



JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



Click a box to view the video

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
www.iterbelgium.be



Summary

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



[Click a box to view the video](#)

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



BELGIUM

ITER Fusion project

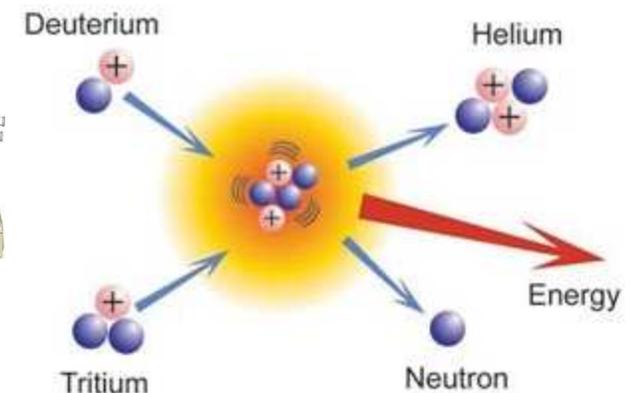
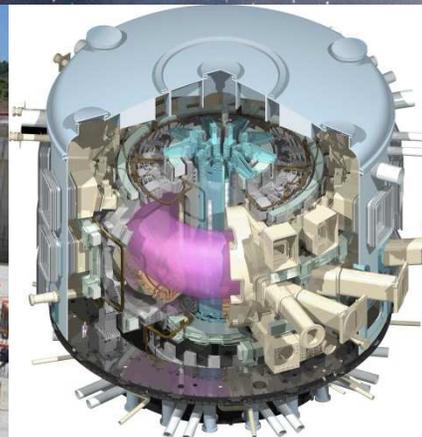
JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



Click a box to view the video

- 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





BELGIUM

Advantages of fusion

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



[Click a box to view the video](#)

- 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 m³)
- no evacuation needed, even in worst case

But

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



BELGIUM

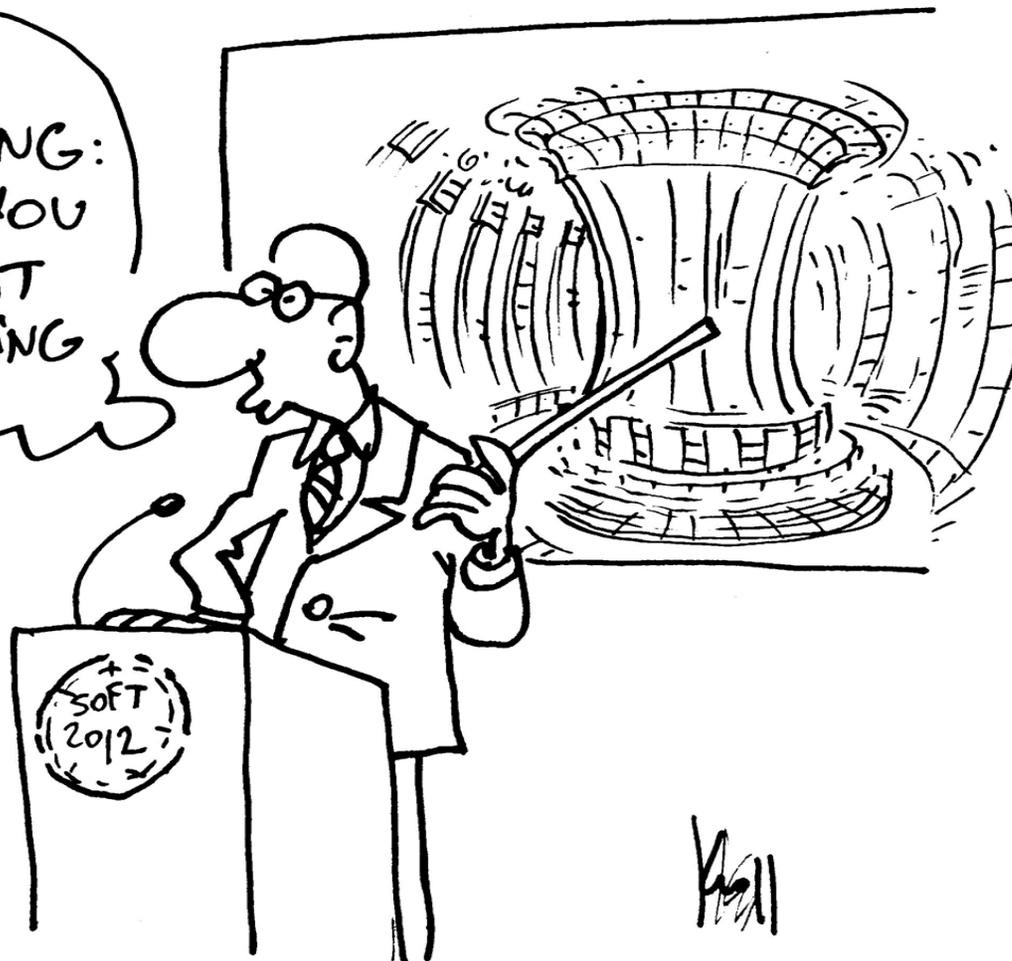
JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



[Click a box to view the video](#)

Challenge 1: science

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



Handwritten signature



BELGIUM

Challenge 2: complex technology

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



[Click a box to view the video](#)





