EURATOM in Latvia

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Institute of Solid State Physics University of Latvia (ISSP LU)

Excellence Centre of Advanced Material Research and Technology (CAMART)

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AEUL in cooperation

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In cooperation with

Instituto Tecnológico e Nuclear (ITN), Lisboa, Portugal;
Karlsruhe Institute of Technology (KIT), Germany;
Nuclear Research and consultancy Group (NRG) The Netherlands;
Max-Planck-Institut fuer Plasmaphysik (IPP), Garching, Germany;
ENEA FTU, Frascati, Italy;
IEA University of Maryland, USA

R&D programmes & projects in Latvia: research logistics-areas

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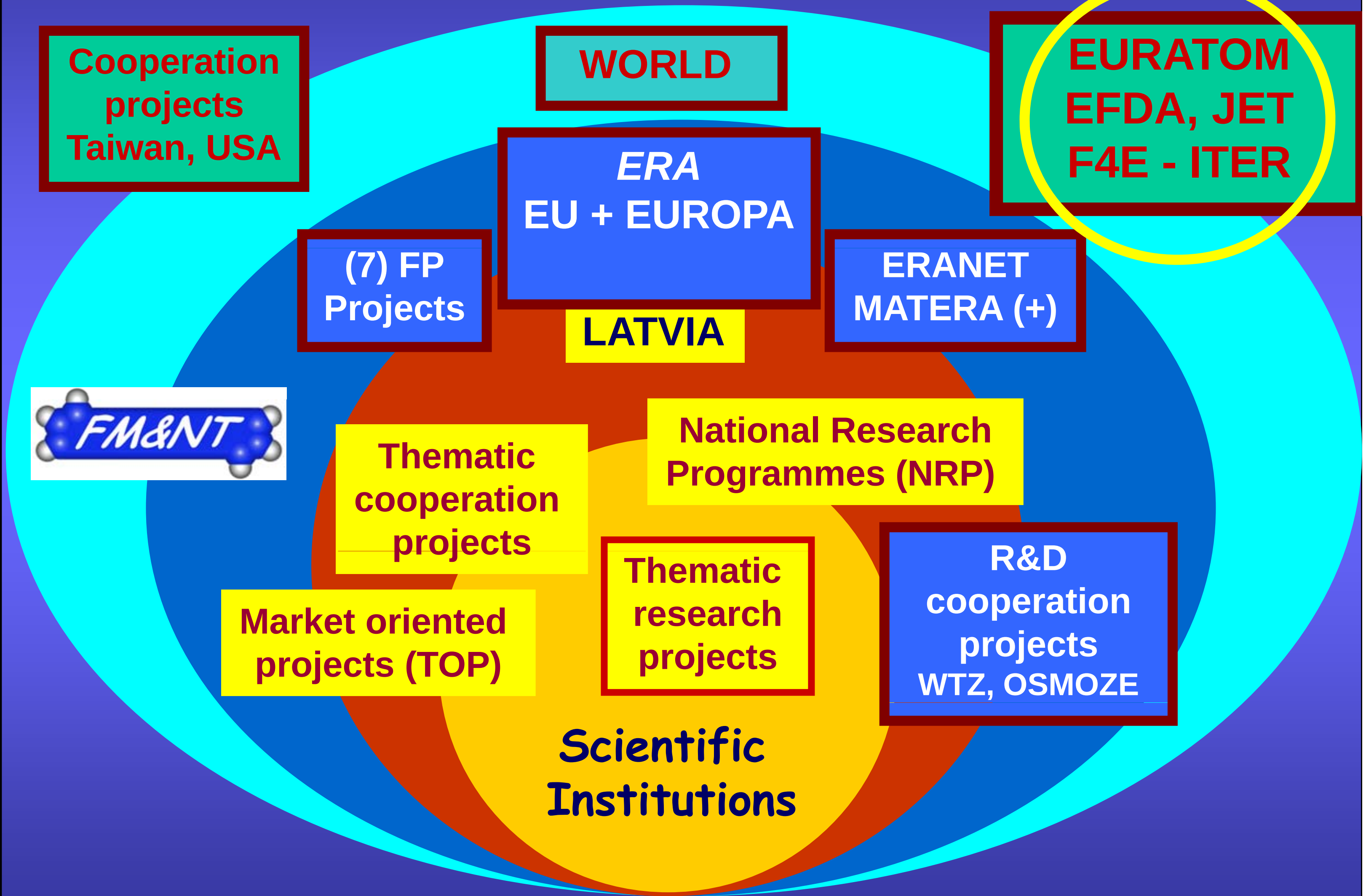

ITER

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iter

china eu india japan korea russia usa

EURATOM-F4E (ITER)

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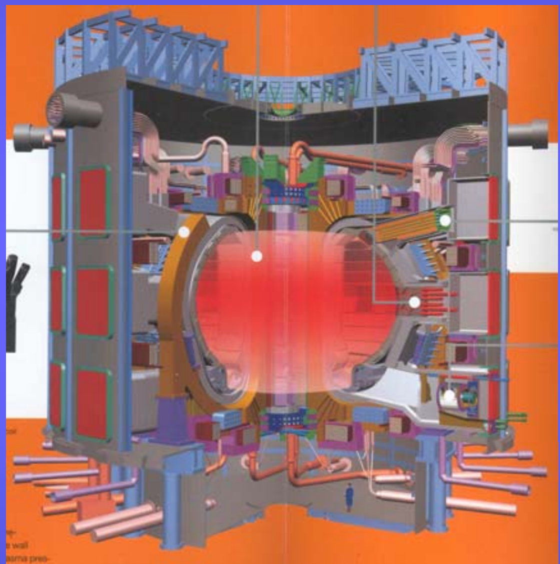
27.11.07. – International agreement has bean signed by EU+Switzerland, Russia, USA, Japan, South Korea, China, India

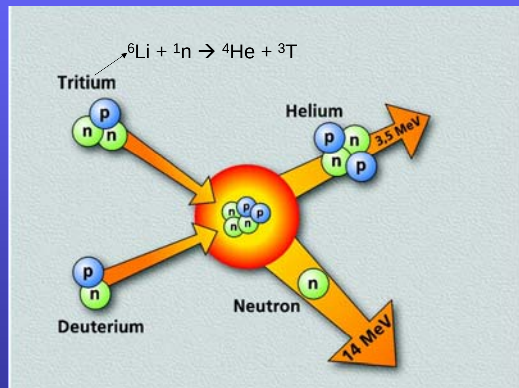
Total 34 countries, incl. Latvia

ASSOCIATION EURATOM – UNIVERSITY OF LATVIA (AEUL) SINCE 2002



Reactor ITER will be built in Europe – in Cadarache – soth of France, near Marcel

Fusion and International Thermonuclear Experimental Reactor **(ITER)**



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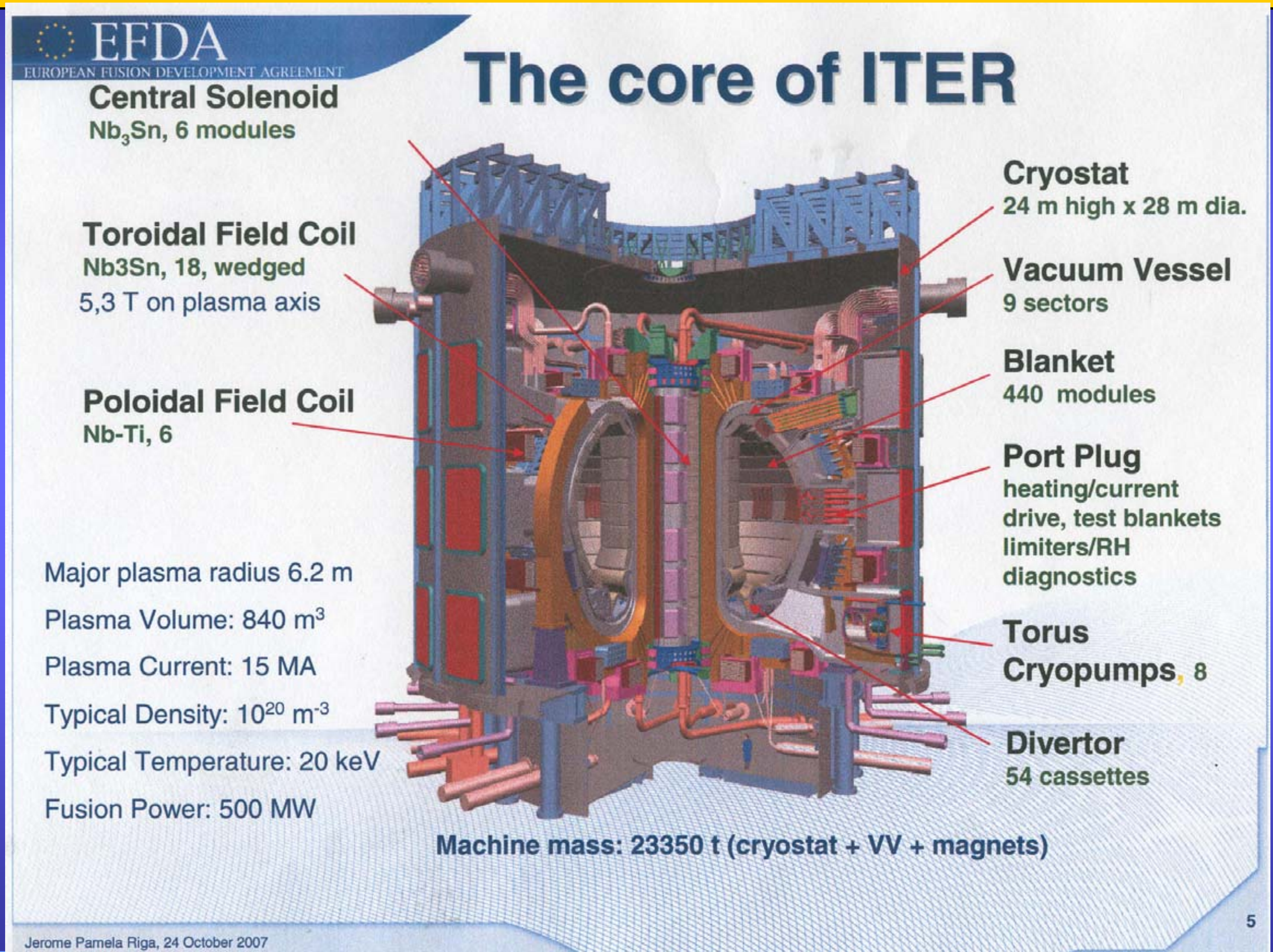

