



The CRPP and the international fusion programme

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Summary

- Introduction: a brief history of the CRPP
- ITER and Broader Approach
- CRPP, ITER and DEMO
- How could we help industry?
- Conclusion



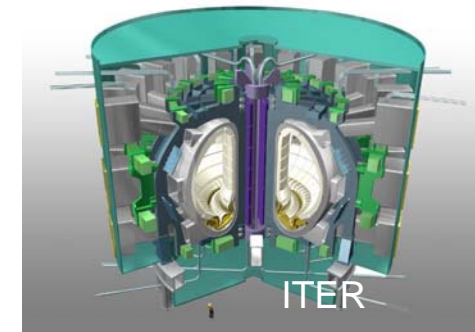
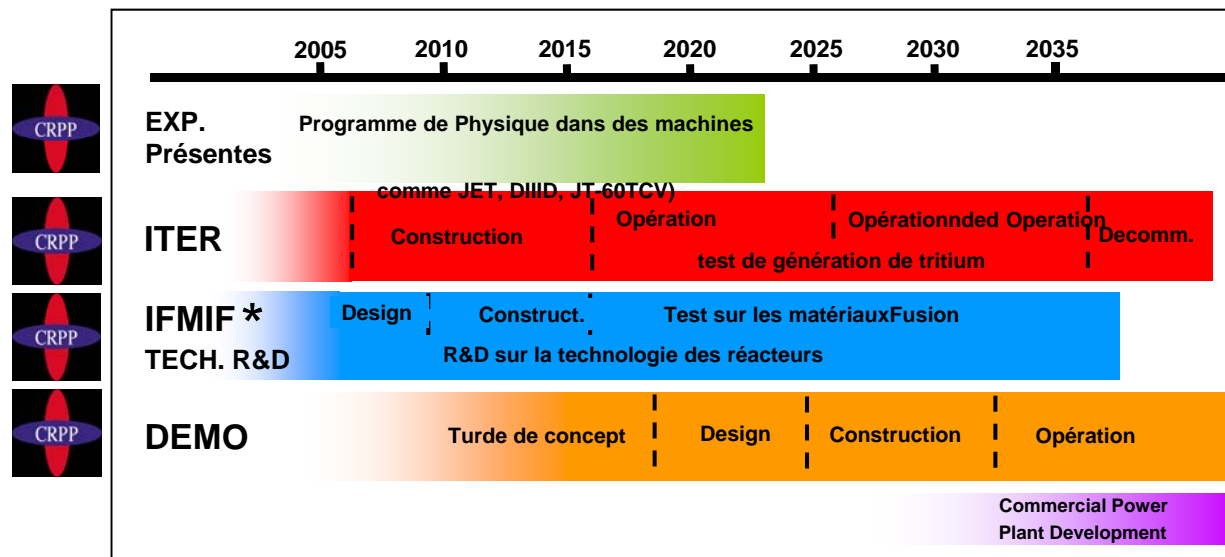
History of the CRPP

- 1961: Foundation of the CRPP by the Swiss National Science Foundation, 3 years after the 2nd Conference « Atoms for Peace » in Geneva (1958). We shall be 50 years old on first of May!
- 1973: Integration of the CRPP into the EPFL
- 1978-1979: Frame Agreement CH-Euratom. The CRPP becomes the Research Unit of the [Association Euratom - Swiss Confederation](#)
- 1994: Integration into the CRPP of the Fusion Technology Laboratories of the PSI

Since 1979, Switzerland (through the CRPP) is a full member of the European fusion research programme.