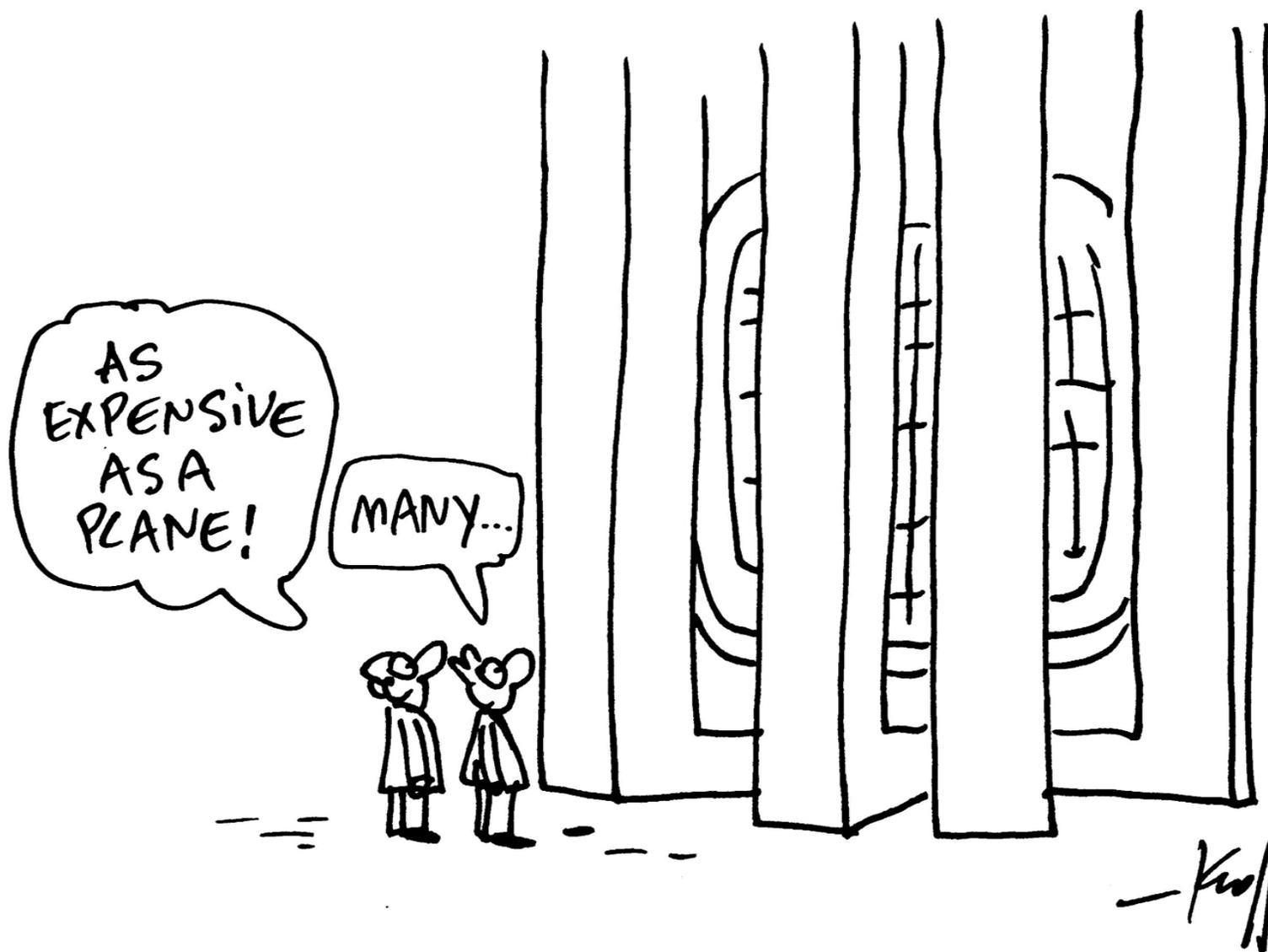
BELGIUM

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



Click a box to view the video

Challenge 3: cost for infrastructures





BELGIUM

Challenge 4: development time

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



[Click a box to view the video](#)

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

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



Koll



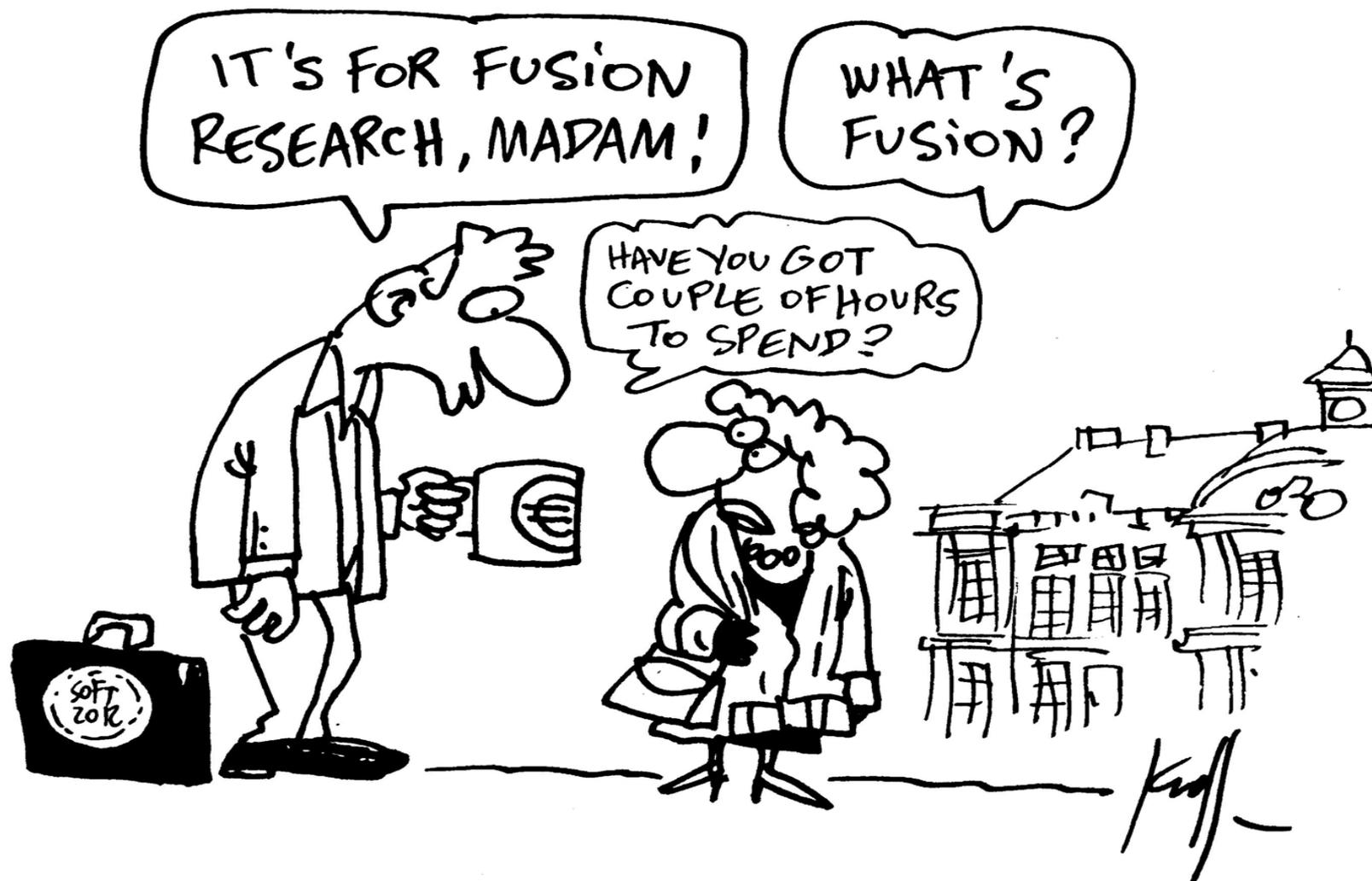
BELGIUM

Challenge 5: public funding

JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



[Click a box to view the video](#)





BELGIUM

Tokamak concept

JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



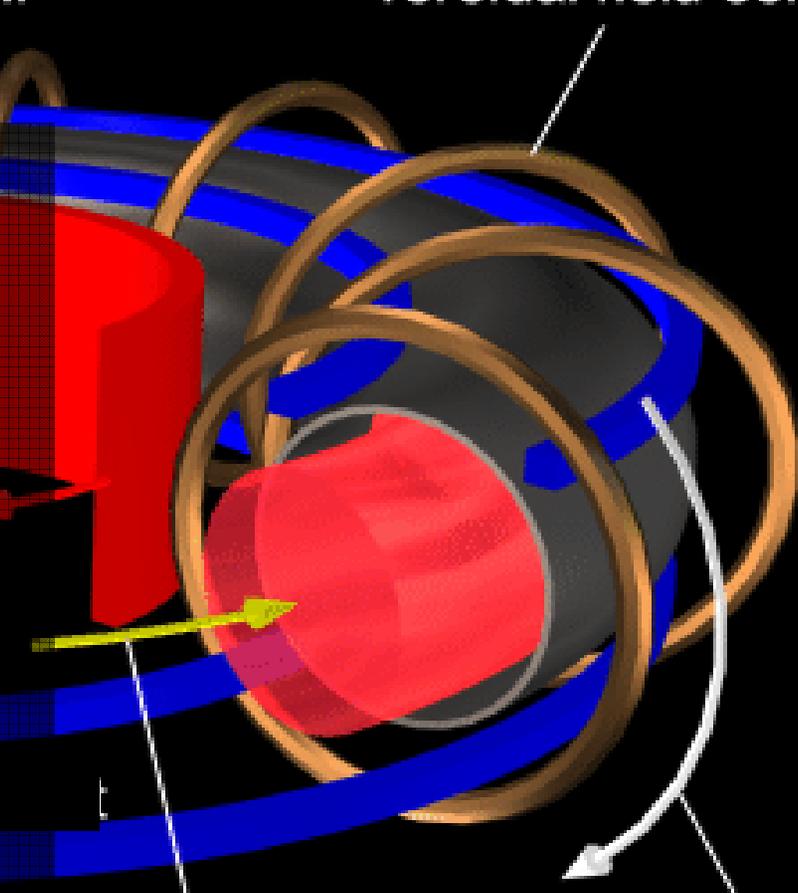
[Click a box to view the video](#)