Tokamak (JET, JT60A); Stellarator (W7-X)

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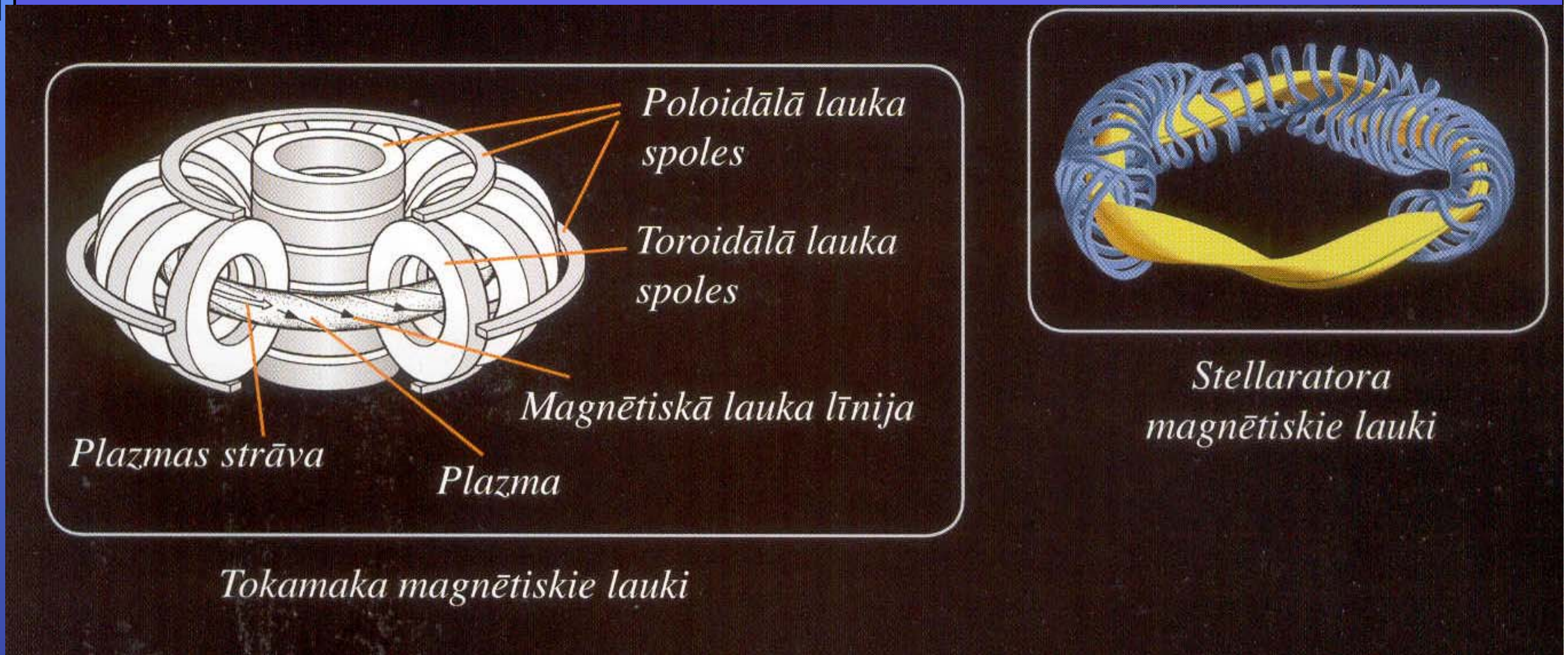

ITER site in Cadarache

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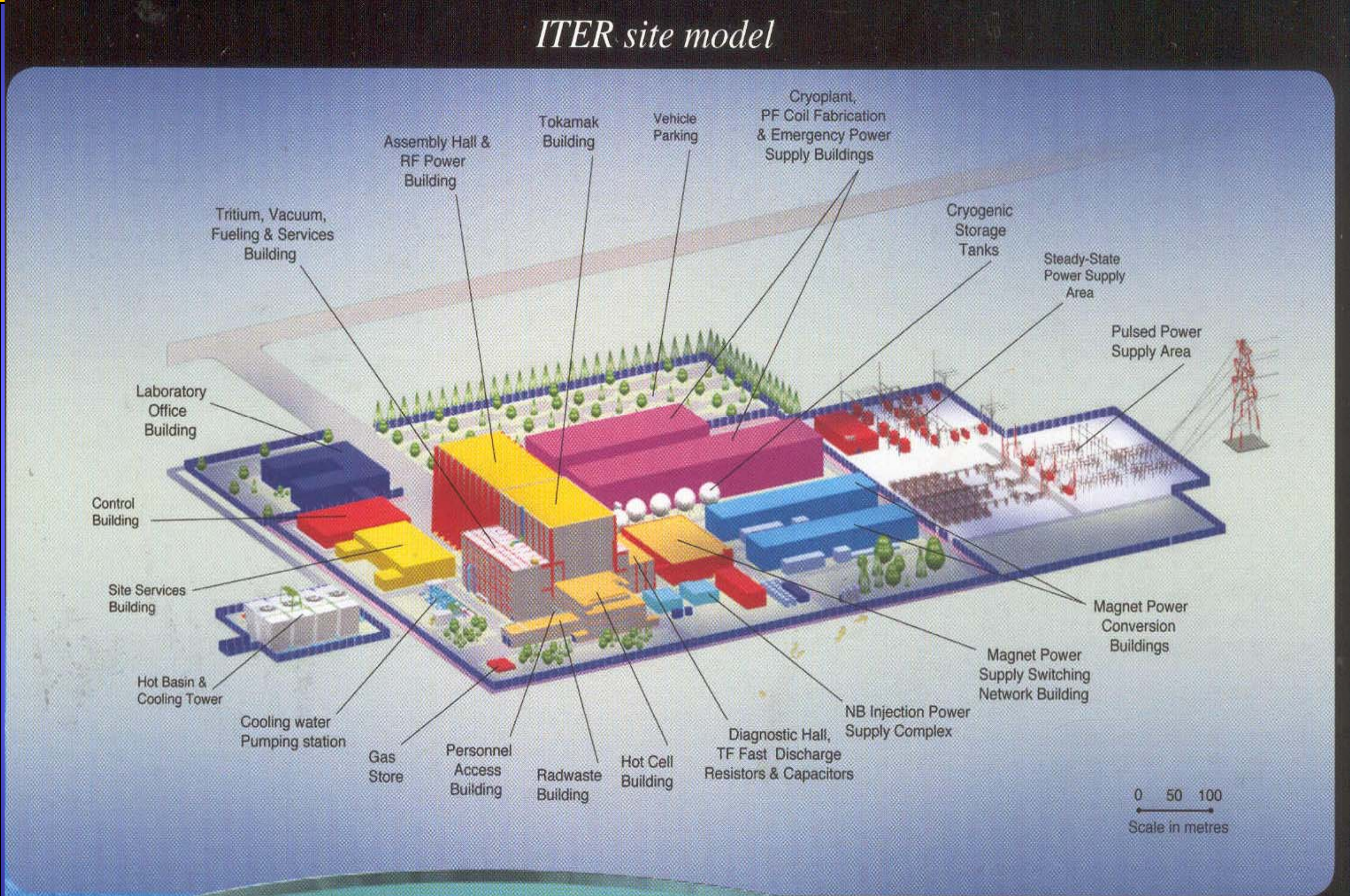