The international frame

- The four pillars of international research



$$P_{\text{fusion}} = 15 \text{ MW}; 5 \text{ s}$$

$$P_{\text{fusion}} = 500 \text{ MW}, 500 \text{ s}$$

$P_{\text{elec}} =$ a few hundreds of MW to 1'000 MW_e, steady state

* IFMIF: International Fusion Material Irradiation Facility

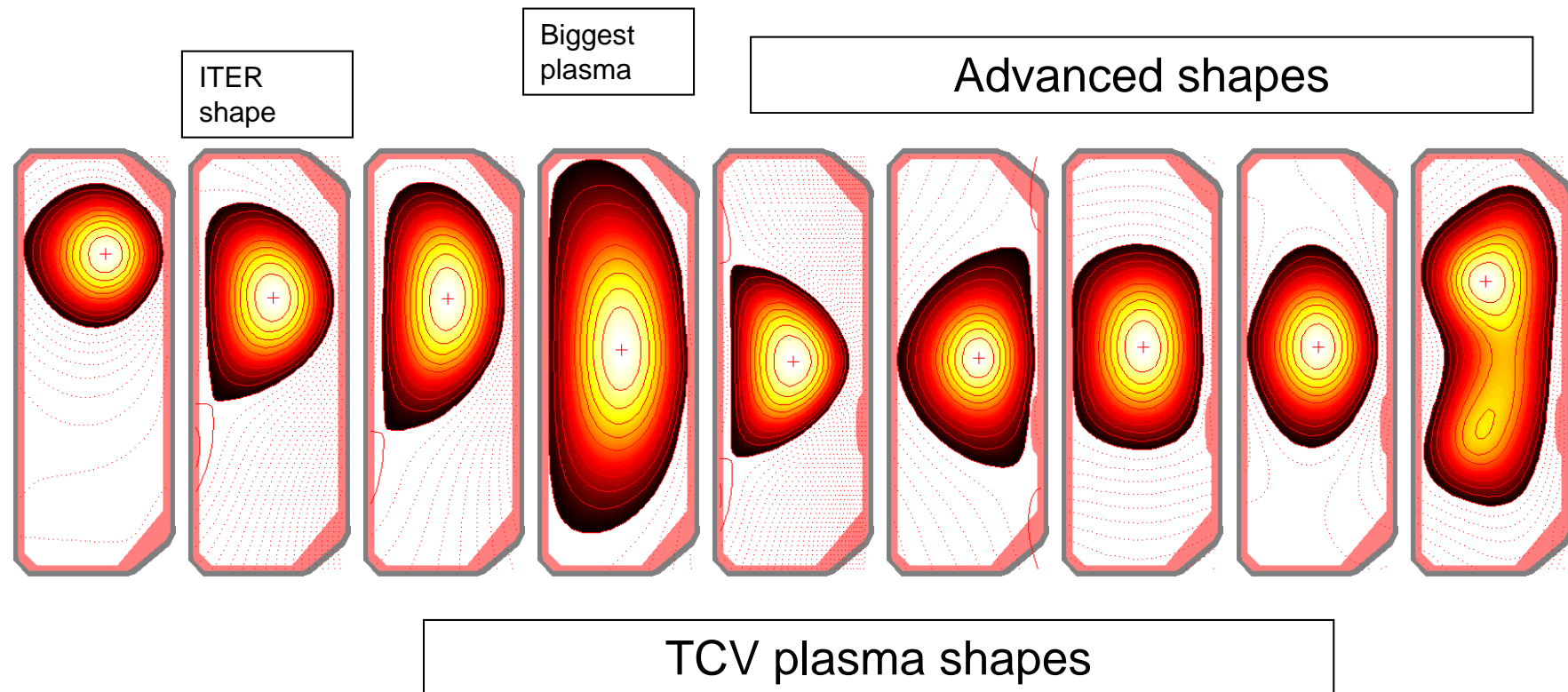


The mission of the CRPP

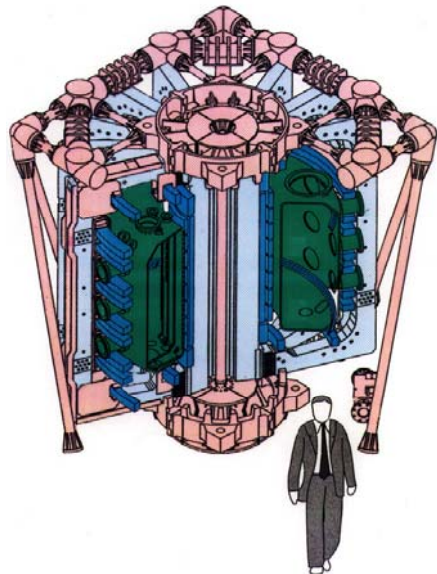
- Mission statement: to contribute to the realization of fusion as an energy source within the framework of the collaboration with Euratom (« Framework Agreement of 1978 »)
- The activities of the CRPP include:
 1. The development of physics scenarios for **ITER** and **DEMO**
 2. The participation in the construction of **ITER**
 3. R&D in material sciences for **ITER** and **DEMO** (« Broader Approach »)
 4. Technology transfer
 5. Education and training