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



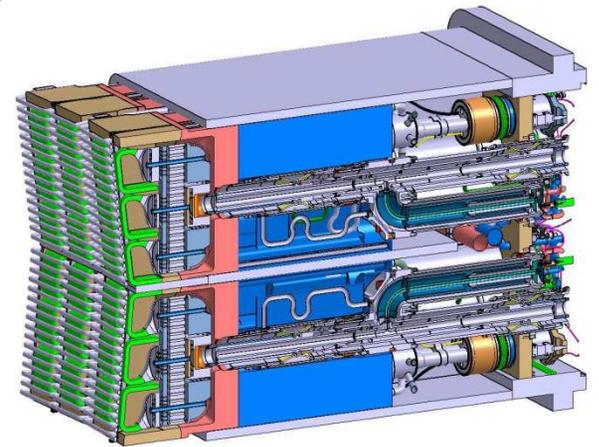
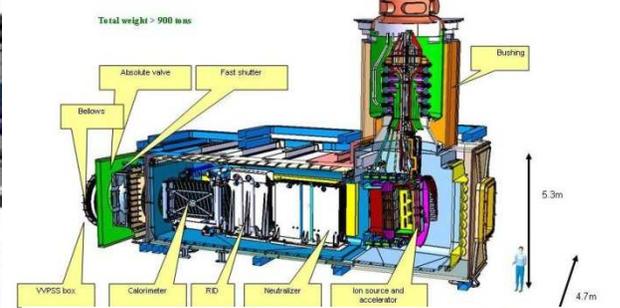
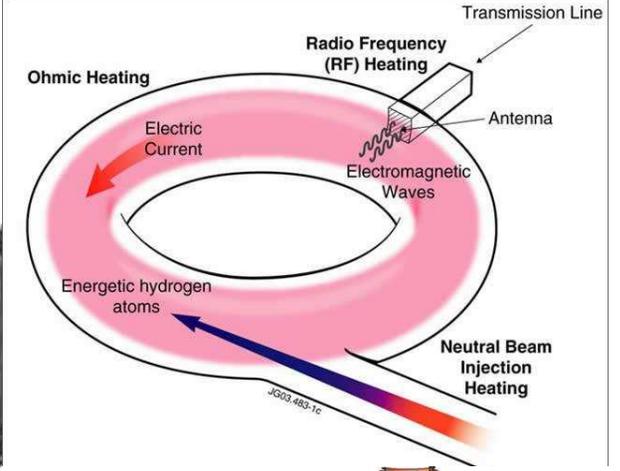
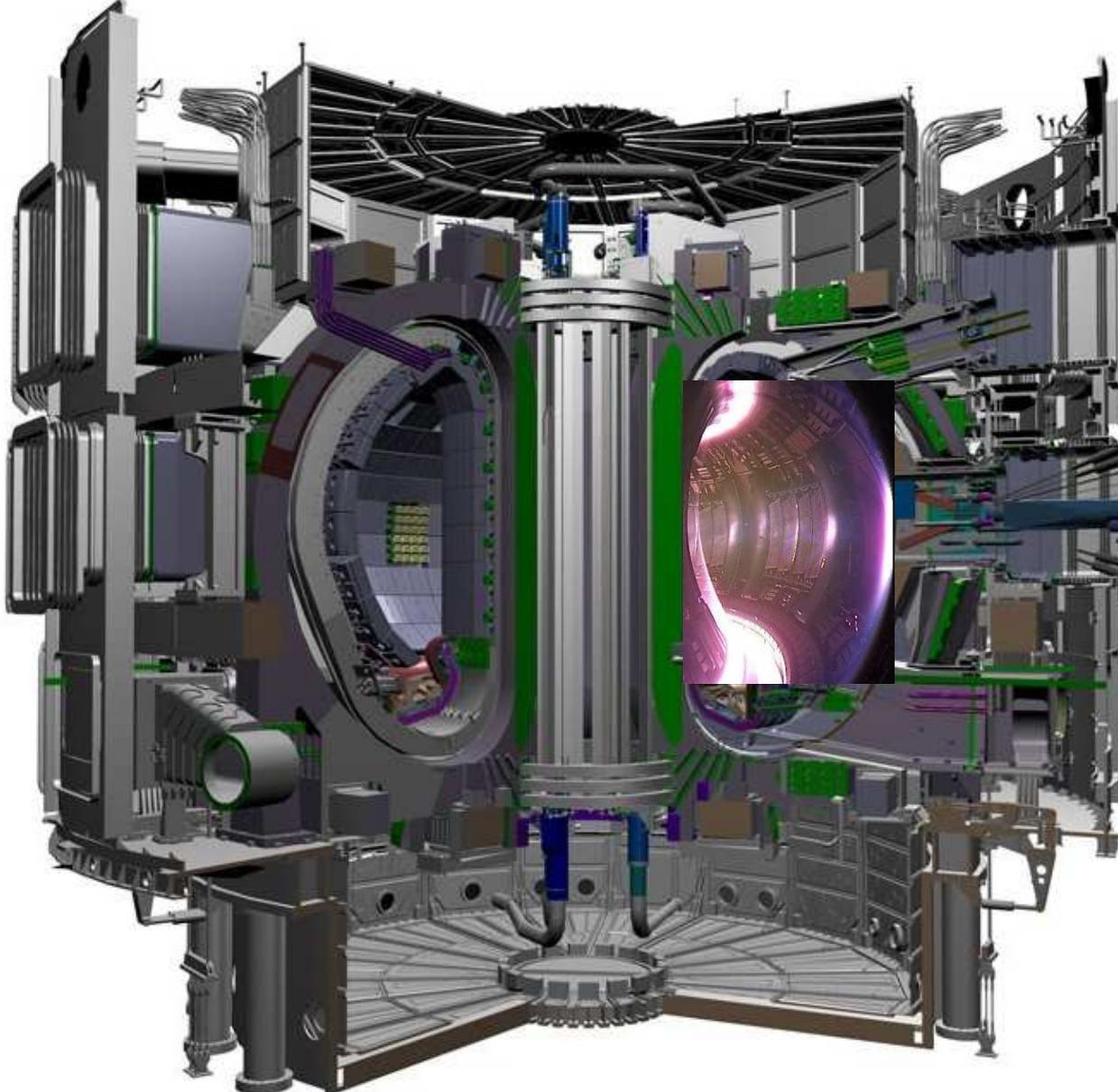
ITER BELGIUM