Overall fusion planning

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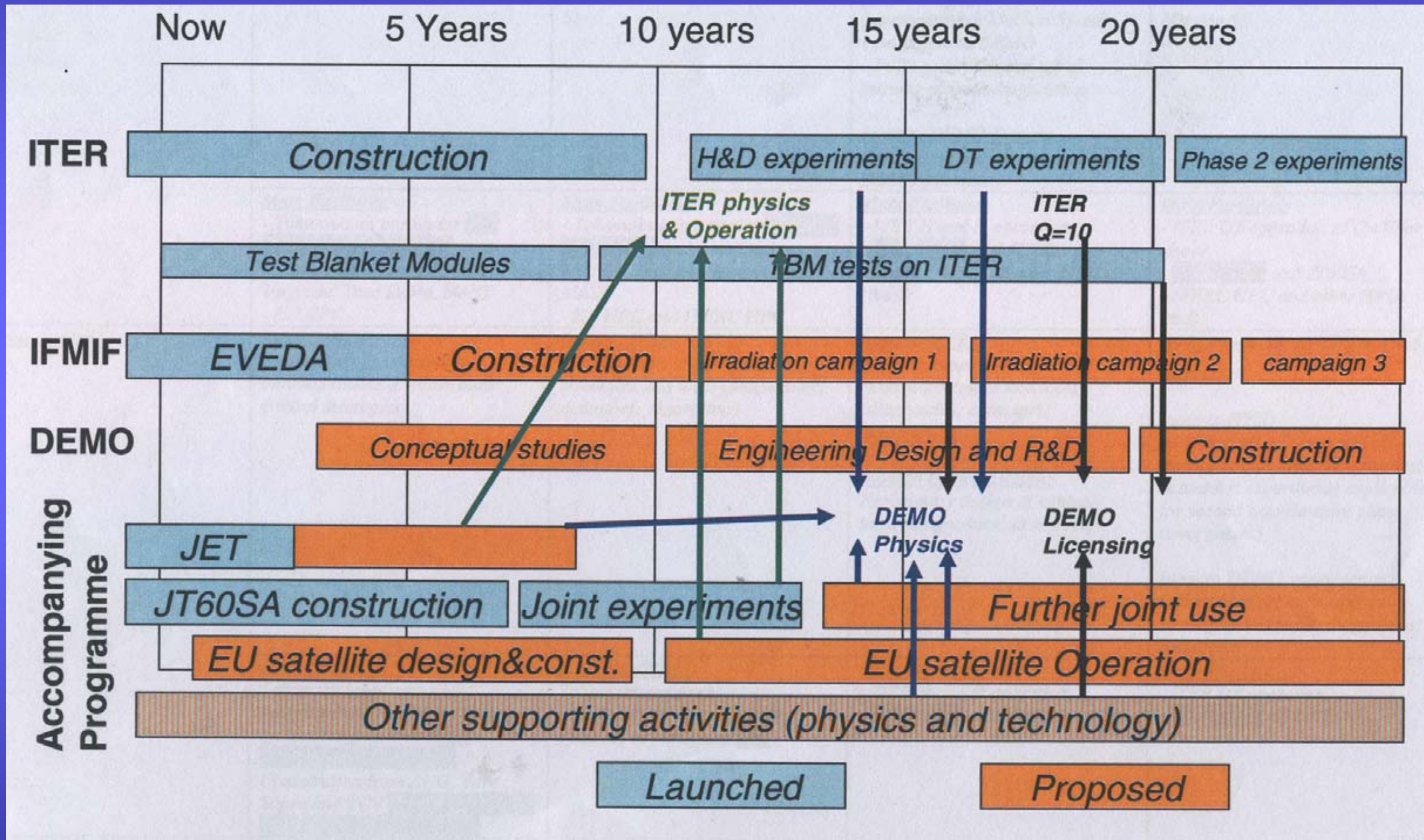

ITER design parameters

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ITER design parameters

Total fusion power (megawatt)	500 MW
Power multiplication factor (Q)	10
Tokamak diameter	24 m
Tokamak height	15 m
Plasma volume	850 m^3
On-axis toroidal magnetic field (tesla)	5.3 T
Operational life	20 years+

JET : ITER

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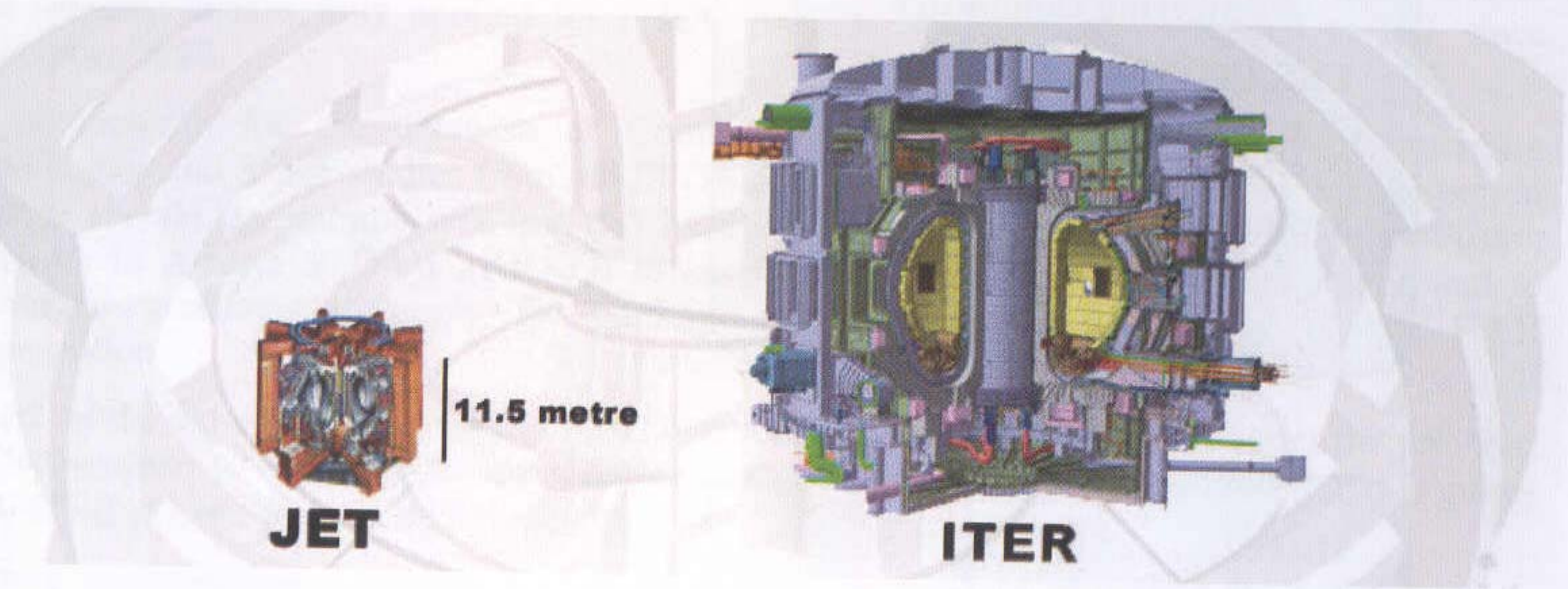

Comparison of JET, the so-far largest Tokamak worldwide and ITER. ITER will be nearly 30 m high and will weigh 23 000 tons.

Overall fusion planning

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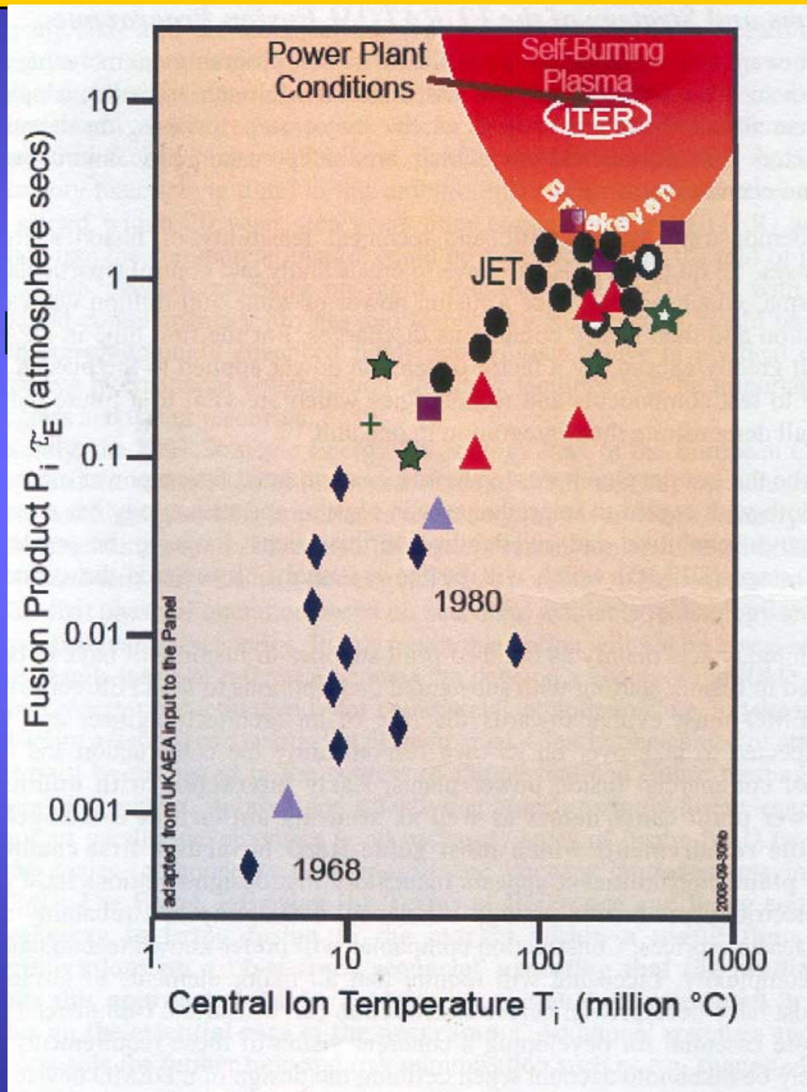

