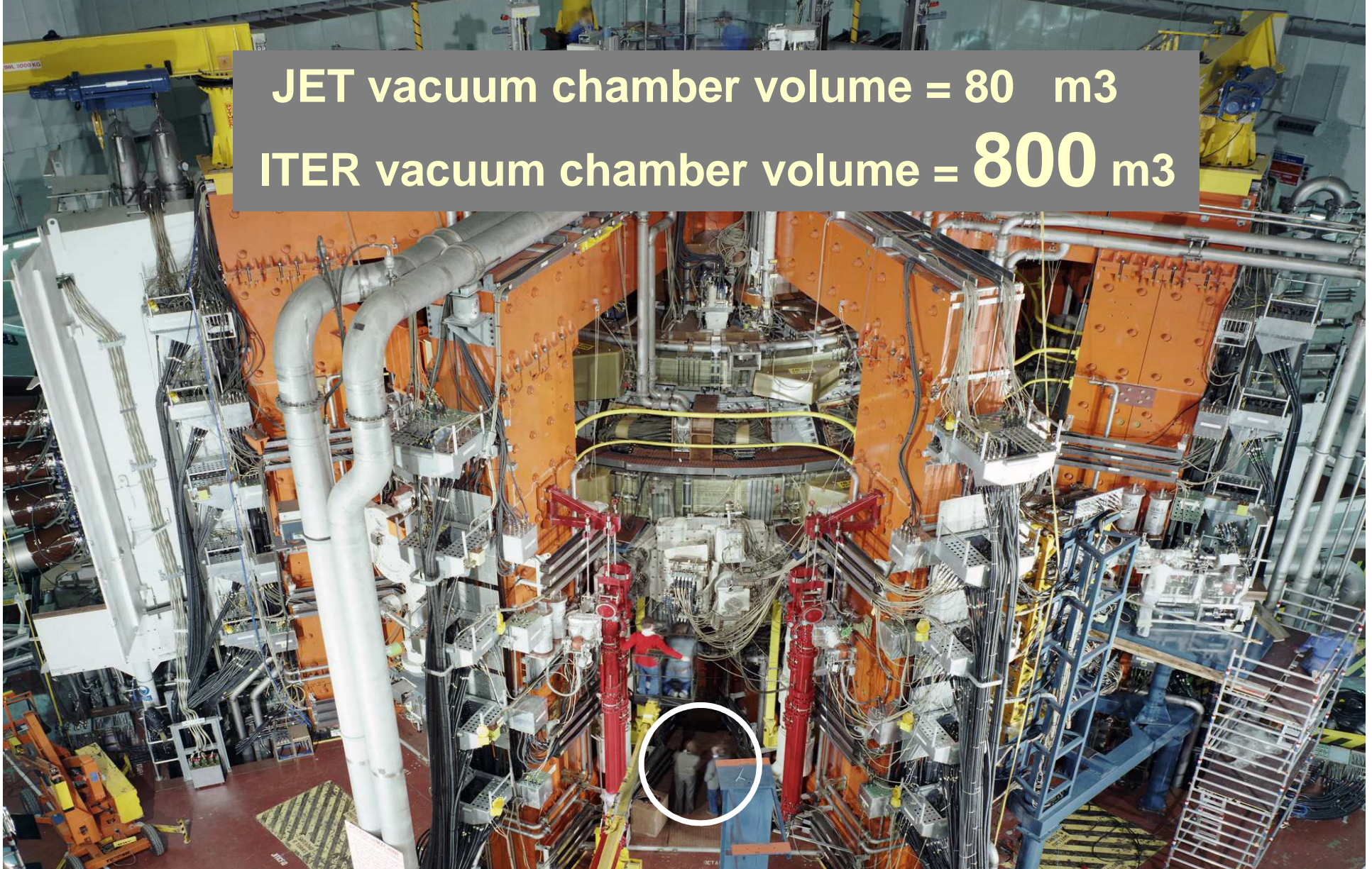
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JET (Joint European Torus, Culham, UK)



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JET vacuum chamber volume = 80 m<sup>3</sup>  
ITER vacuum chamber volume = 800 m<sup>3</sup>







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# ITER international collaboration with 7 DA's







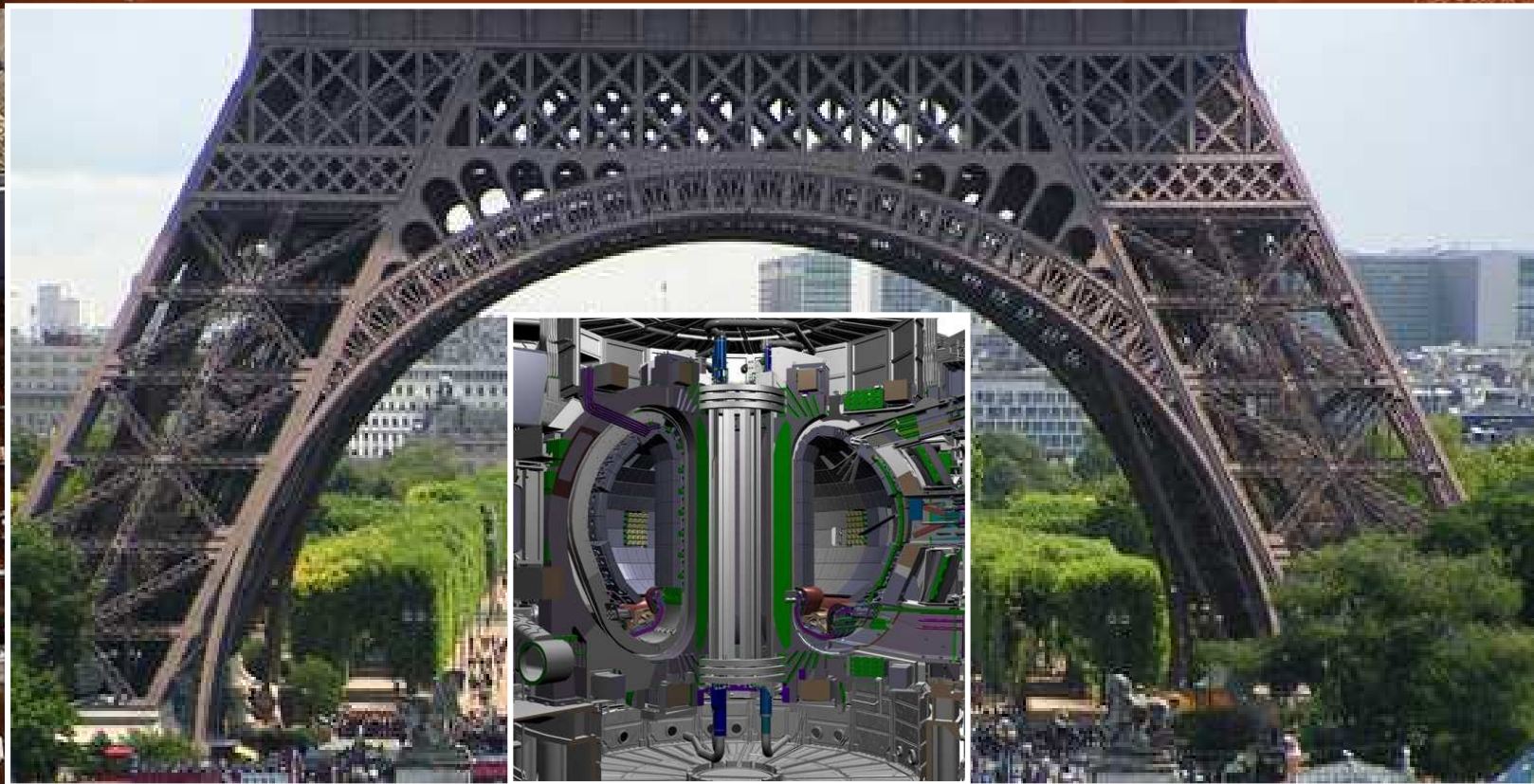
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status site 2007-2014