ITER reactor design and heating

JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



Click a box to view the video





ITER BELGIUM

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS

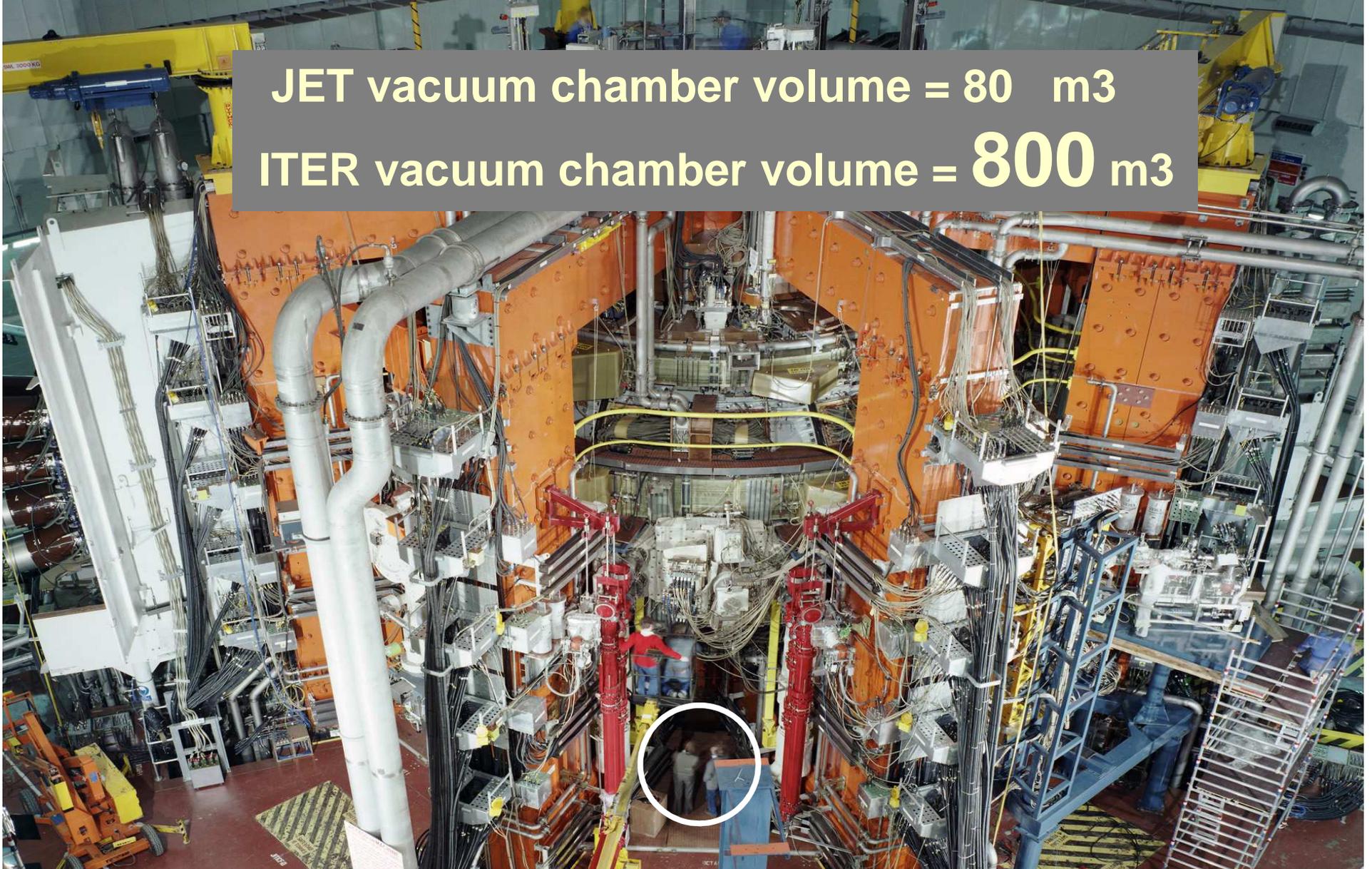


[Click a box to view the video](#)

JET (Joint European Torus, Culham, UK)

JET vacuum chamber volume = 80 m³

ITER vacuum chamber volume = 800 m³





BELGIUM

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



Click a box to view the video

ITER international collaboration with 7 DA's

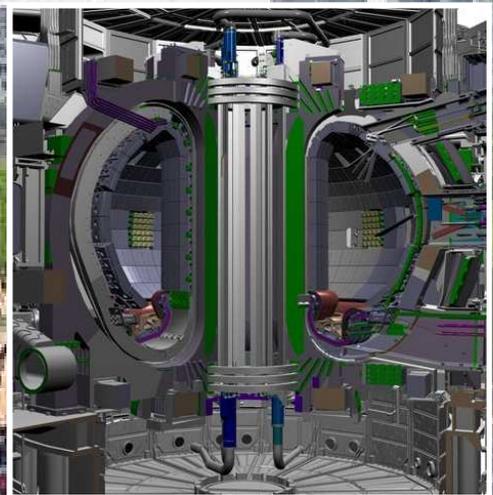
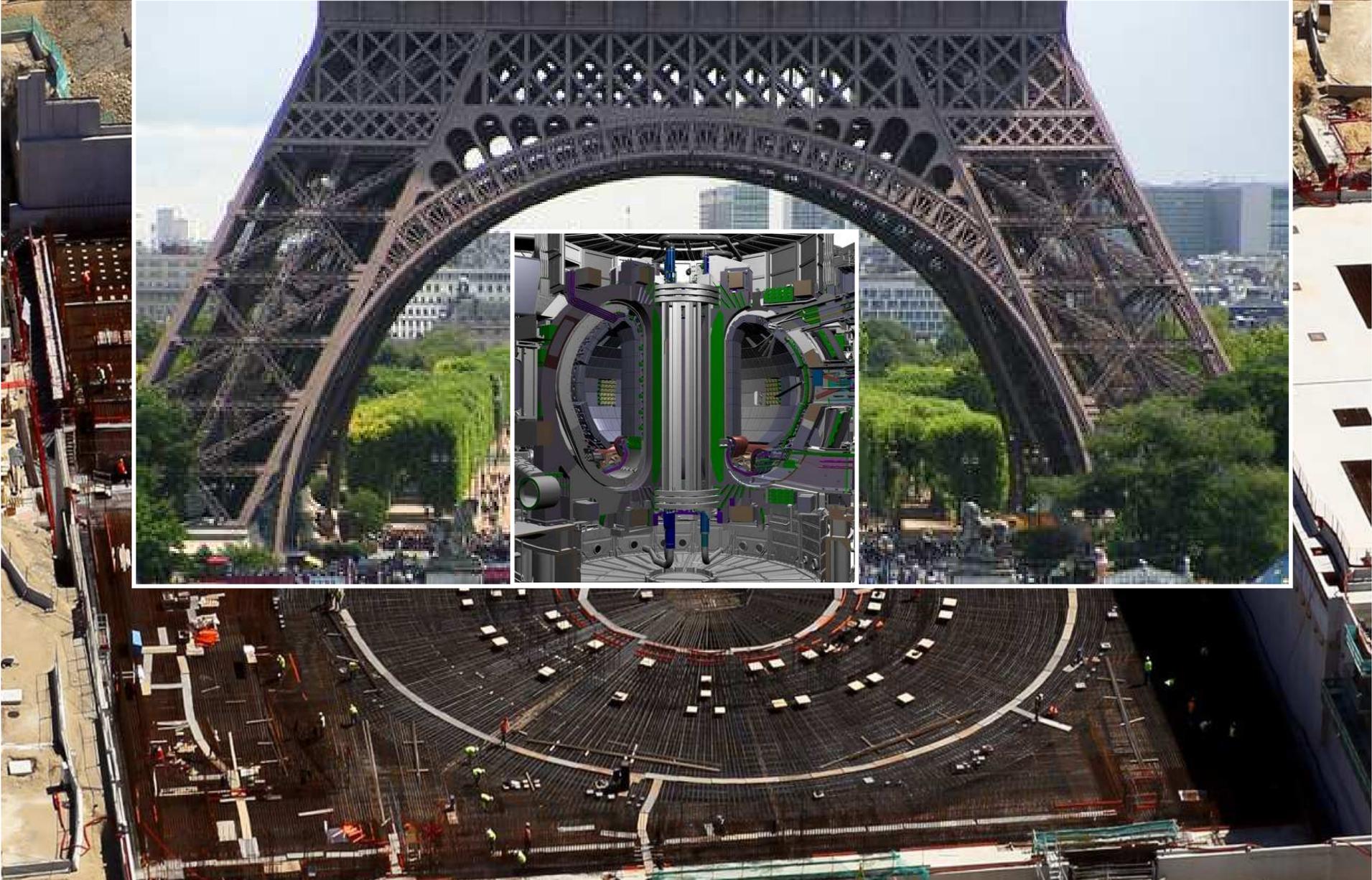