Overall fusion planning

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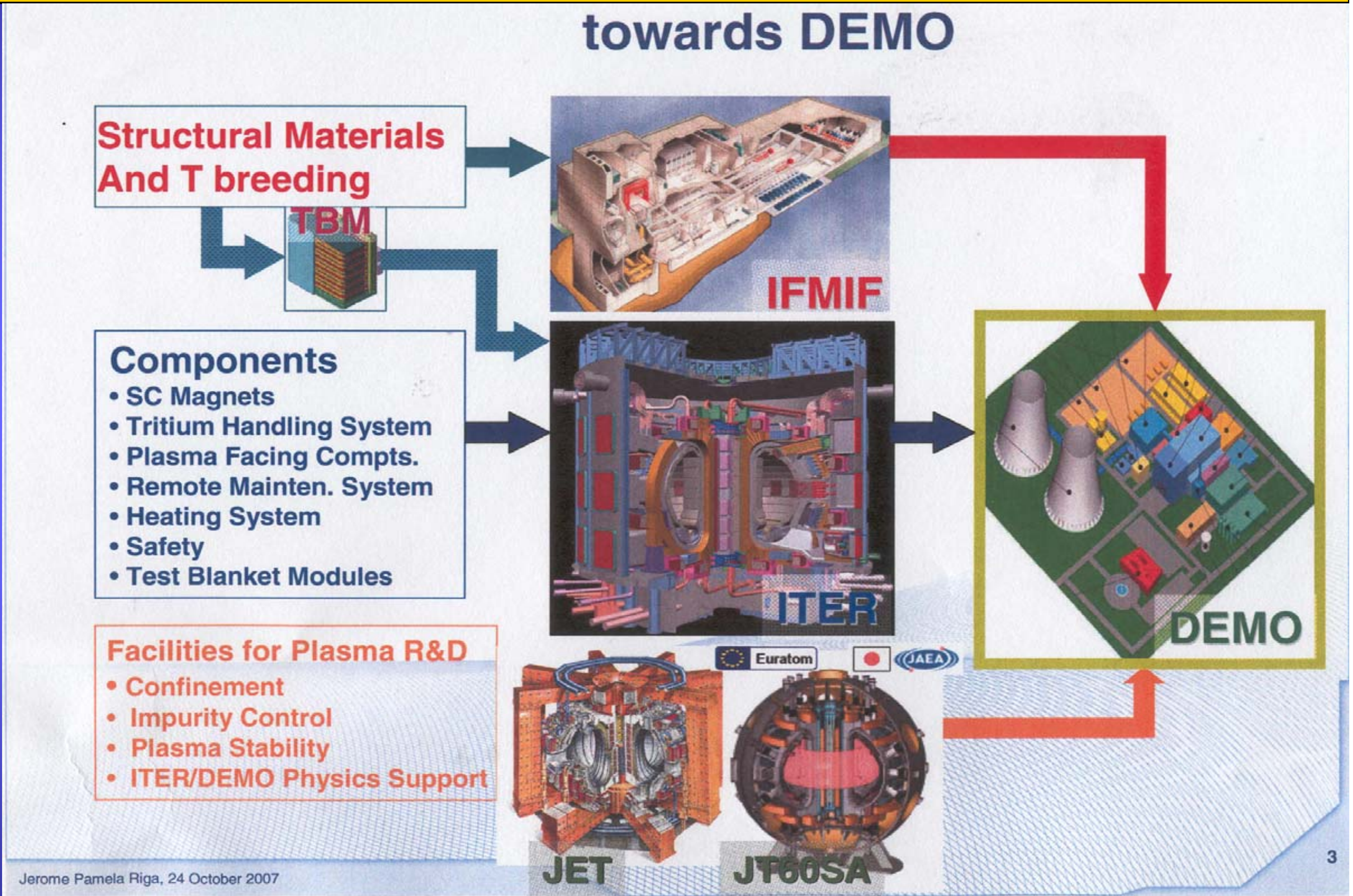

IFMIF

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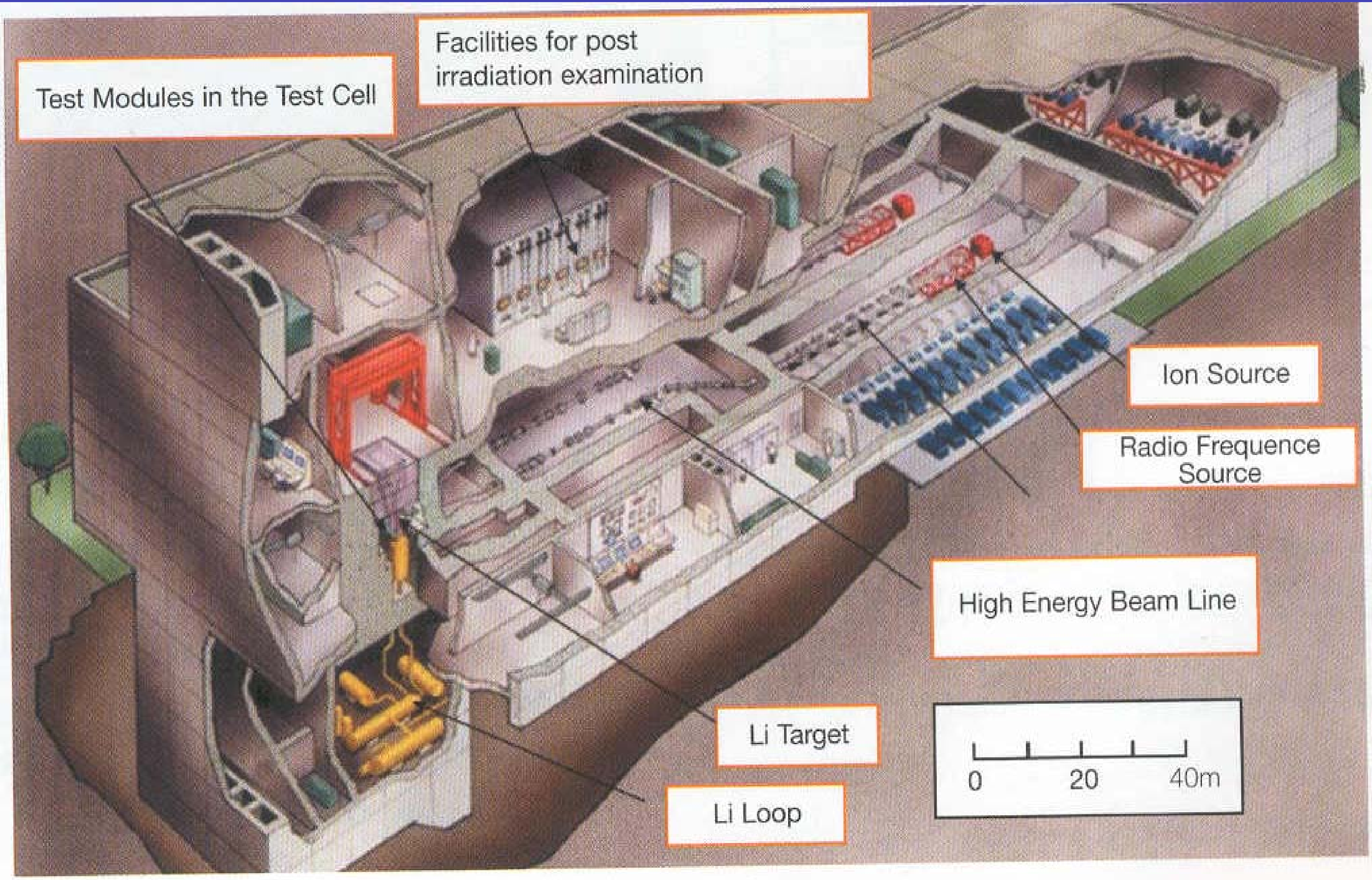

Innertial fusion
NIF (USA)

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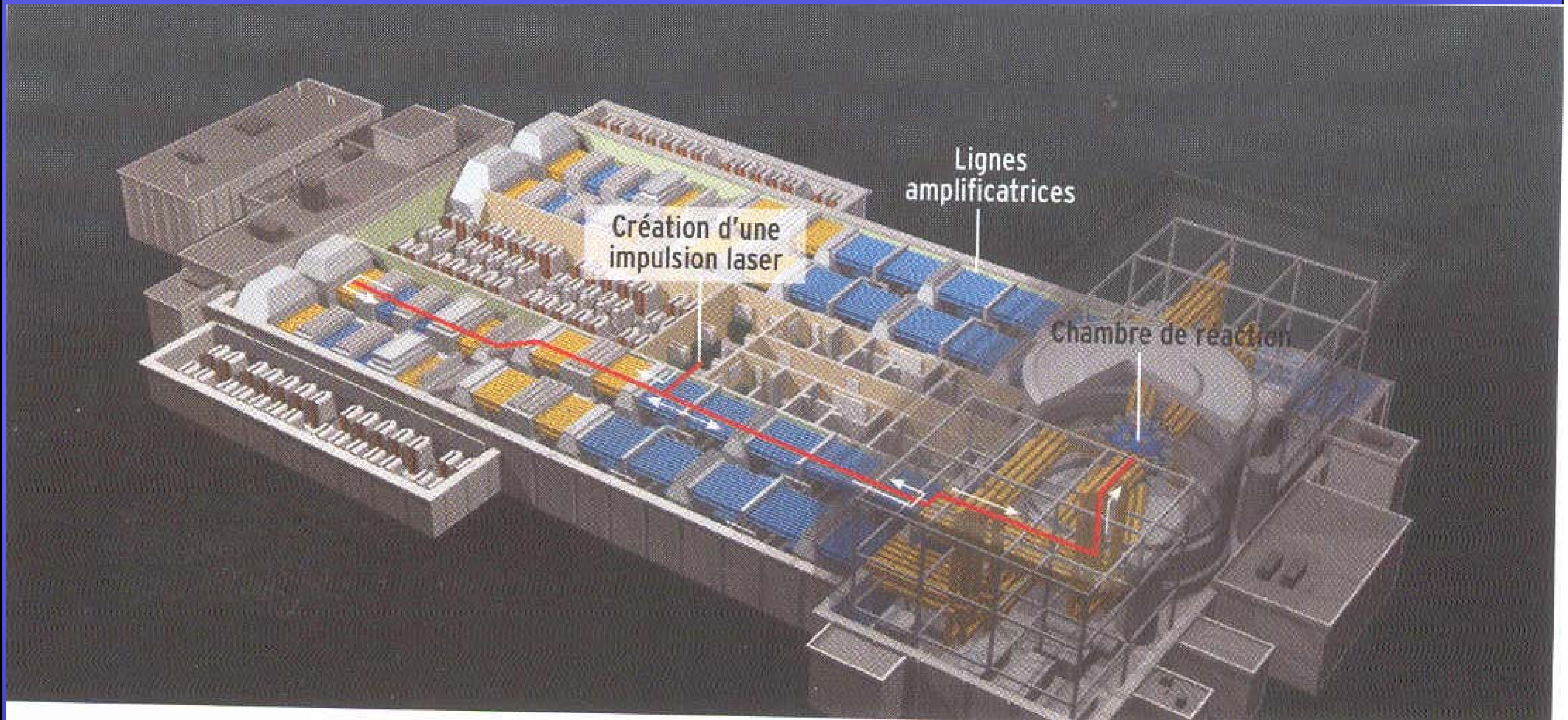