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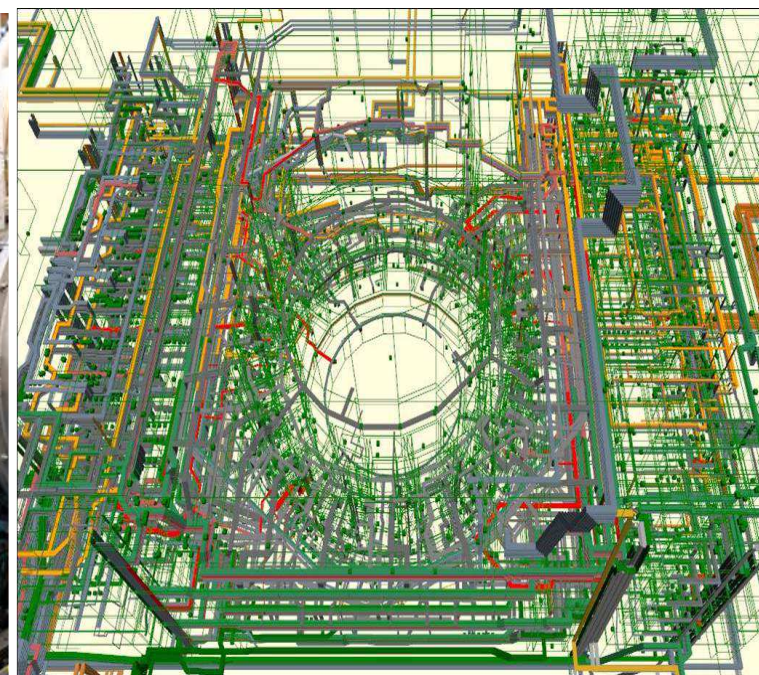
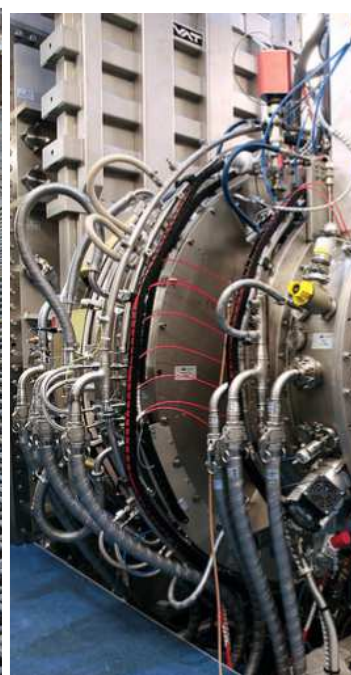
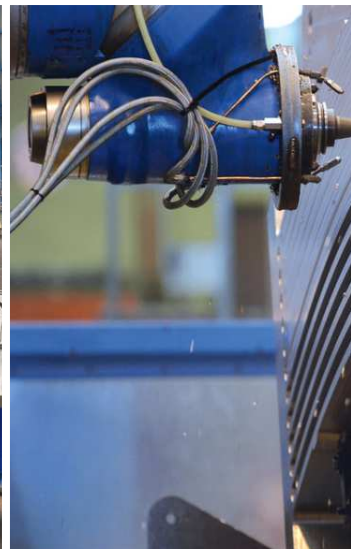




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A lot is going on...

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<http://www.iter.org/>

the way to new energy

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Search

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Construction

Transport

The Machine

The Science

The Organization

The Project

Glossary

General Information



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## ITER deals with 7 Domestic Agencies for procurements



### Three giants take position on the platform

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Working for ITER

today's focus

SCI REACHING 150,000,000 °C



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FOR  
ENERGY**

Bringing the power of the sun to earth

**F4E is the European  
Domestic Agency**

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[PROCUREMENT AND GRANTS](#)

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## A PARTNERSHIP WITH INDUSTRY AND SMEs

EUROPE'S CONTRIBUTION MANAGED  
THROUGH:

GRANTS TO FINANCE R&D ACTIONS  
PROCUREMENT TO AWARD CONTRACTS  
PAVING THE WAY FOR A MARKET IN  
COMMERCIAL FUSION



**ABOUT F4E**  
Our objectives



**UNDERSTANDING FUSION**  
Fusion is part of the solution



**PROCUREMENT AND GRANTS**  
Building a partnership with industry



**CAREER OPPORTUNITIES**  
Working at F4E



**WHY ITER?**  
The way to sustainable energy

## LATEST NEWS

10 September 2014

### F4E signs contracts for the Blanket First Wall full-scale prototype



An exciting technical challenge,  
the European manufacturing of  
the Blanket First Wall full-scale

## LATEST EVENTS

13 October 2014

### SOFT optimism in the air



Ready to tackle ITER, eager to  
tussle with its intricacies and  
enthusiastic about DEMO.