TCV

- Mission: Develop the physics basis for **ITER** scenarios for the design of **DEMO**



TCV



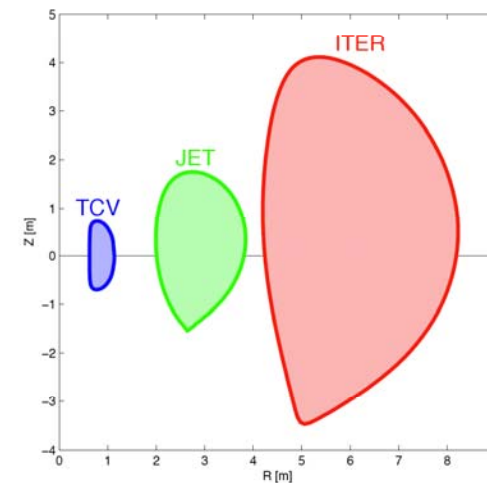
TCV parameters:

$R_0=0.88\text{m}$, $a<0.25\text{m}$, $B_T<1.54\text{T}$

$-0.7<\delta<1$, $1 \leq \kappa \leq 2.8$, $I_p \leq 1\text{MA}$,

$0.5 \times 10^{19} < n_e < 2 \times 10^{20} \text{m}^{-3}$, $T_e(0) < 18\text{keV}$

4.5 MW high frequency heating





CRPP and Industry

- The CRPP participates in the initiative of the State Secretariat for Education and Research for industrial promotion.
- In particular, it supplies the technical support for the Industrial Councillor, Mr J. R. Leidner.
- Experience in international industrial contracts
- It offers to the programme for industrial promotion its networking with the European and international fusion research community:
 - committees where Switzerland is represented
 - direct contacts with all other European laboratories
 - contacts with laboratories worldwide
 - the CRPP could provide contacts for industry in case of technical issues.



The European Fusion Associations

Countries participating in the European Fusion Programme

- **Euratom - CEA (1958)**
France
- **Euratom - ENEA (1960)**
Italy (incl. Malta)
- **Euratom - IPP (1961)**
Germany
- **Euratom - FOM (1962)**
The Netherlands
- **Euratom - FZJ (1962)**
Germany
- **Euratom - Belgian State (1969)**
Belgium
(incl. Luxembourg)
- **Euratom - RISØ (1973)**
Denmark
- **Euratom - UKAEA (1973)**
United Kingdom
- **Euratom - VR (1976)**
Sweden
- **Euratom - Conf. Suisse (1979)**
Switzerland
- **Euratom - FZK (1982)**
Germany
- **Euratom - CIEMAT (1986)**
Spain
- **Euratom - IST (1990)**
Portugal