Iiquid metal droplets in plasma (cooperation AEUL & IST)

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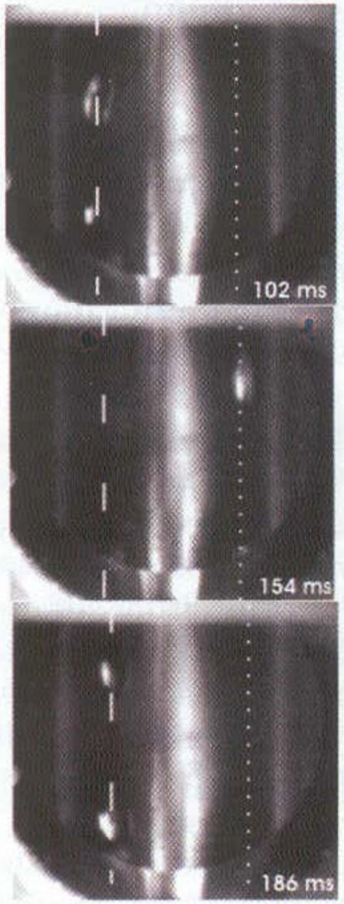

Figure 2.1 - Sequence of frames evidencing the droplets radial shift due to the influence of the plasma.

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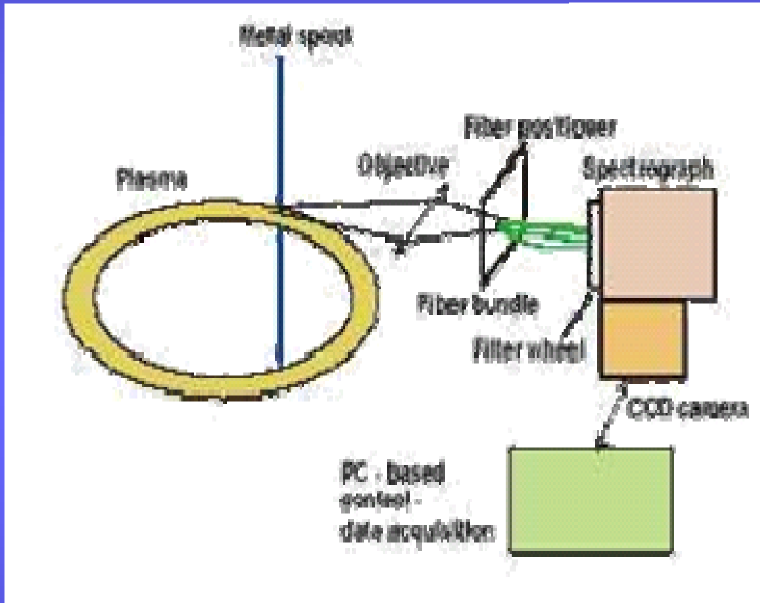

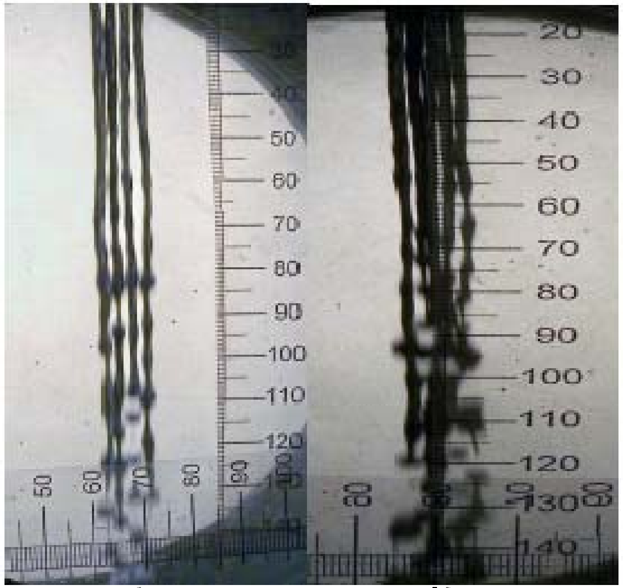

a) b)

Figure 3.1.2.2 a) Version proposed for installation on ISTTOK: four d=2.6 mm jets; BUL ~11 cm; v -2.80 m/s; b) version with five d=2.6 mm jets; BUL -9 cm; v-2.3 m/s. Photo has been taken under the angle when all jets can be clearly seen. Scales are given both for the break-up length and the side deviation

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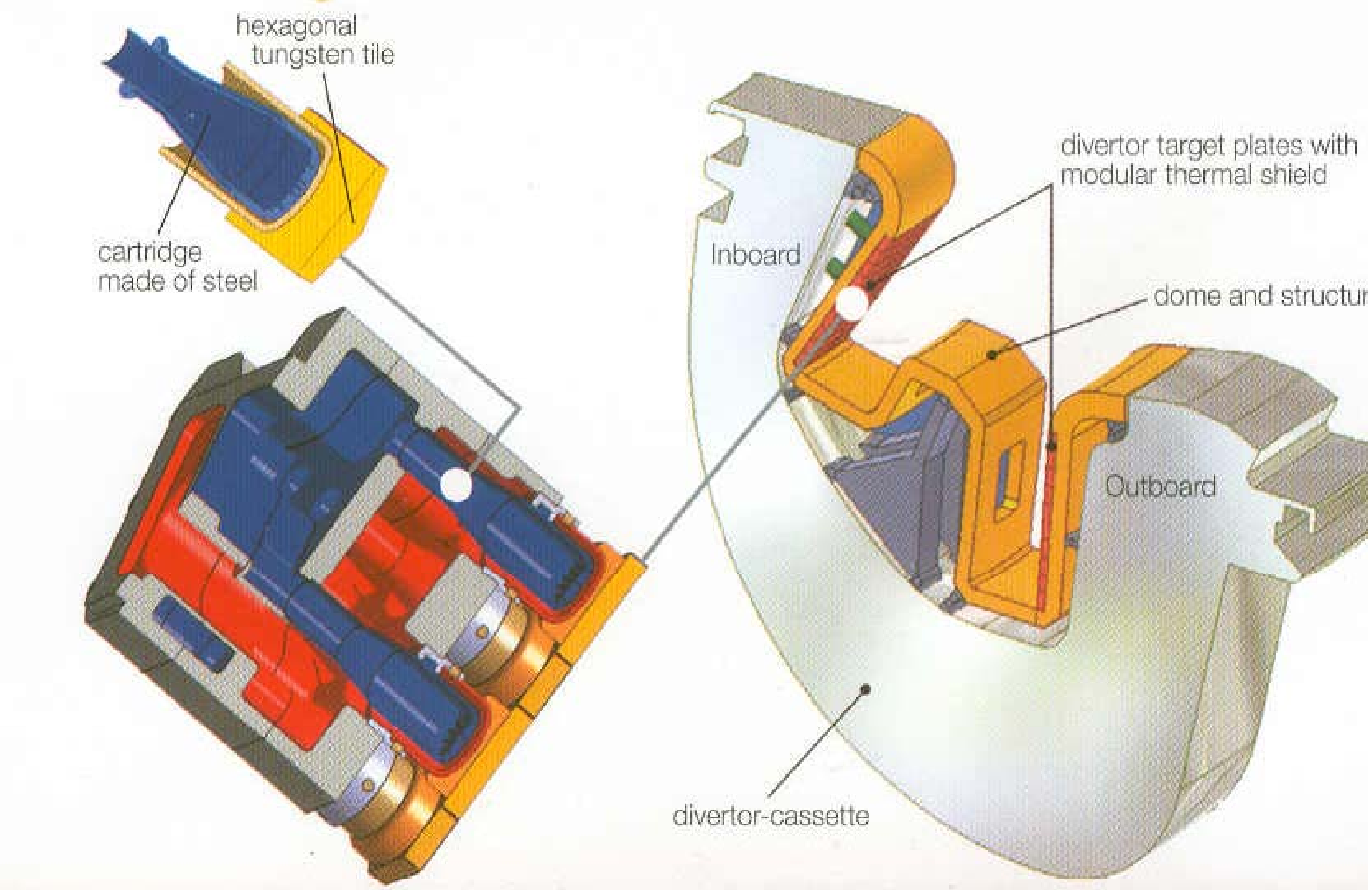

Upgraded In-Ga-Sn stands for investigationof free jets (at FTU)