## PROCUREMENT AND GRANTS

01 October 2014 - 28 November 2014

> **F4E-OPE-0559**  
PF Coils Impregnation Tooling and Additional  
Tooling

16 September 2014 - 30 October 2014

> **F4E-OMF-0578**  
Engineering Support Services in the Area of



**ITER**  
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## F4E Calls workspace



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[ITER Task Agreements](#)

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[Key Reference Documents](#)

[F4E Model Contracts & Tender  
Conditions](#)

## Latest calls

16 September 2014 - 30 October 2014

> [F4E-OMF-0578](#)

Engineering Support Services in the Area  
of Thermo hydraulic and Fluid dynamic  
a .....

## Welcome to the F4E Industry and Fusion Laboratories Portal

F4E's Industry & Fusion Laboratories Portal is optimised  
for the use of **INTERNET EXPLORER**; Any document  
**upload** must be strictly performed within **INTERNET  
EXPLORER**.

In order to allow users to familiarise themselves with the  
new features of the Industry Portal as quickly as possible,  
F4E has posted a series of five tutorials on the [Help page](#)  
of the Portal



## Announcements

**MAGNETS: (PF Coils-OPE-559) meetings with  
companies -21st October 2014- presentations  
and Q&A @**

by F4E Business Intelligence Group

Further to the launch of the OPE-559 - Impregnation tooling and Additional  
tooling - F4E organises an information session in its premises in Barcelona to  
present some aspects of the Call for Tender and answer to questions.  
See the attached agenda.

03/10/2014 17:56

## Company database



[Get an account](#)



[Register my company](#)



[Search companies](#)

ITER DAs Access

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IN  
HERE**

ILO National  
Initiatives

ILO Access

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## Links





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# Get your account...



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[CALLS](#) [USER REGISTRATION](#) [CONTACT](#) [HELP](#)

## Account management

**1.0 - Get an account**

2.0 - Register my company

2.1 - General information

2.2 - Financial data

2.3 - Quality and delivery

2.4 - Company contacts

2.5 - Additional documents

### Account information

\* indicates a required field

First name: \*

Last name: \*

Email: \*

Confirm your email: \*

Phone number:

Postal address:

Country: \*

Password: \*

Confirm your password: \*

Please, select the account type:

☒ Individual user ☐ Register my company ☐ Link to existing company



**...and register your competences**



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☐ I wish to not be notified of any future emails about call modifications or publications.

Activity codes - Your areas of interest (Please select at least one activity code)

2

- |   |  |
|---|--|
| + | : 10000 CIVIL ENGINEERING AND BUILDINGS  |
| + | : 20000 ELECTRICAL ENGINEERING (COMPONENT SUPPLY) - See 104xx series for INSTALLATION      |
| + | : 30000 ELECTRONICS  |
| + | : 40000 DATA PROCESSING  |
| - | : 50000 MECHANICAL ENGINEERING SUPPLIES AND MANUFACTURING TECHNIQUES                       |
| + | : 50100 SUPPLY OF RAW MATERIALS  |
| - | : 50200 MACHINE TOOLS, WORKSHOP AND QUALITY CONTROL EQUIPMENT                              |
|   | <input type="checkbox"/> 50201 SHEET METAL EQUIPMENT                                       |
|   | <input type="checkbox"/> 50202 MACHINING EQUIPMENT   |
|   | <input type="checkbox"/> 50203 WELDING AND JOINING EQUIPMENT                               |
|   | <input type="checkbox"/> 50204 HEAT TREATMENT EQUIPMENT                                    |
|   | <input type="checkbox"/> 50205 SURFACE TREATMENT EQUIPMENT                                 |
|   | <input type="checkbox"/> 50206 QUALITY CONTROL EQUIPMENT                                   |
|   | <input type="checkbox"/> 50207 ASSEMBLY EQUIPMENT  |
|   | <input type="checkbox"/> 50208 MACHINE TOOL ACCESSORIES                                    |
|   | <input type="checkbox"/> 50209 MAINTENANCE & REPAIR OF MANUFACTURING AND CONTROL EQUIPMENT |
|   | <input type="checkbox"/> 50210 HOT ISOSTATIC PRESSING EQUIPMENT                            |

Selected activities: 

Code	Name

Remove

### F4E procurement packages

Related procurement packages:

Selected packages: \*

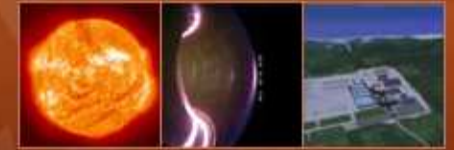




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## Role of Iterbelgium

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1. interface between F4E/Iter org. and national industries
2. prospection and cartography of Belgian competences
3. support in call for tenders for interested companies
4. help in creation of partnerships for CFT's
5. participate/organize networking events (SOFT, IBF, ...)
6. create awareness on science-educational possibilities :
  - fusion show as teaser for third degree of secondary schools
  - master and doctoral levels in fusion technology
  - support continuity in fusion technology competences

PS:



is the Iterbelgium operator



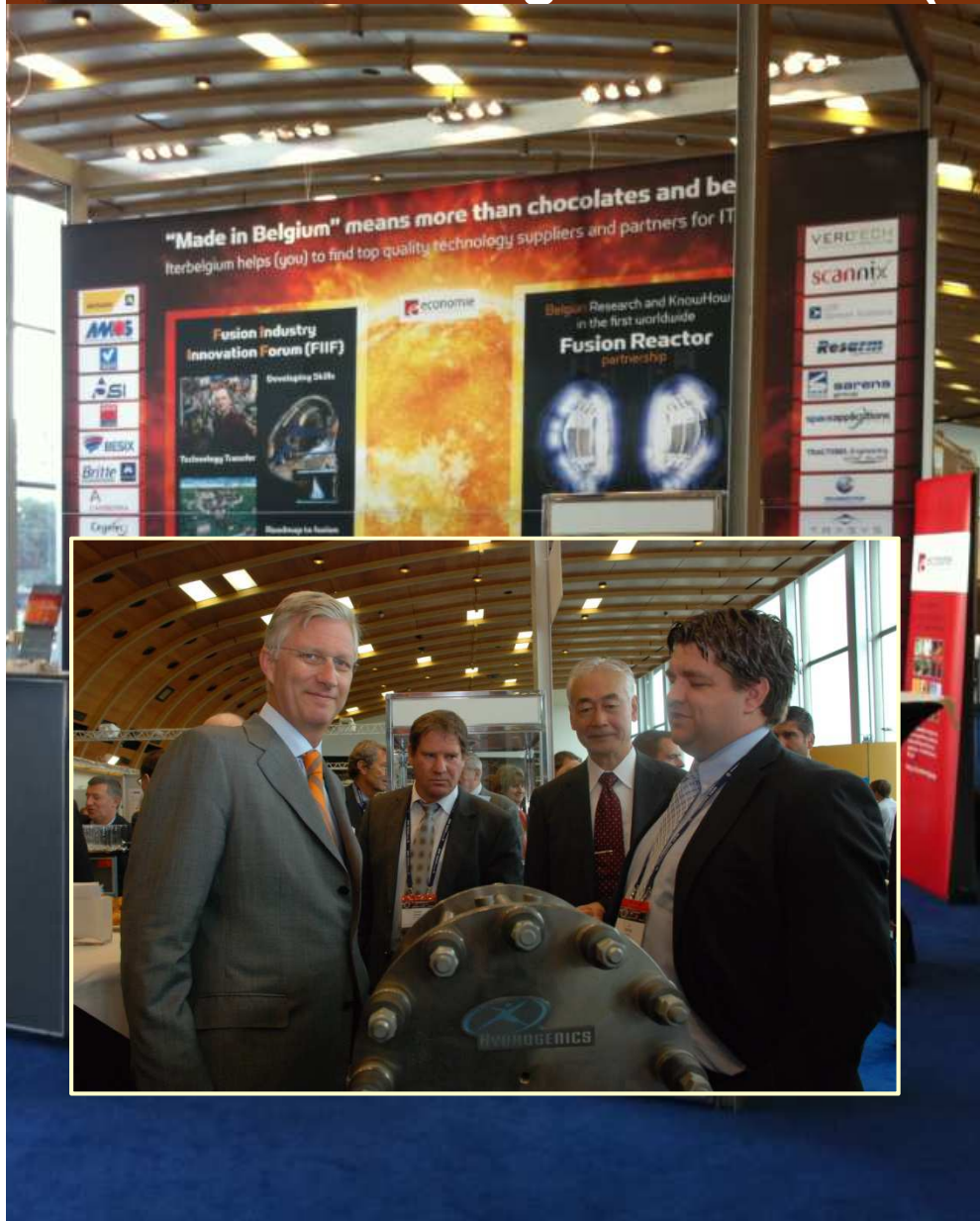
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# Iterbelgium booths (SOFT 2012/2014)

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# Fusion show support to UA

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Erasmus+



European Master of Science in  
Nuclear Fusion and Engineering Physics

This 2 years Masters programme aims to provide a high-level multinational research-oriented education in fusion-related engineering physics.



ERASMUS MUNDUS

FUSION

International Doctoral College in Fusion Science and Engineering



Fusion DC







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# Technical visits (JET Culham)

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# create ITERBELGIUM data sheets

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User:   
Pass:

## ITERBELGIUM MEMBERS

AERTSSEN KRANEN



BE Mr Manuel Aerts

AIB-VINCOTTE  
INTERNATIONAL



BE Mr Andre Weyn

ALLARD-EUROPE



BE Mr Jef Dijckmans

ALM



BE Mr Fred Limbort

AMOS



BE Mr Carlo Flebus

ANGLO BELGIAN  
CORPORATION (ABC)



BE Mr Bernardo  
Rodriguez

ATLAS COPCO



BE Mr Jean Schaus

BARCO



BE Mr Cris Tanghe

BESIX



Mr Didier  
Damseaux

## SOFT 2012



27th Symposium  
September 24-28, 2012

## OPEN TENDERS

ITER-related calls for  
tenders can be found  
directly.



FUSION-related call for  
tenders can be found  
directly.



## News

- NEW – Free of charge  
FUSION related call  
for tenders
- Colloquium on the  
FUSION related call  
for tenders

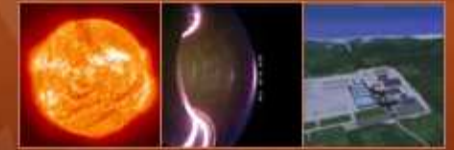
**NOW AVAILABLE on APP**



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## What can you do?

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- join Iterbelgium if interested in ITER (no charge)
- market exportable skills on Iterbelgium (1 page data sheet)
- register on F4E database and get pre-qualified (see link F4E)
- get information on CFT's on F4E and Iter org. websites
- ask support to Iterbelgium and ILO's network (national industry liaison officers)
- be in Marseille end of March at IBF 2015 (Belgian booth)



Palais du Pharo / Marseille / France  
**March 25-27, 2015**

	ITER	CONFERENCE	OPTIONAL PROGRAMME	PRACTICAL INFORMATION	REGISTRATION	LOGIN
---	------	------------	--------------------	-----------------------	--------------	-------

481 participants from 242 c





## Belgian SME examples



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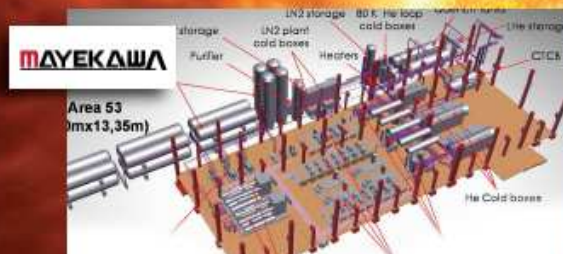
# BELGIAN TECHNOLOGY IN ITER