BELGIUM

status site 2007-2014

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS

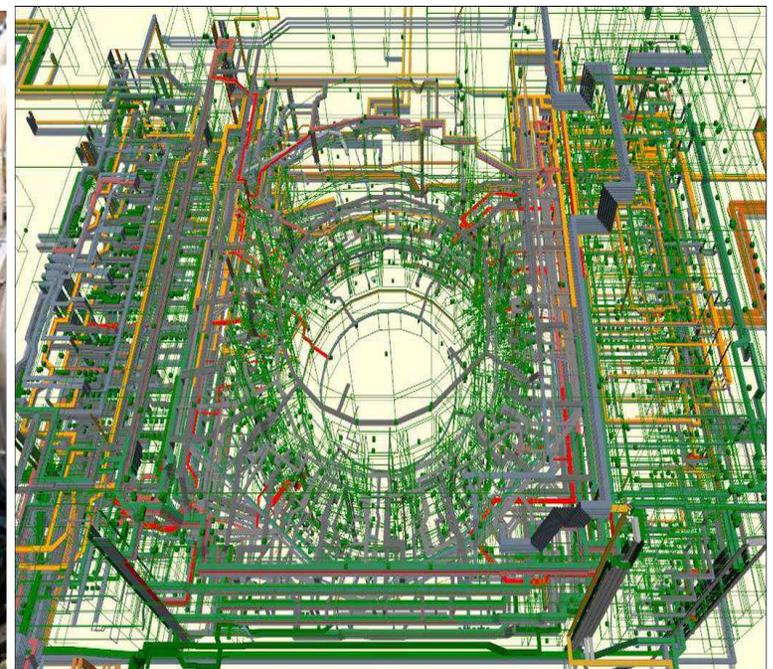




BELGIUM

A lot is going on...

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS





BELGIUM

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

JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



Click a box to view the video



the way to new energy

search:

Google™ Custom Search

china eu india japan korea russia usa

- Construction
- Transport
- The Machine
- The Science
- The Organization
- The Project
- Glossary
- General Information

iter mag
iter newsline

ITER deals with 7 Domestic Agencies for procurements



Three giants take position on the platform

- ITER Intranet
- ITER & the Environment
- Safety at ITER
- ITER newsline
- Working for ITER

today's focus

SCI REACHING 150,000,000 °C

ITER Mag

ITER Mag is now available in the following languages:

Subscribe to



BELGIUM

<http://fusionforenergy.europa.eu/>

JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



Click a box to view the video

Home | Skip to Content | FAQ | Contact Us | Sign up for F4E News | Useful Links | RSS Feeds



FUSION FOR ENERGY

Bringing the power of the sun to earth

F4E is the European Domestic Agency

ABOUT F4E

UNDERSTANDING FUSION

PROCUREMENT AND GRANTS

MEDIA CORNER

CAREER OPPORTUNITIES



Read more

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



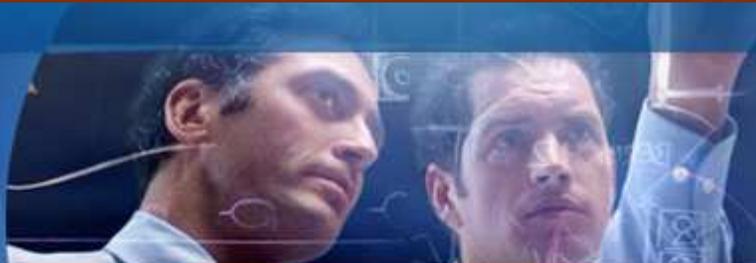
BELGIUM

F4E announcements and CFT's

JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



Click a box to view the video



INDUSTRY AND FUSION LABORATORIES PORTAL

Sign In

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

F4E Calls workspace

[Search F4E public calls](#)

[ITER Task Agreements](#)

[ITER calls](#)

[Administrative procurement](#)

[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 @ 03/10/2014 17:56

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.

Company database

[Get an account](#)

[Register my company](#)

[Search companies](#)

ITER DAs Access

SIGN IN HERE

ILO National Initiatives

ILO Access

SIGN IN HERE

Links



ITER BELGIUM

Get your account...

JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



Click a box to view the video



FUSION FOR ENERGY



INDUSTRY AND FUSION LABORATORIES PORTAL

Sign In

[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



BELGIUM

Role of Iterbelgium

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



Click a box to view the video

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



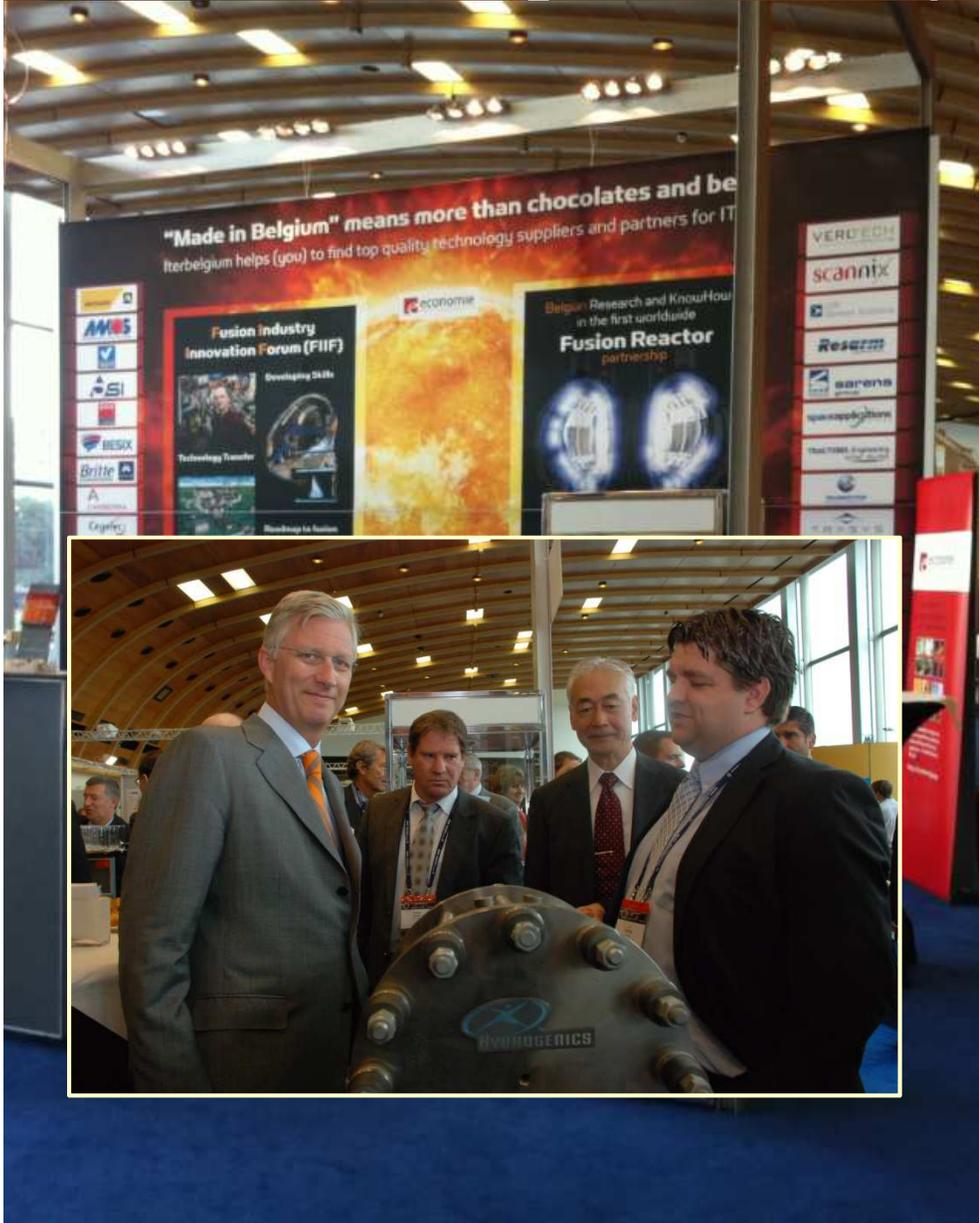
BELGIUM

Iterbelgium booths (SOFT 2012/2014)

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



Click a box to view the video





BELGIUM

Fusion show support to UA

JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



Click a box to view the video



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

International Doctoral College in Fusion Science and Engineering



Fusion DC    



BELGIUM

Technical visits (JET Culham)

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



[Click a box to view the video](#)





BELGIUM

create ITERBELGIUM data sheets

JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



Click a box to view the video

NL FR **EN**

SEARCH

- HOME
- CONTACT US
- CONTACT LIST
- GOAL OF THE UNIT
- THE ITER PROJECT
- BELGIAN COMPANIES
- DOCUMENTS
- LINKS
- FUSION EXPO 2010
- ITER INTERNATIONAL
- MEDIA

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

NOW AVAILABLE on APP

SOFT 2012



OPEN TENDERS
ITER-related calls for
directly.