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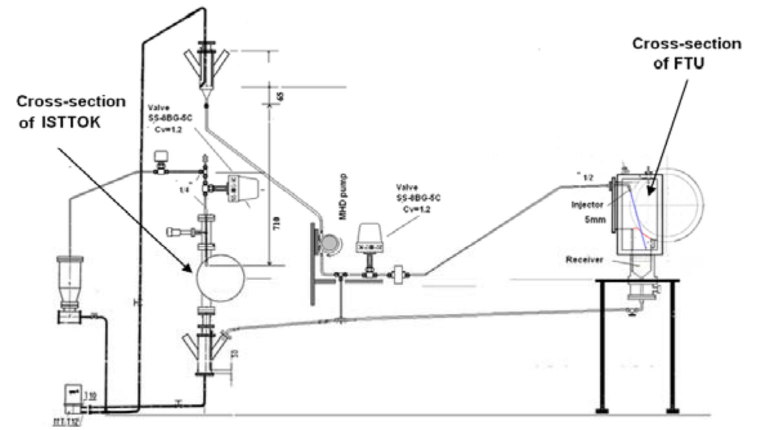
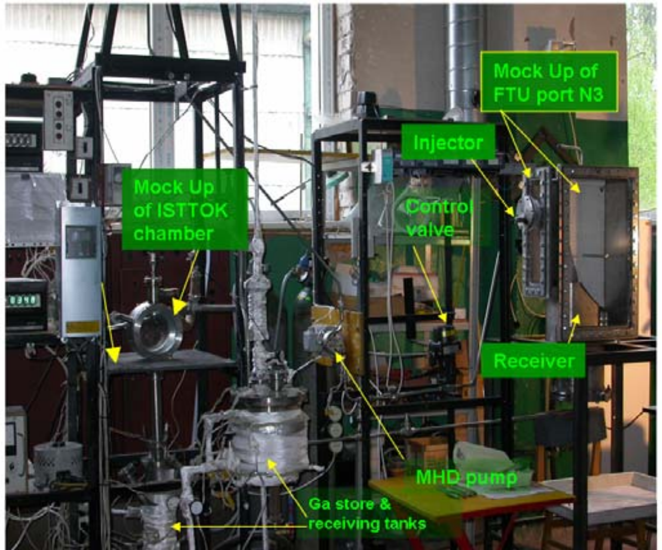
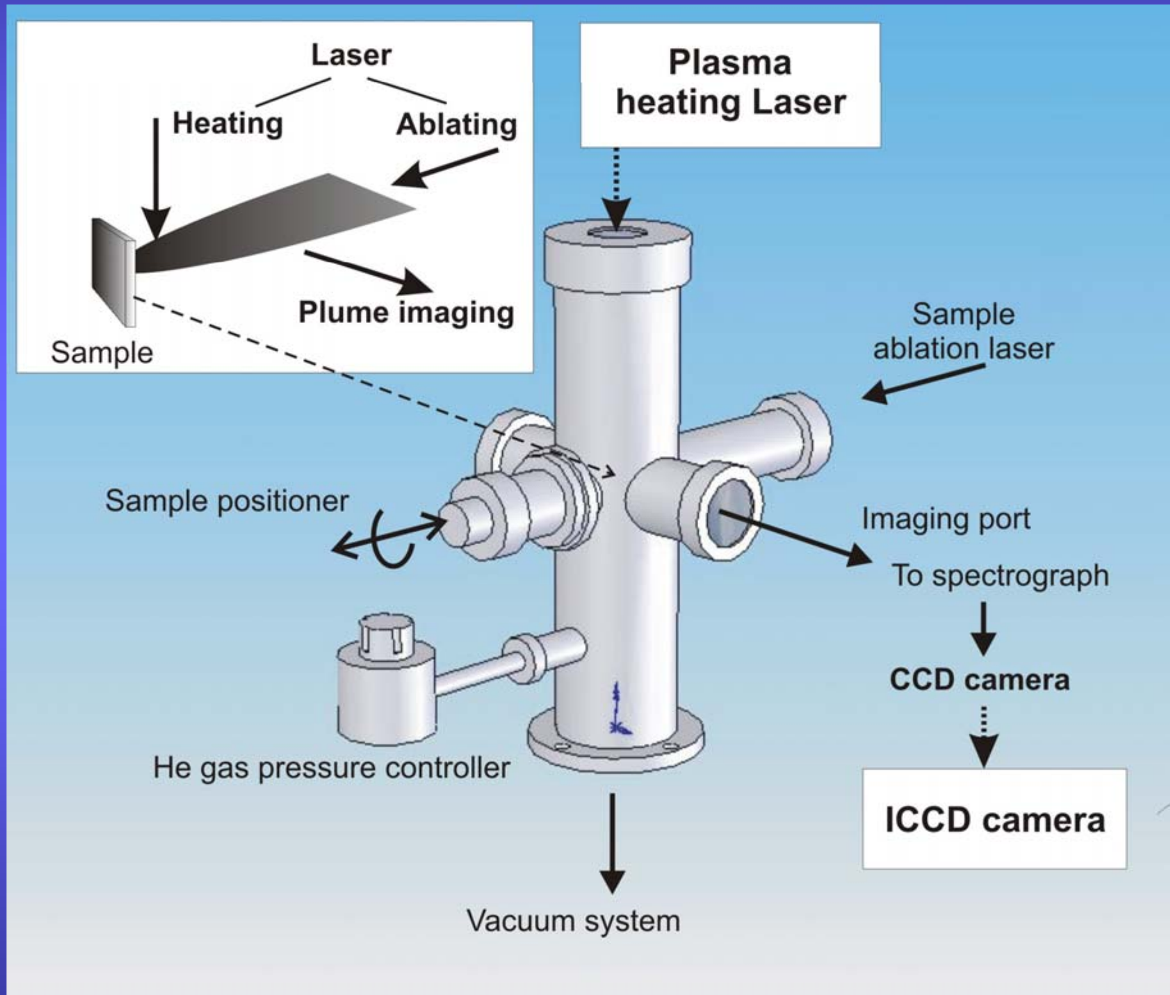




LIBS



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The setup of equipment for time-resolved spectroscopy of Ga vapor emission at FTU

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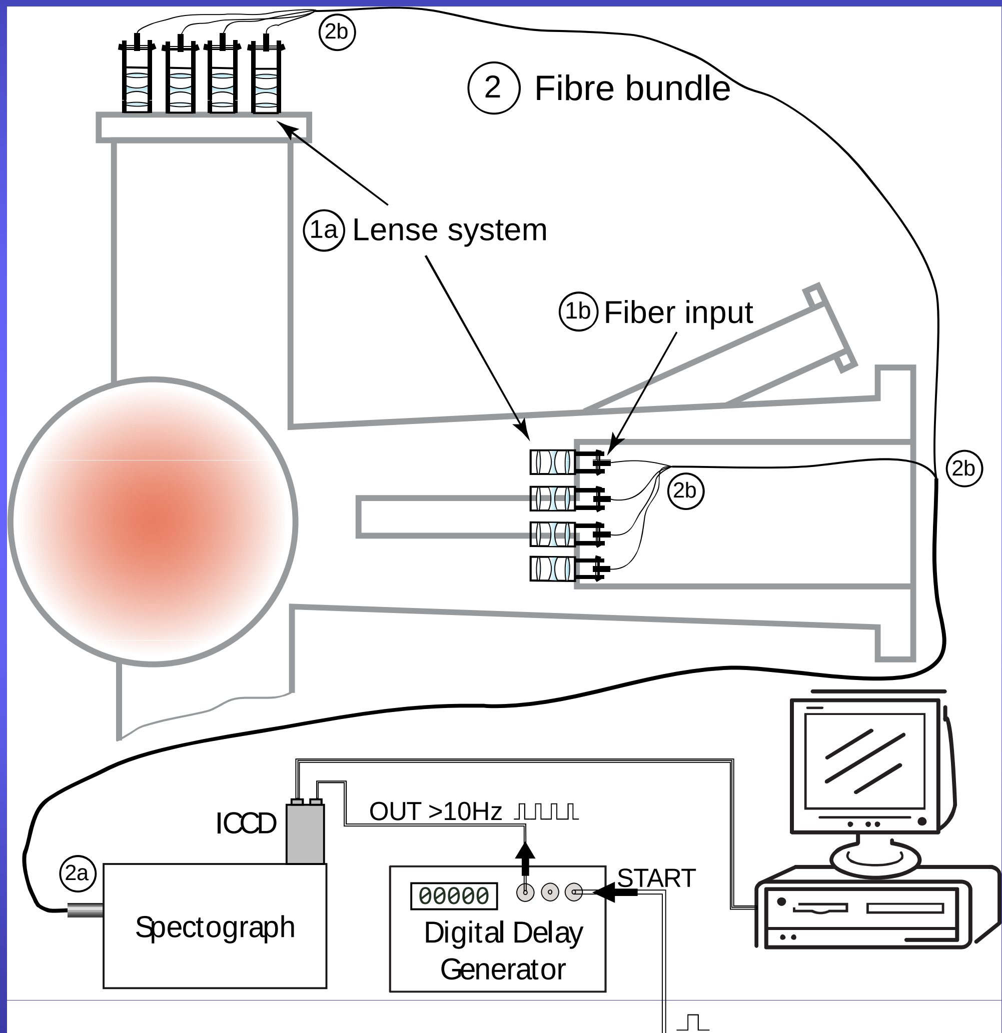