## HIGH SENSE OF QUALITY, NOT ONLY FOR BEER AND CHOCOLATES



**EXTREMELY HOT PLASMA ICRH HEATING ANTENNAS**

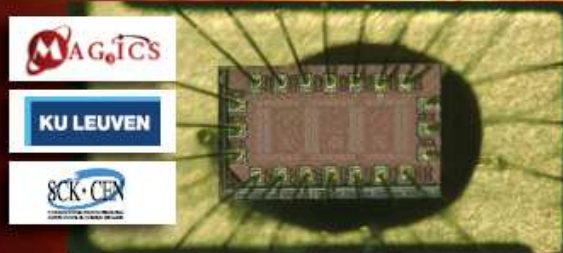
**www.iterbelgium.be**



**EXTREMELY COLD HELIUM CRYO-COMPRESSOR UNITS**



**EXTREMELY EXOTIC CRYOSTAT MOUNTING**



## EXTREME RADIATION-HARD ELECTRONICS



**EXTREME QUALITY IN VACUUM VESSEL CONTROLS**



**EXTREMELY LEAK TIGHT HIGH TECH METAL SEALS**



**EXTREME QUALITY IN JT 60 MAGNET TEST CRYOSTAT**





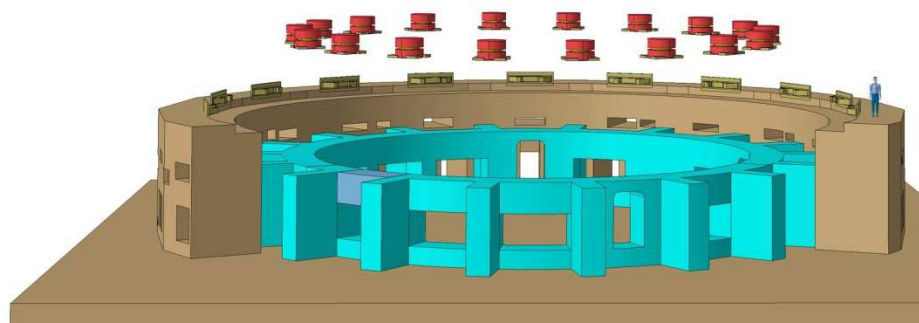
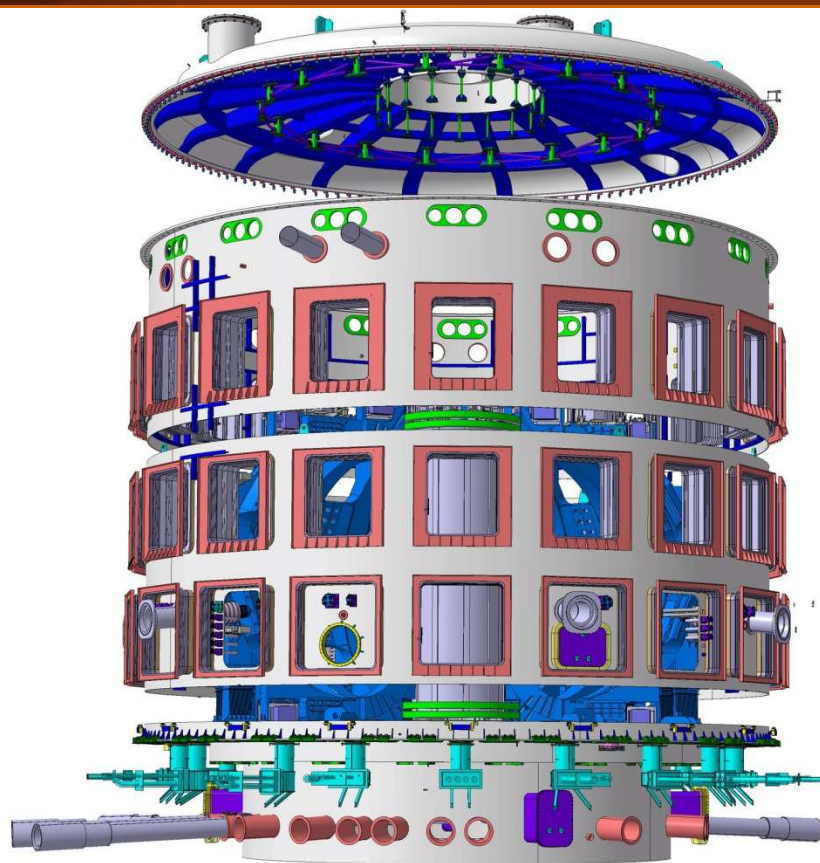
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# SARENS : cryostat mounting

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# HTMS : High Tech Metal Seals



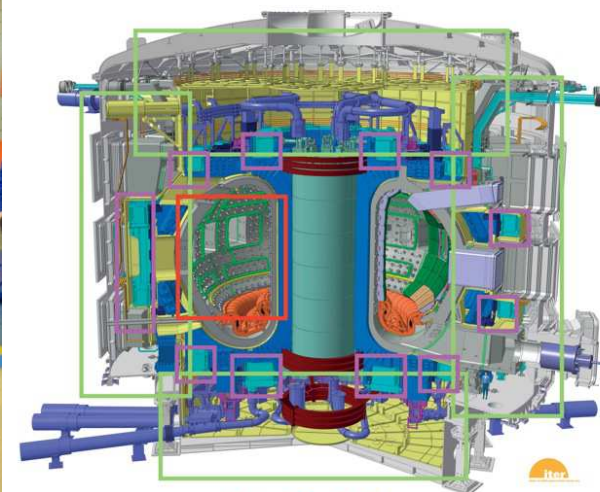
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## HTMS

High Tech Metal Seals

Custom made METALLIC SEALS  
for NUCLEAR FUSION projects



Metal Seals for:

• Vacuum vessel • Cryostat • Ports

Resilient metal seals  
for static and semi-dynamic applications:



[www.htms.be](http://www.htms.be)





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# VINCOTTE : Quality control Vacuum Vessel