FUSION-related call for
directly



News

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

BELGIAN COMPANIES

IterBelgium Members

User login

User:

Pass:



BELGIUM

What can you do?

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



Click a box to view the video

- 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



ITER BELGIUM

Belgian SME exempels

JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



Click a box to view the video

BELGIAN TECHNOLOGY IN ITER

HIGH SENSE OF QUALITY, NOT ONLY FOR BEER AND CHOCOLATES

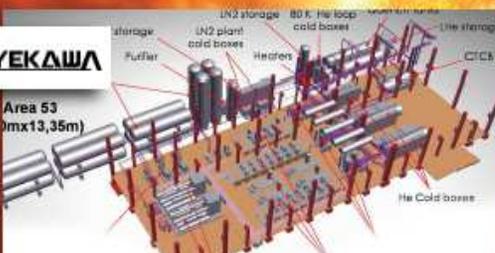


EXTREMELY HOT PLASMA ICRH HEATING ANTENNAS

www.iterbelgium.be



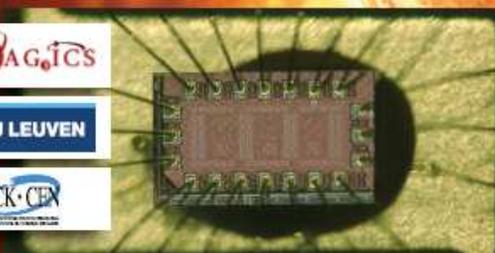
EXTREMELY EXOTIC CRYOSTAT MOUNTING



EXTREMELY COLD HELIUM CRYO-COMPRESSOR UNITS



EXTREMELY LEAK TIGHT HIGH TECH METAL SEALS



EXTREME RADIATION-HARD ELECTRONICS



EXTREME QUALITY IN VACUUM VESSEL CONTROLS



EXTREME QUALITY IN JT 60 MAGNET TEST CRYOSTAT



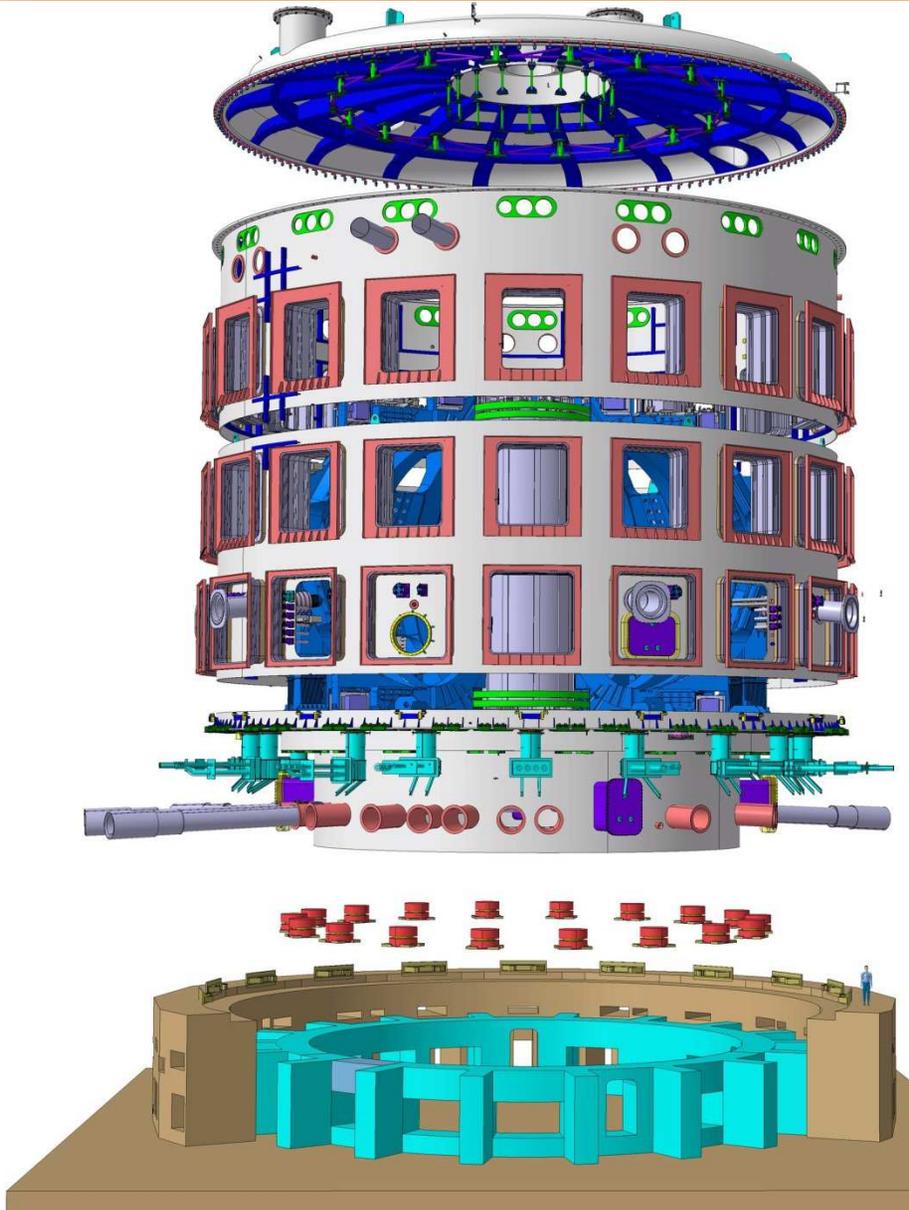
BELGIUM

SARENS : cryostat mounting

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



Click a box to view the video





JOIN ITER, THE ULTIMATE PROJECT FOR FUSION POWER PLANTS



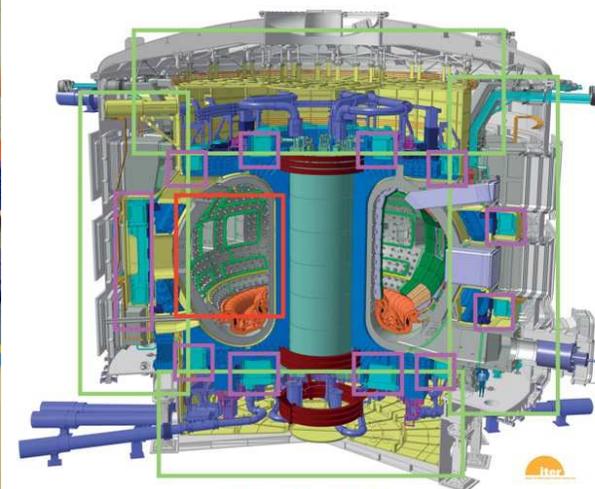
Click a box to view the video

HTMS : High Tech Metal Seals



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



BELGIUM

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS

VINCOTTE : Quality control Vacuum Vessel



[Click a box to view the video](#)