LIBS spectroscopy

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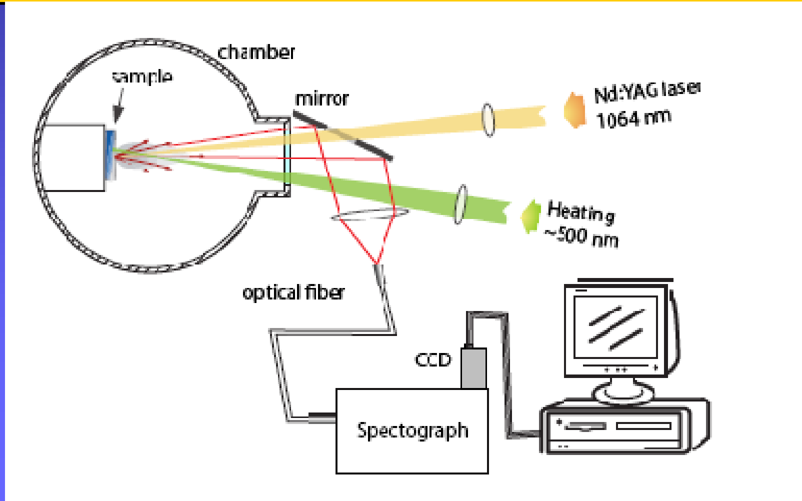

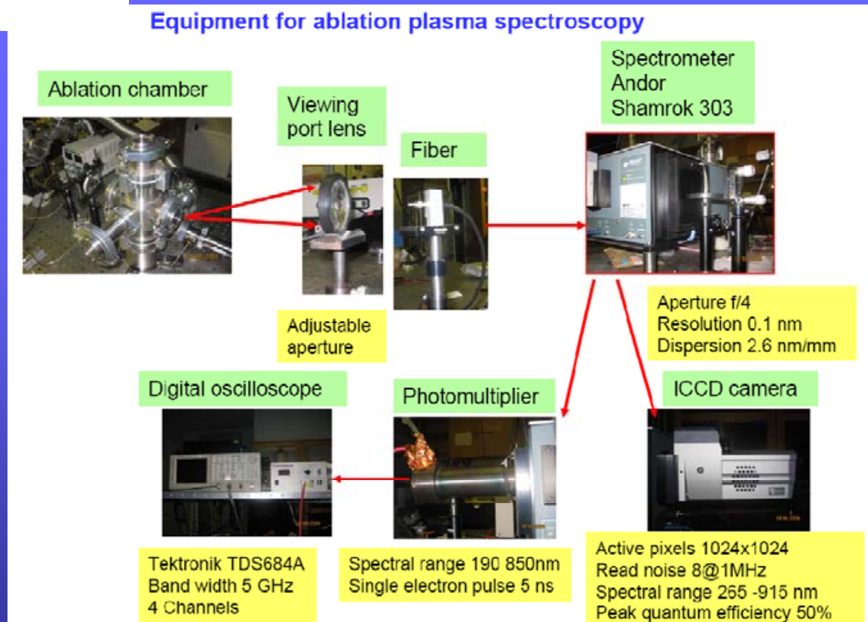

The model of the γ-Fe crystalline lattice with 2 Y substitutes and 1 O impurity atom

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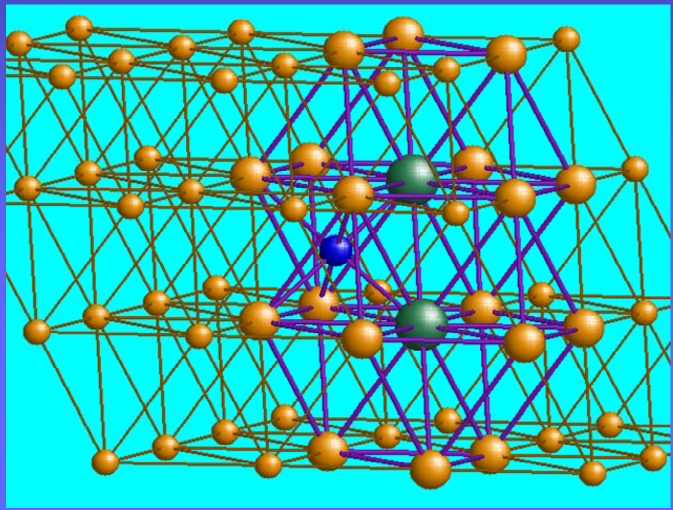

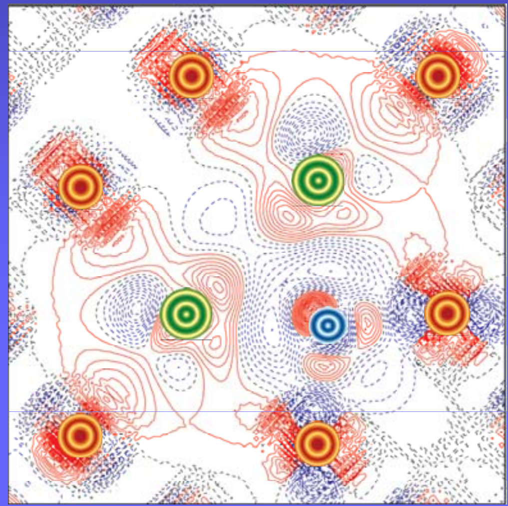

Fe Y O

Fe Y O

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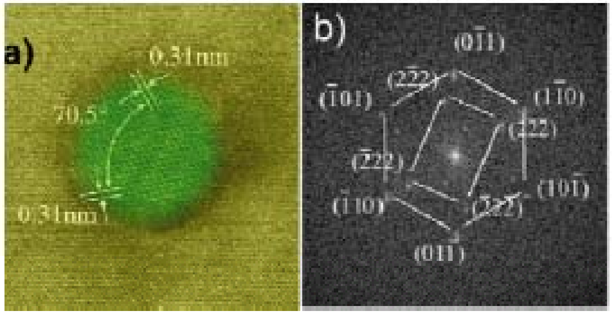
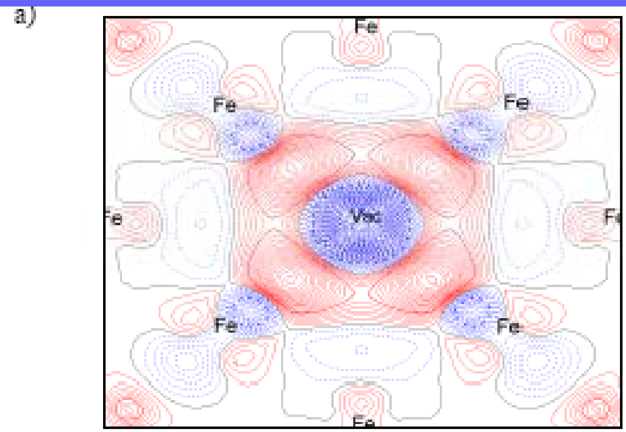


Figure 3.4.3.1.1 HRTEM micrograph of Y_2O_3 nanoparticle embedded into ferrite matrix (a) and its further transformation to Fourier image (b) [2]. Comprehensive experimental studies on ODS steels with atomic resolution performed recently at IMF-1, FZK, Karlsruhe show stability of pure Y_2O_3-ODS and yttria nanoparticles.



Temporal evolution of neoclassical tearing modes in the frequently interrupted regime

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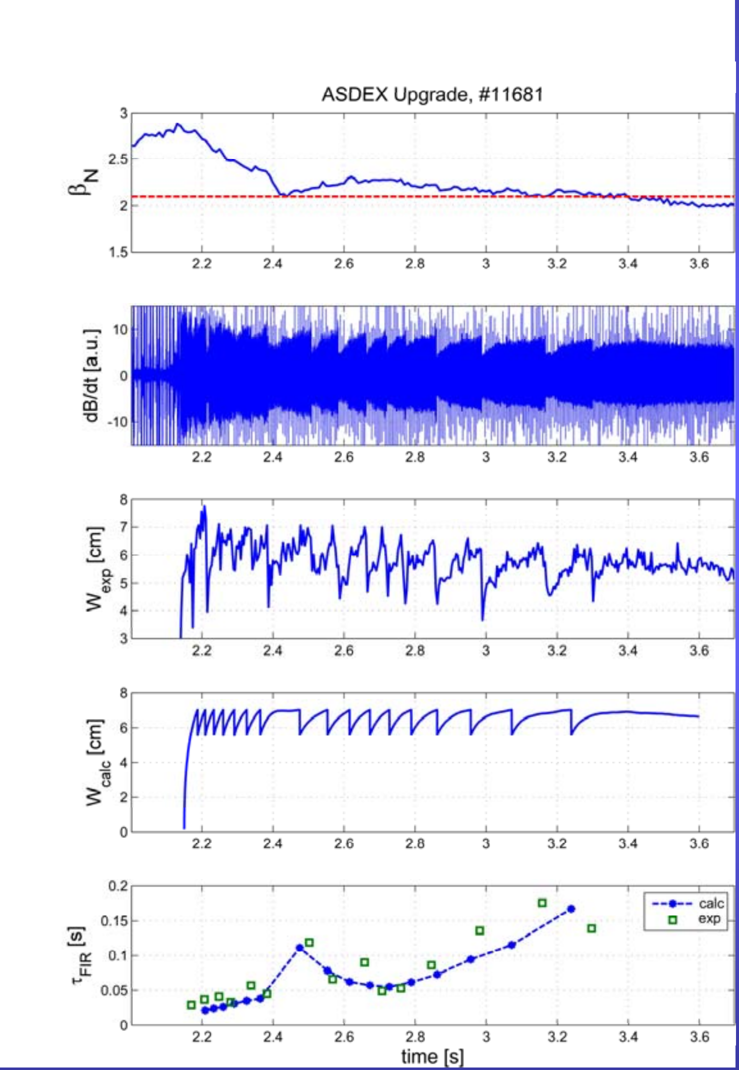

13th European Fusion Theory Conference in Riga 12-15 oct. 2009

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The tiles of the divertor and core drilling positions in a poloidal and toroidal direction