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2012 7 18







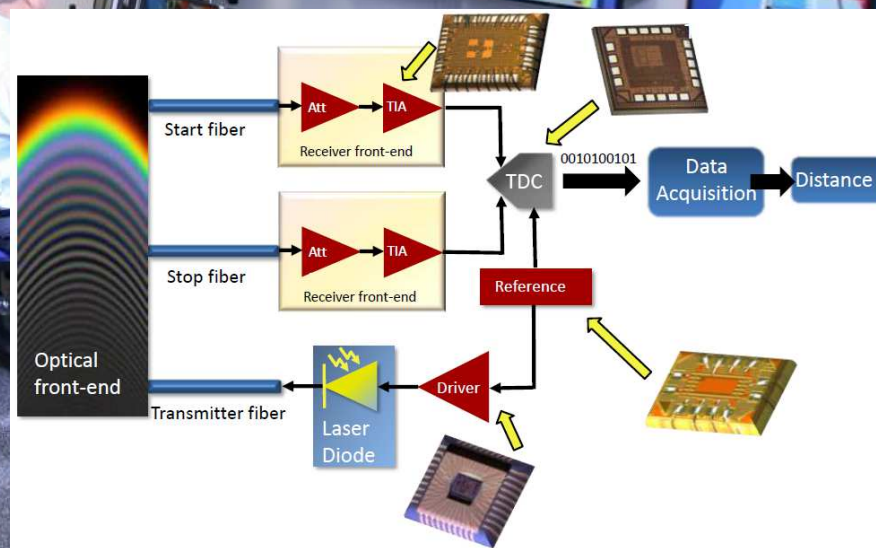
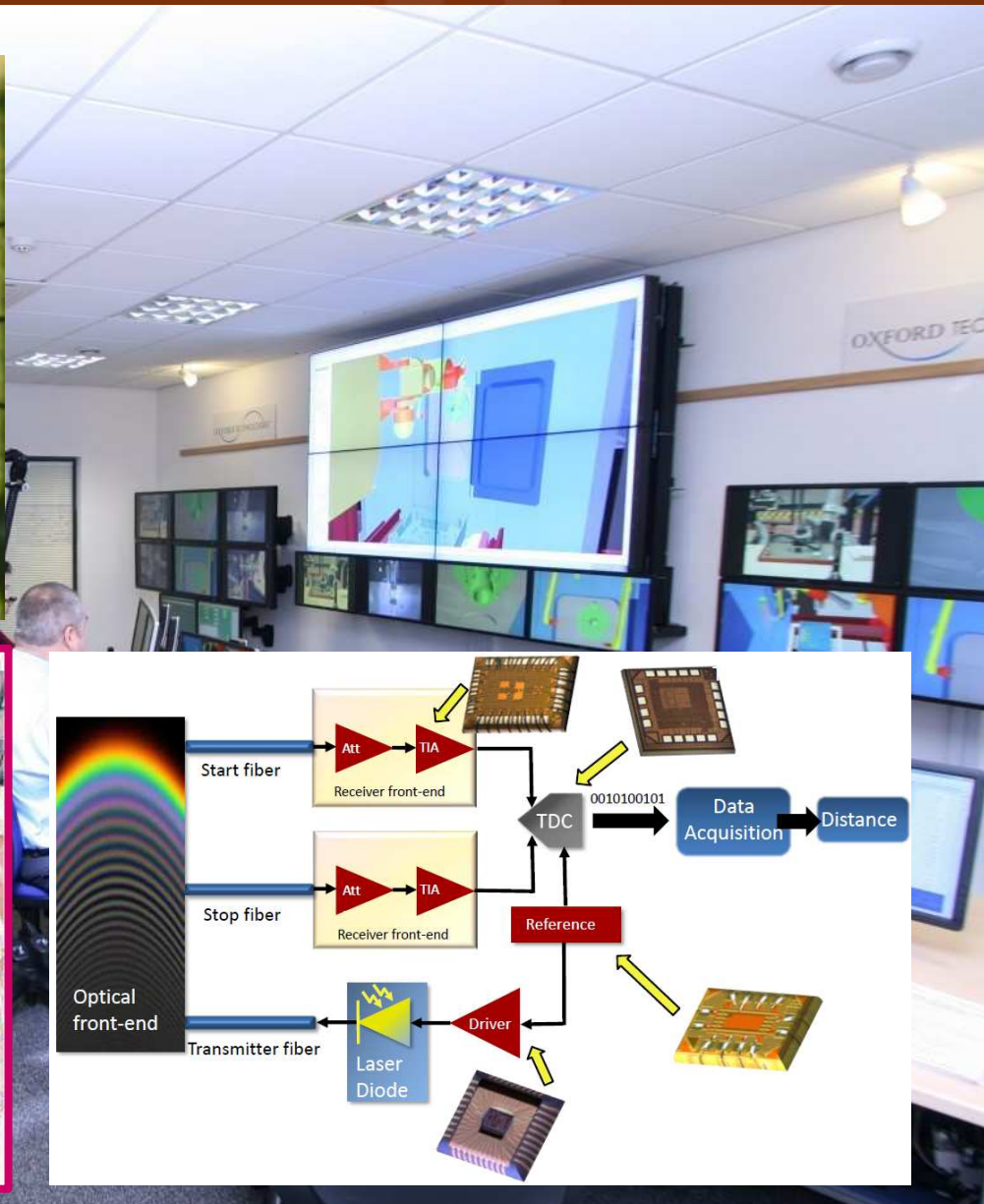
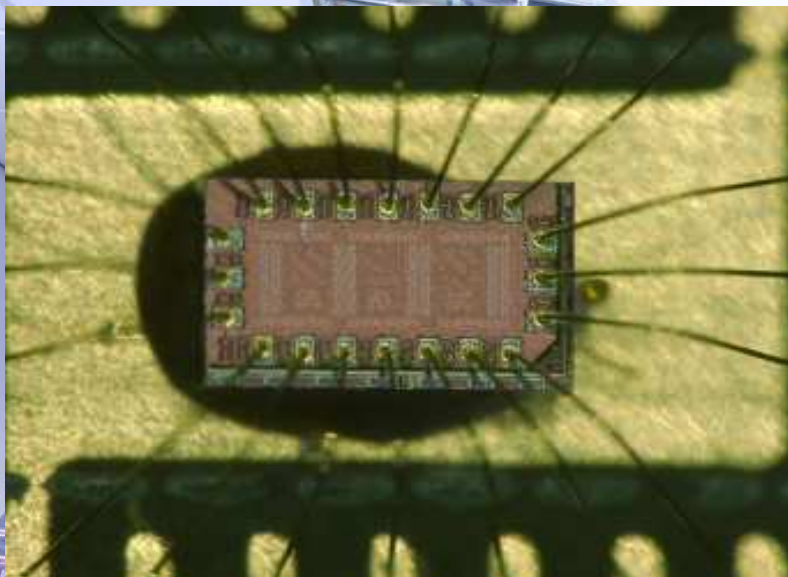
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# MAGYICS/KUL/SCK-CEN : Rad-hard electronics