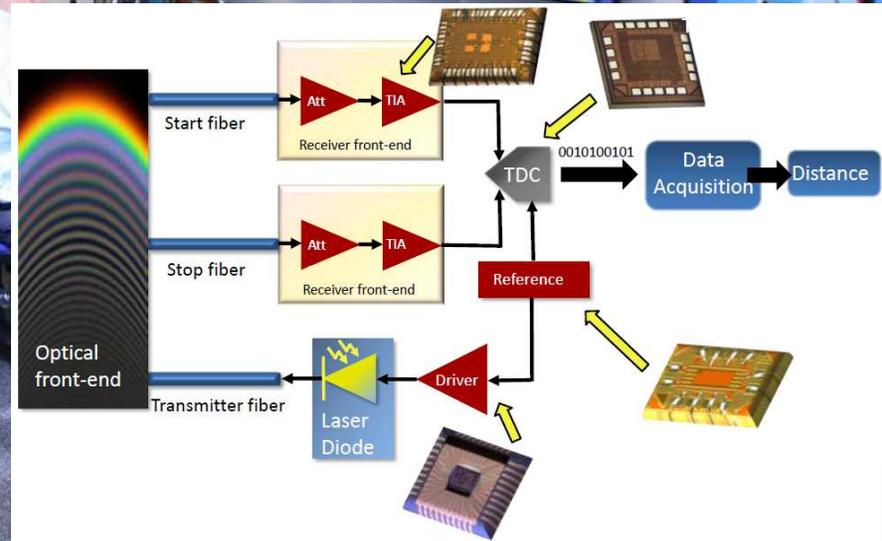
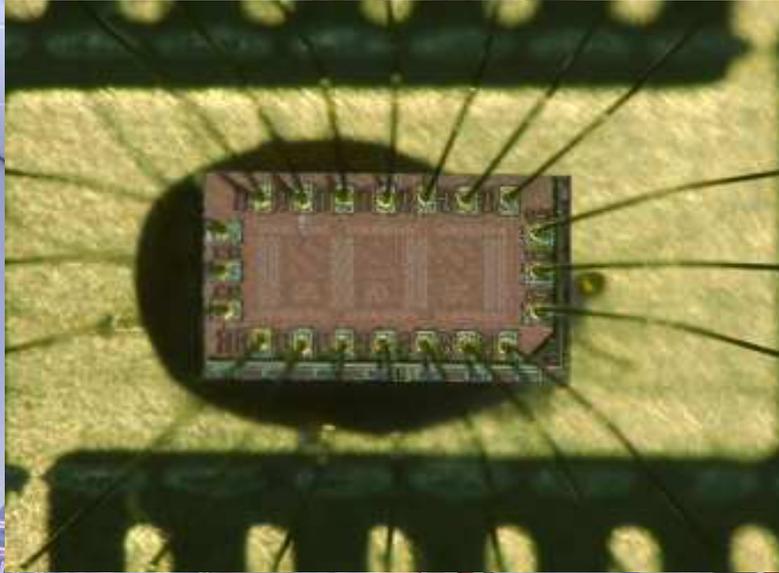


JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



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

Click a box to view the video





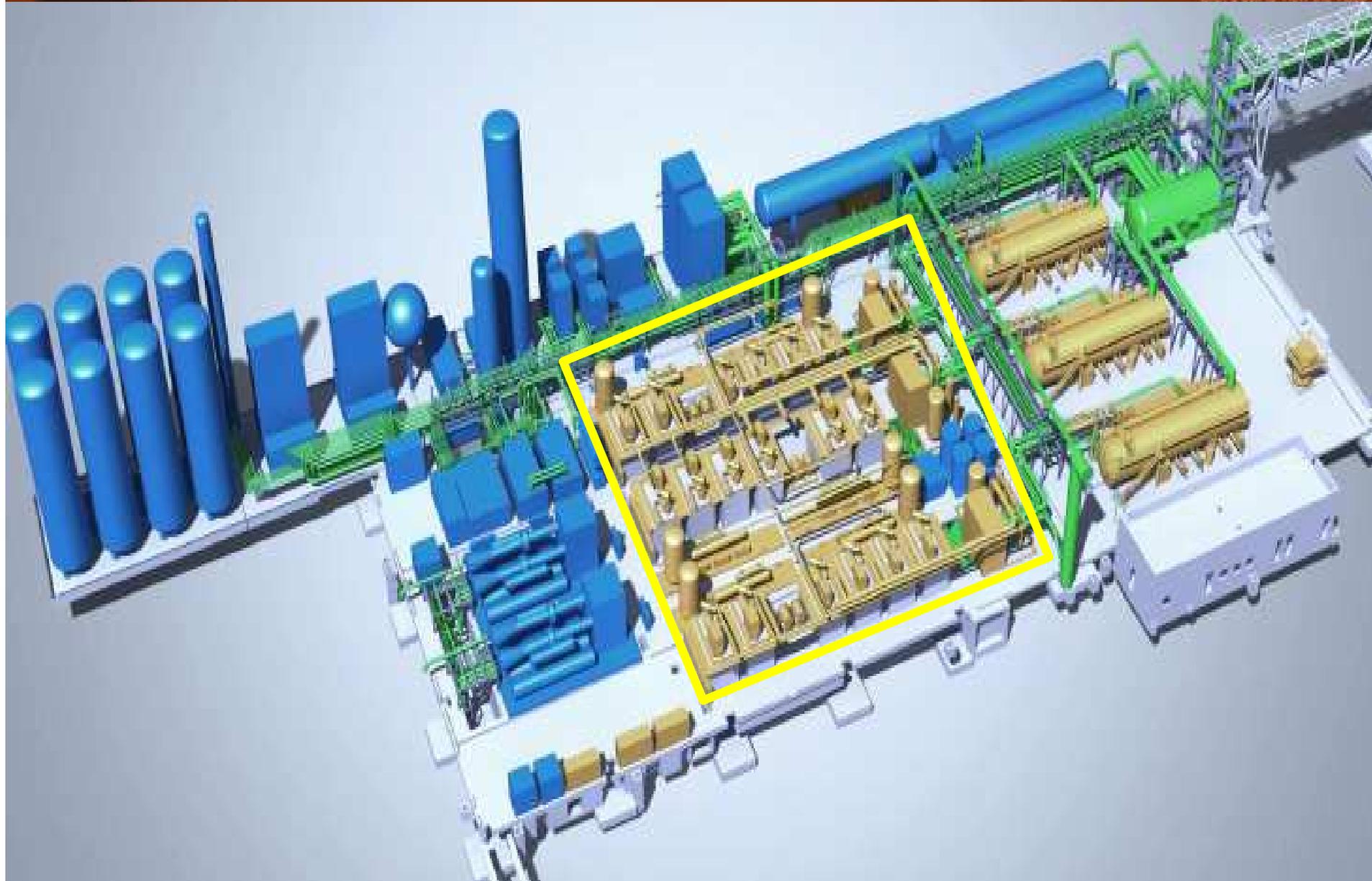
BELGIUM

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



[Click a box to view the video](#)