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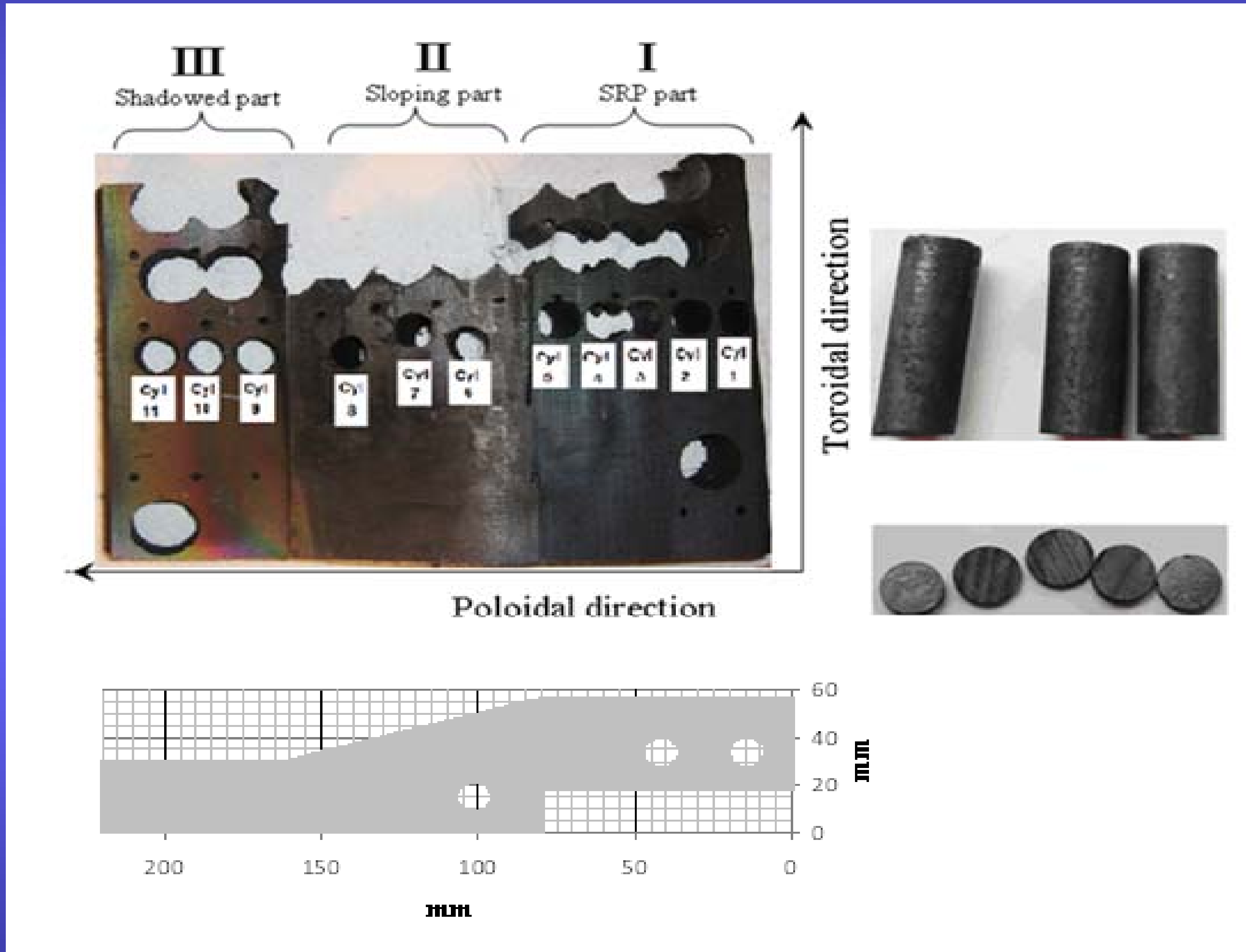

Chemical forms of tritium

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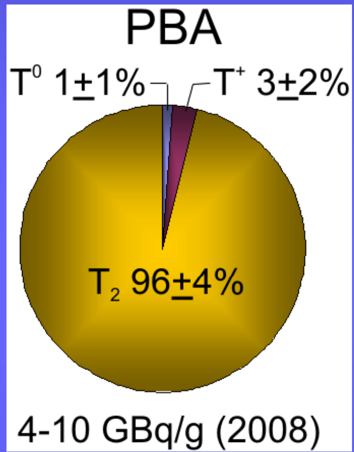

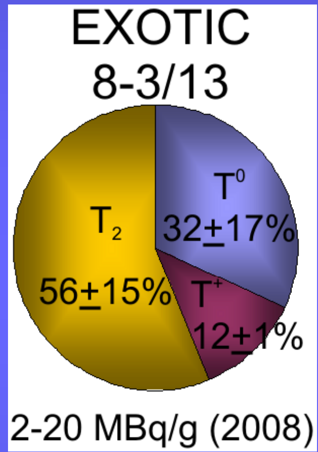

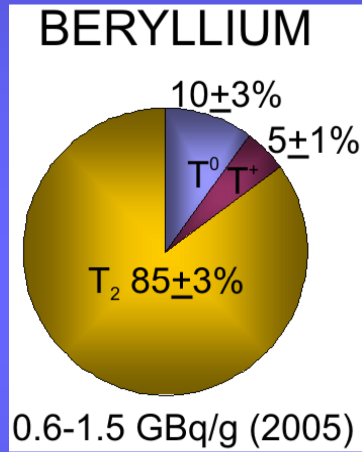

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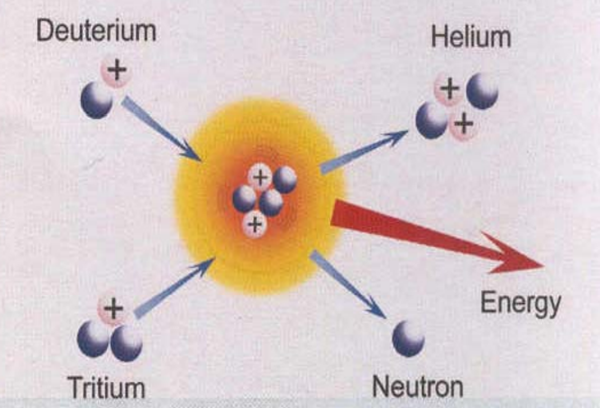
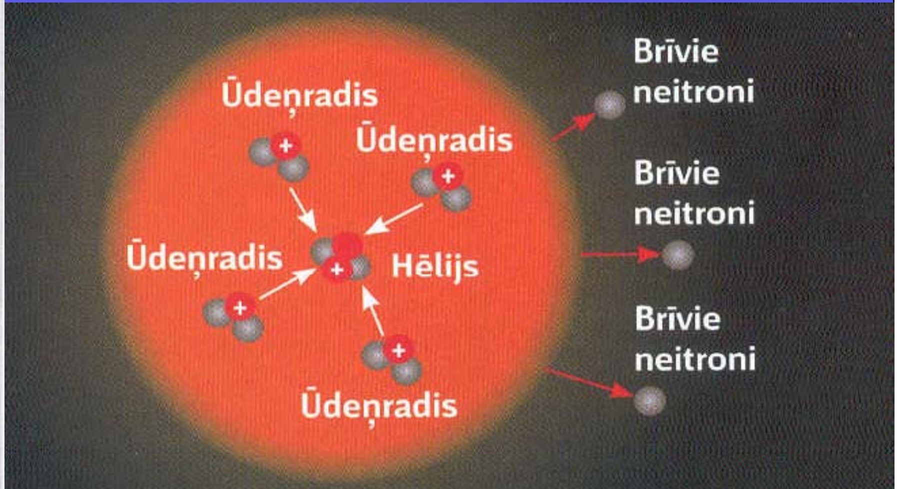
FUSION REACTIONS

The easiest fusion reaction to achieve is between the two heavy isotopes of hydrogen (deuterium and tritium). Most of the energy released in this reaction is carried away by a high speed neutron. The remaining energy goes to the alpha particle (a helium nucleus) which is also produced in the reaction. In a fusion reactor, a blanket around the reactor would slow down the neutrons and convert their energy into heat. This heat can be extracted to generate steam for conventional electricity generation. Lithium, in the blanket, is converted by the neutrons into tritium.



(Image courtesy of EFDA)



SAULES PIETIKS

Katru sekundi Saules dzīlēs hēlija "pelnos" pārvēršas aptuveni 700 miljoni tonnu ūdeņraža! Nebaidies, Saules resursu pietiks vēl dažiem miljardiem gadu.

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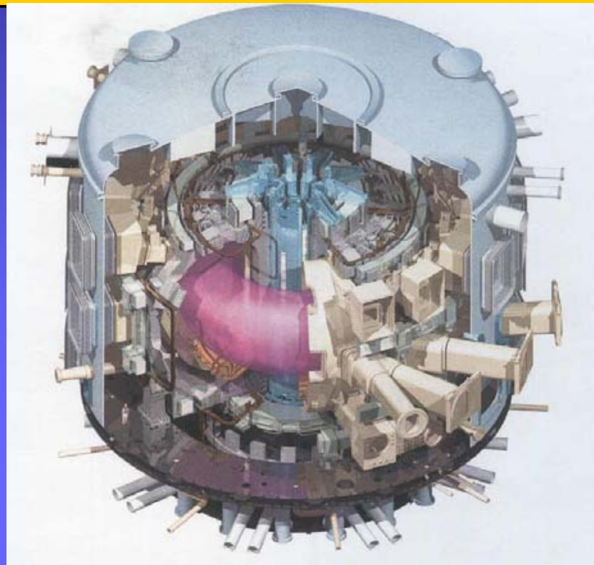

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Thank you very much for your attention