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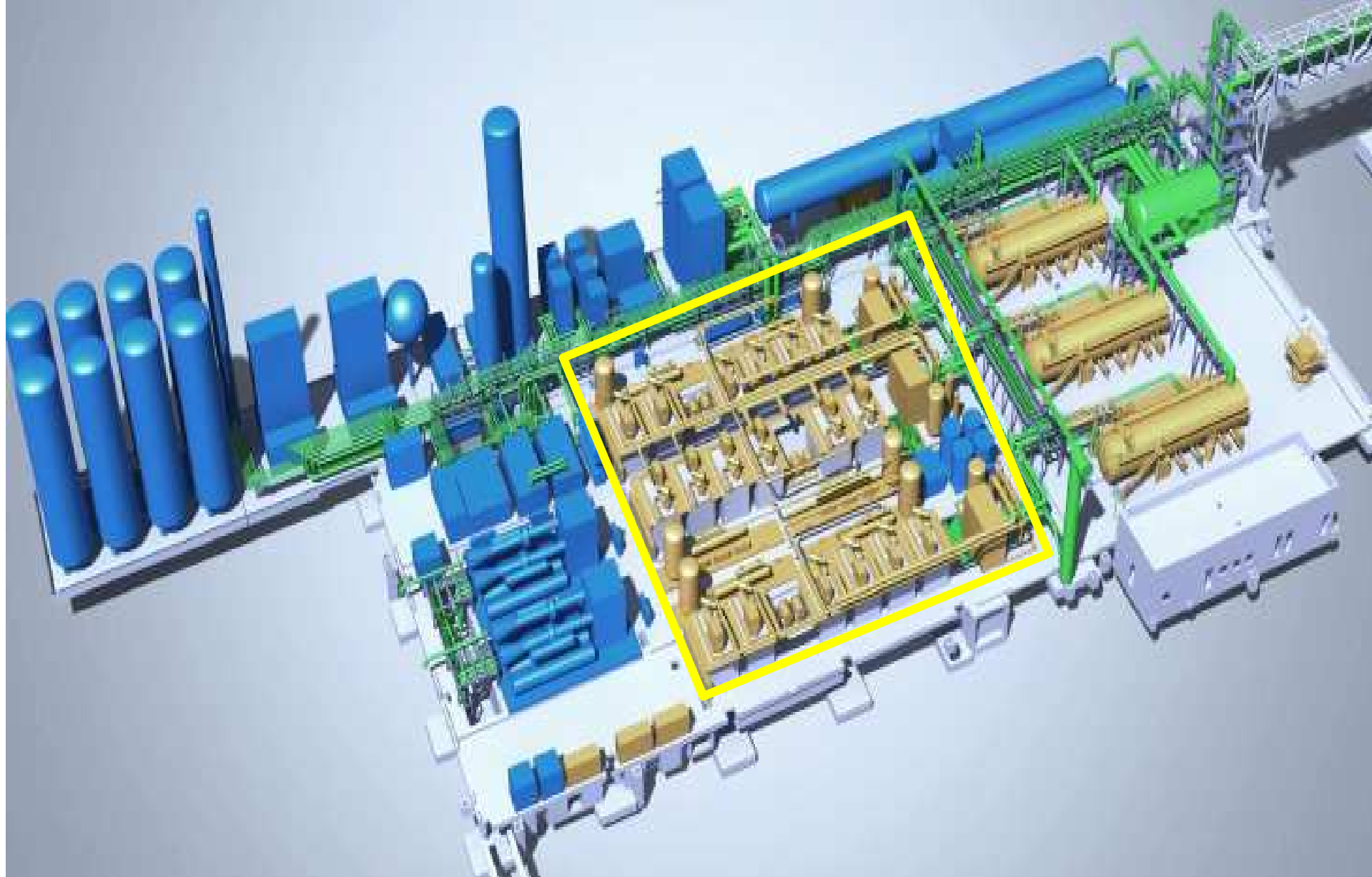
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# MAYEKAWA : 18 LHe cryo-compressors







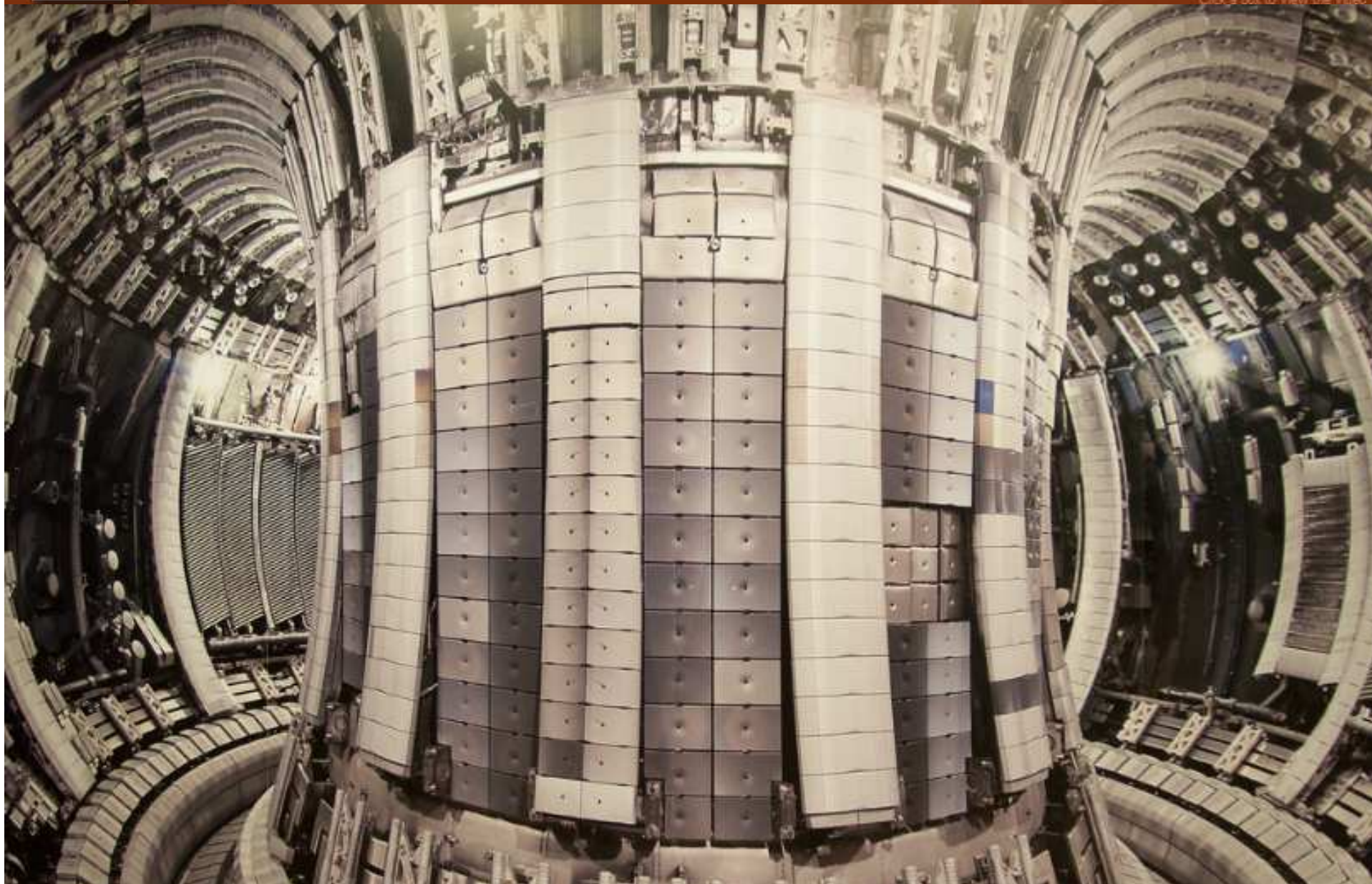
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# *ERM-KMS* : ICRH antenna design ■