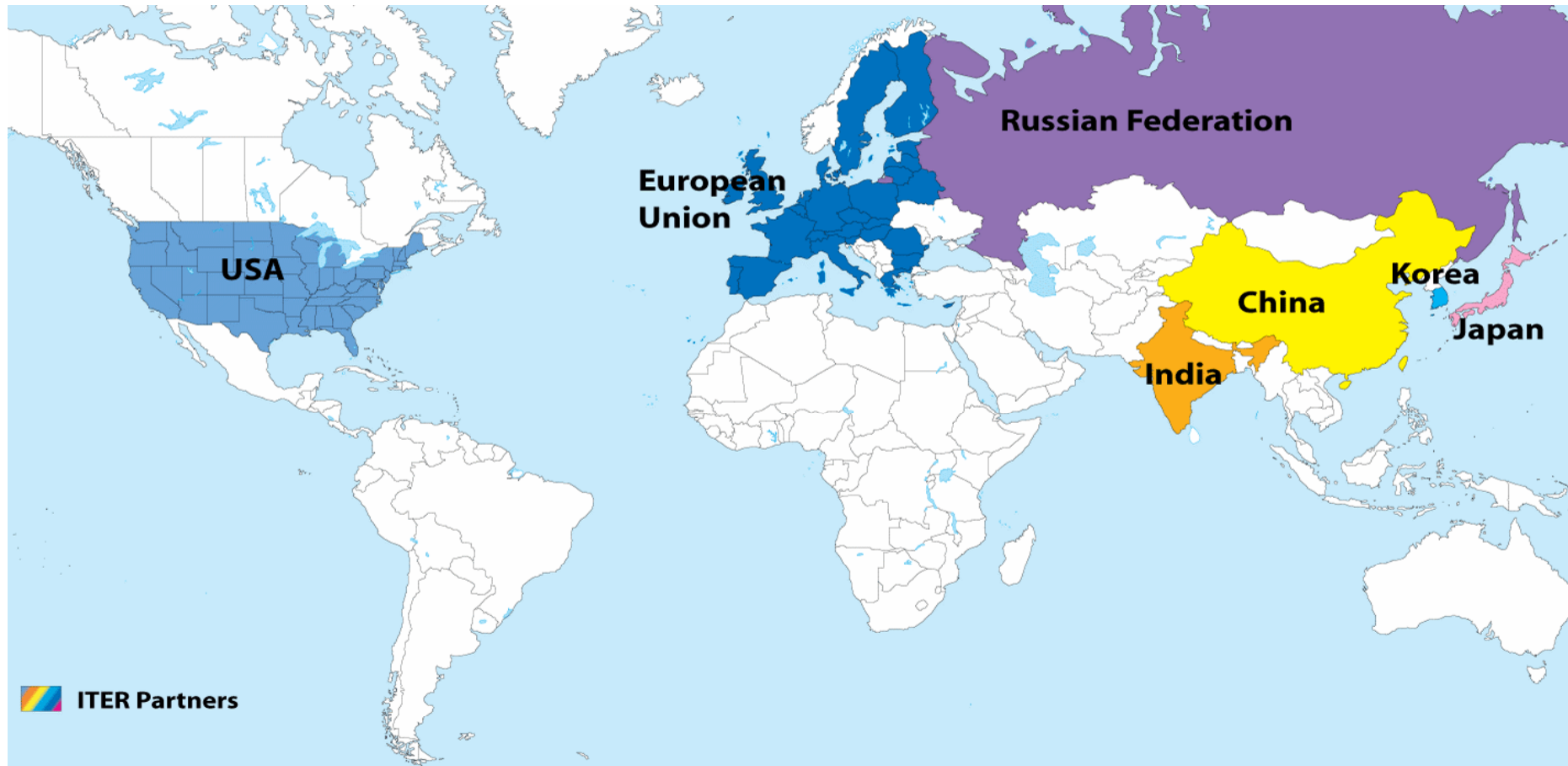
- **Member States**
- **Countries associated to the Euratom Framework Programme**
- **Laboratories of Euratom Fusion-Associations**



- **Euratom - TEKES (1995)**
Finland (incl. Estonia)
- **Euratom - DCU (1996)**
Ireland
- **Euratom - ÖAW (1996)**
Austria
- **Eur - Hellenic Rep (1999)**
Greece (incl. Cyprus)
- **Euratom - IPP.CR (1999)**
Czech Rep.
- **Euratom - HAS (1999)**
Hungary
- **Euratom - MEdC (1999)**
Romania
- **Euratom - Univ. Latvia (2002)**
Latvia
- **Euratom - IPPLM (2005)**
Poland
- **Euratom - MHEST (2005)**
Slovenia
- **Euratom - CU (2007)**
Slovakia
- **Euratom - INRNE (2007)**
Bulgaria
- **Euratom - LEI (2007)**
Lithuania



The ITER Party





Conclusion

- Le CRPP follows since more than a decade a strategy aiming at:
 1. the development of high technology necessary to the construction of **ITER** and the preparation for **DEMO**;
 2. the advancement of physics for the **ITER** scenarios and for the physic basics for **DEMO**.
- It plays a key role in the training of high level specialists necessary for fusion and the industry.
- **Its relations with the fusion community and its knowledge allow it to contribute to the Swiss industrial promotion.**