MAYEKAWA : 18 LHe cryo-compressors





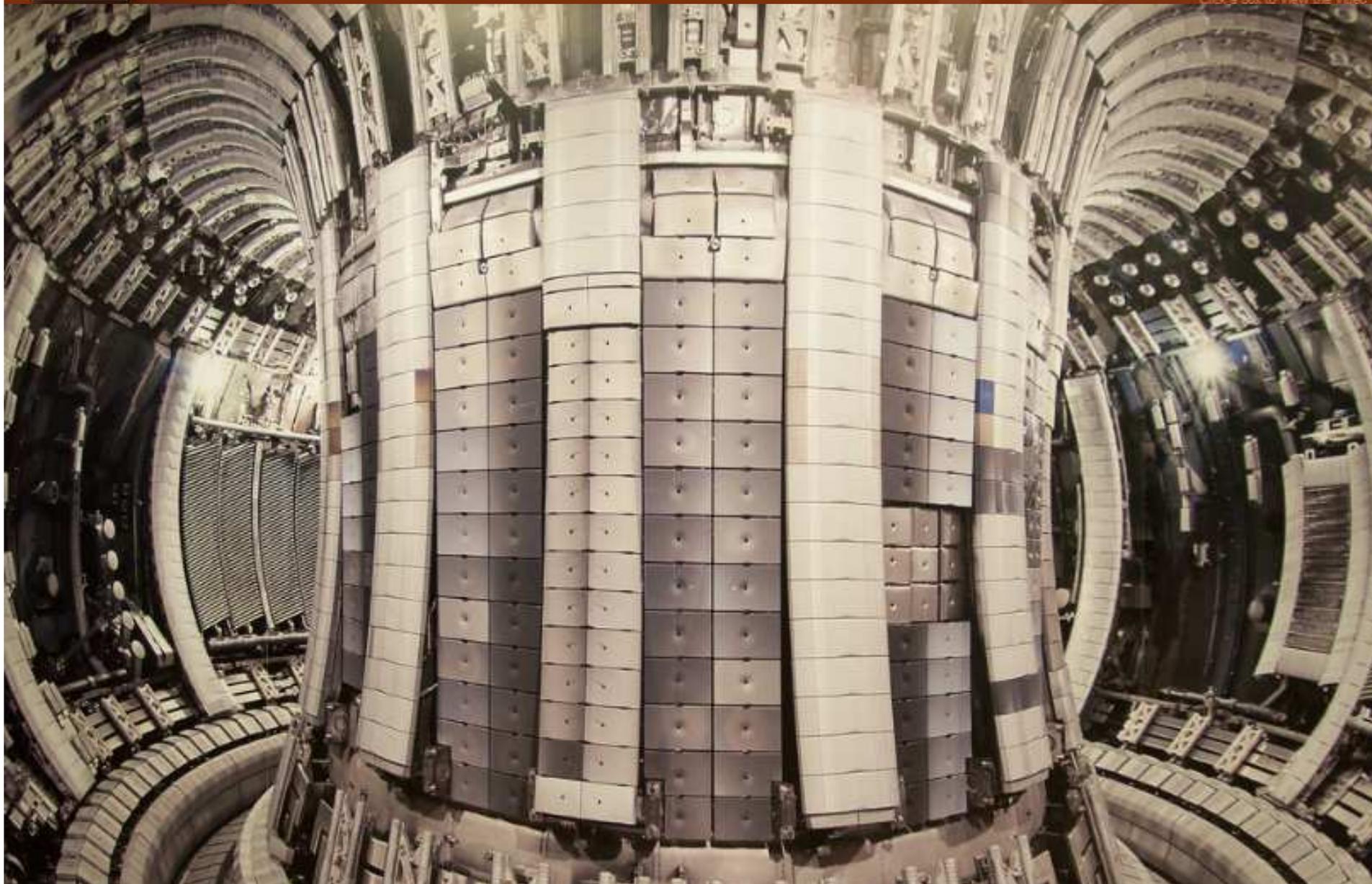
BELGIUM

ERM-KMS : ICRH antenna design

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



[Click a box to view the video](#)

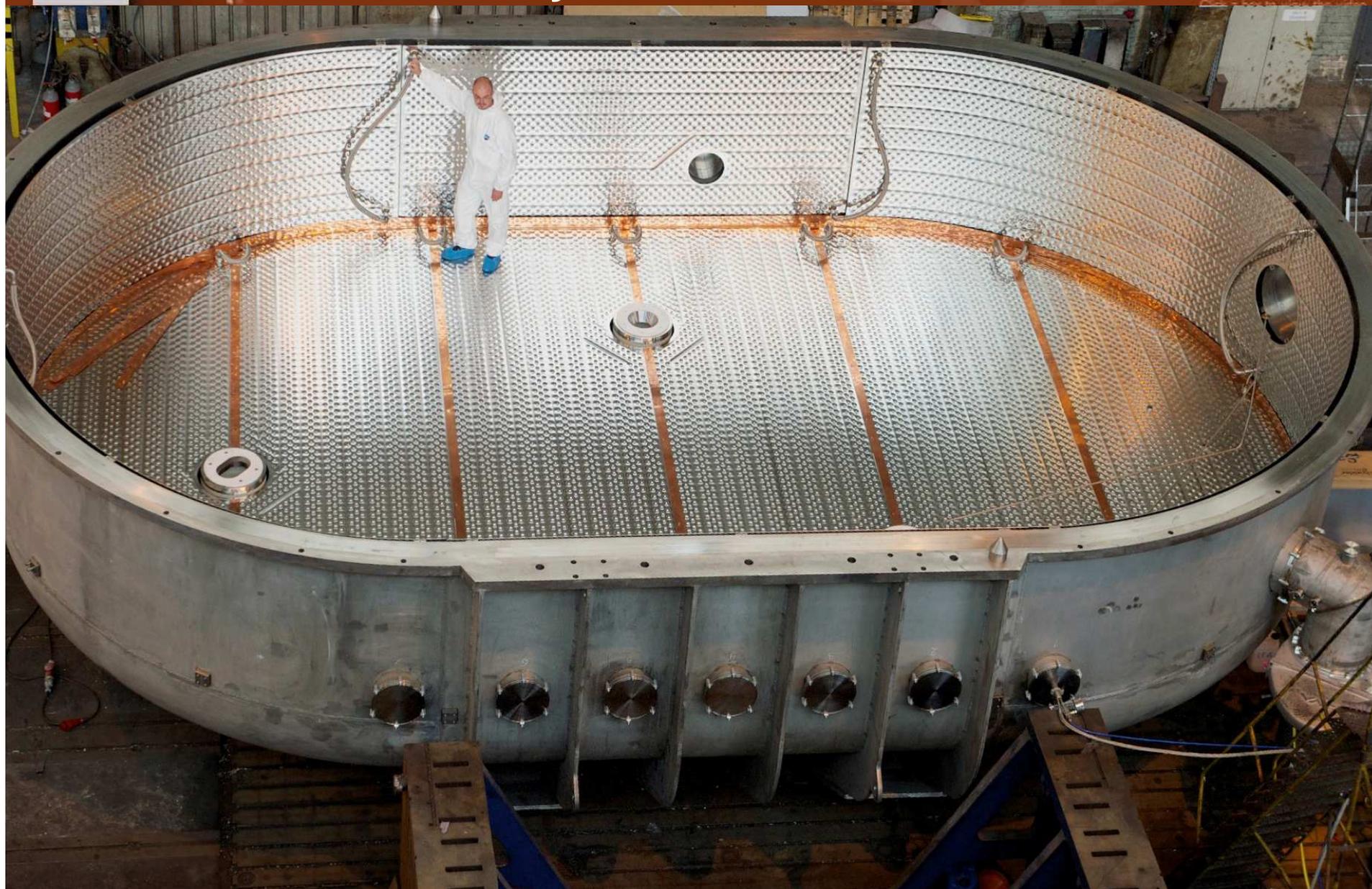




BELGIUM

ALM + CSL: cryostat for JT60

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS





BELGIUM

Why participate and why now?

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



Click a box to view the video

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)



BELGIUM

Join ITER, the ultimate project for fusion power plants

JOIN ITER, THE ULTIMATE PROJECT
FOR FUSION POWER PLANTS



Click a box to view the video

**THANKS FOR
YOUR ATTENTION**

Christian Dierick
ITER Industry Liaison Officer

Agoria asbl
Federation for the Technology Industry
Diamant Building, Bld. A. Reyers 80
1030 Brussels (Belgium)

Tel : +32 2 706 79 55
Fax : +32 2 706 79 88
Mobile : +32 485 91 46 75
christian.dierick@agoria.be
<http://www.iterbelgium.be>