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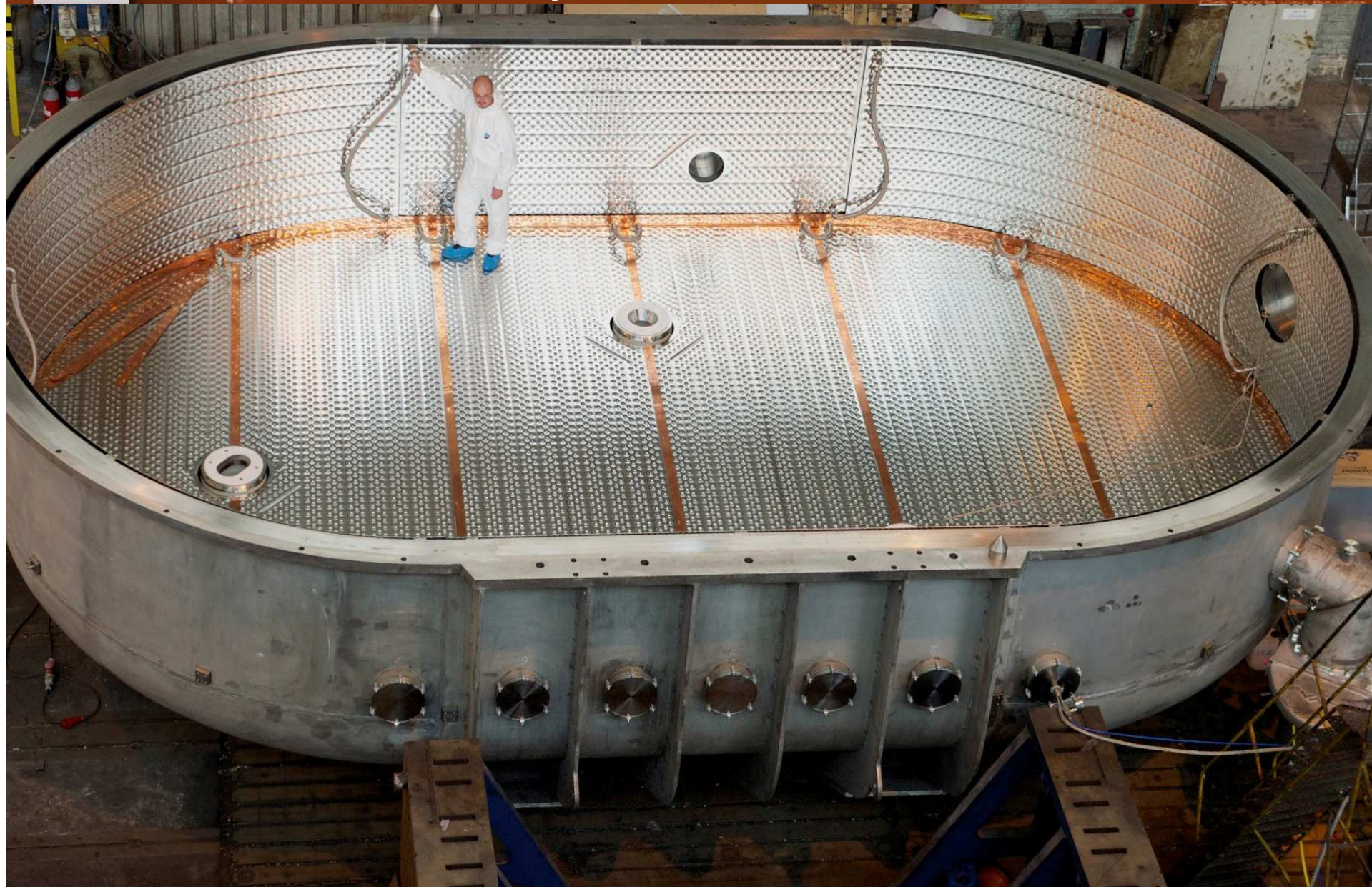


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# ALM + CSL:cryostat for JT60







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## Why participate and why now?

### *Why (trying to) participate in Iter ?*

1. big network of high tech companies
2. many technology challenges
3. branding via pre-qualification
4. possibly contracts to win

### *Why now?*

1. many big contracts awarded for execution during coming years
2. many efforts done to lower barriers for SME participation  
(new industry approach by F4E)



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