Reactor block: from the first outline to site assembly at JHR facility

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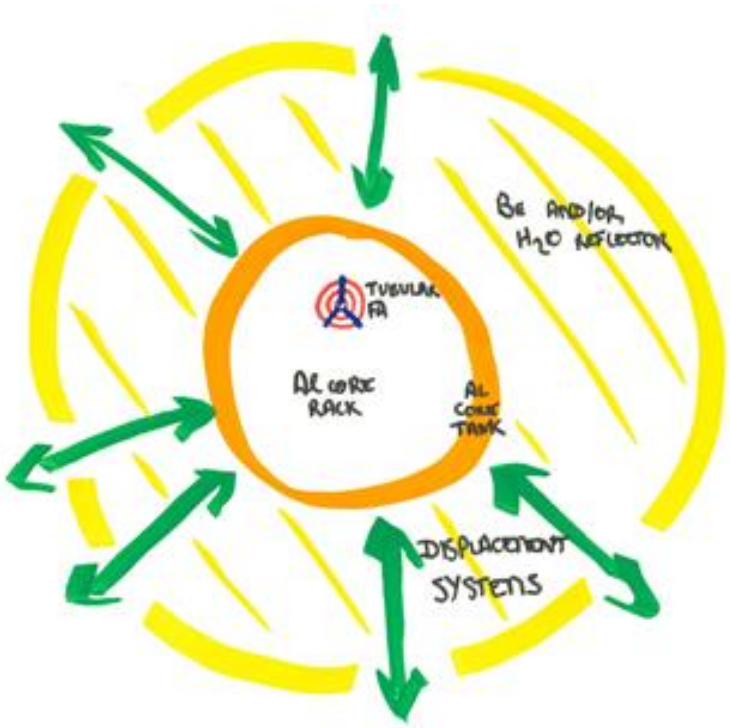
Presentation steps

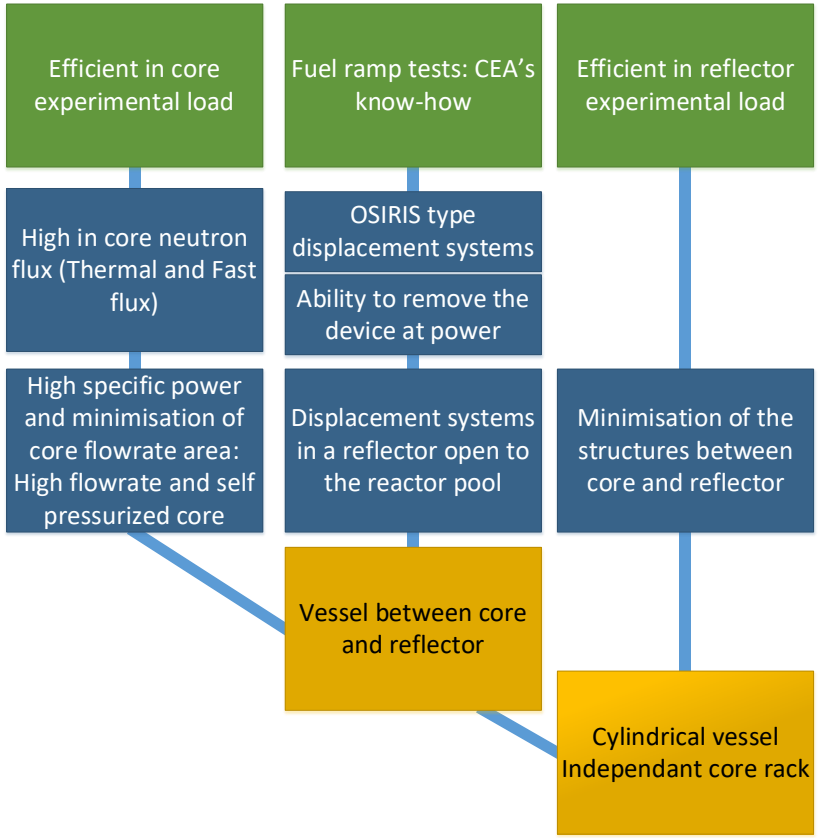
1. **Origin of the overall shape of the reactor block: structuring choices** — **Conceptual Design**
2. **Core cell and colouring** — **Basic Design**
3. **Final shape** — **Basic Design**
4. **Detailed studies and manufacturing** — **Detailed Design**

Concluding remarks

Origin of the overall shape

Conceptual Design

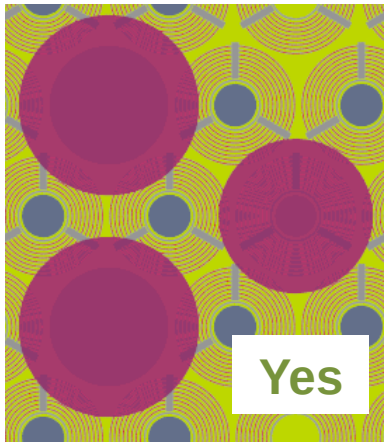


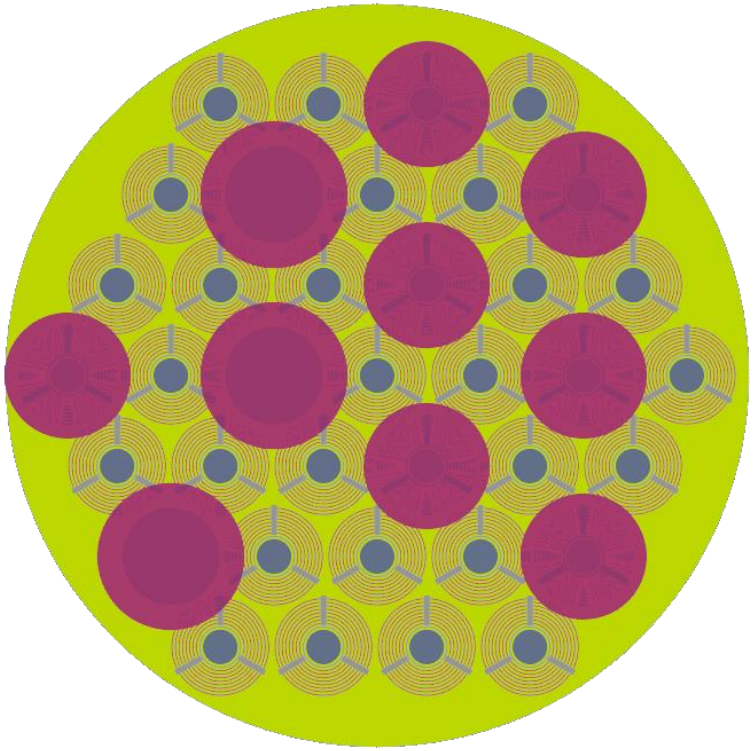


Core cell and colouring

Basic Design

- 10 in core experimental devices
  - 3 large sized devices: Φ92mm
  - 7 small sized devices: Φ32mm
- The same experimental devices above the core
  - 3 positions: Φ140mm
  - 7 others: up to Φ120mm
- And, at this stage:
  - The overall shape of the previous slide
  - Tubular fuel assembly: 3 sectors with 6 plates





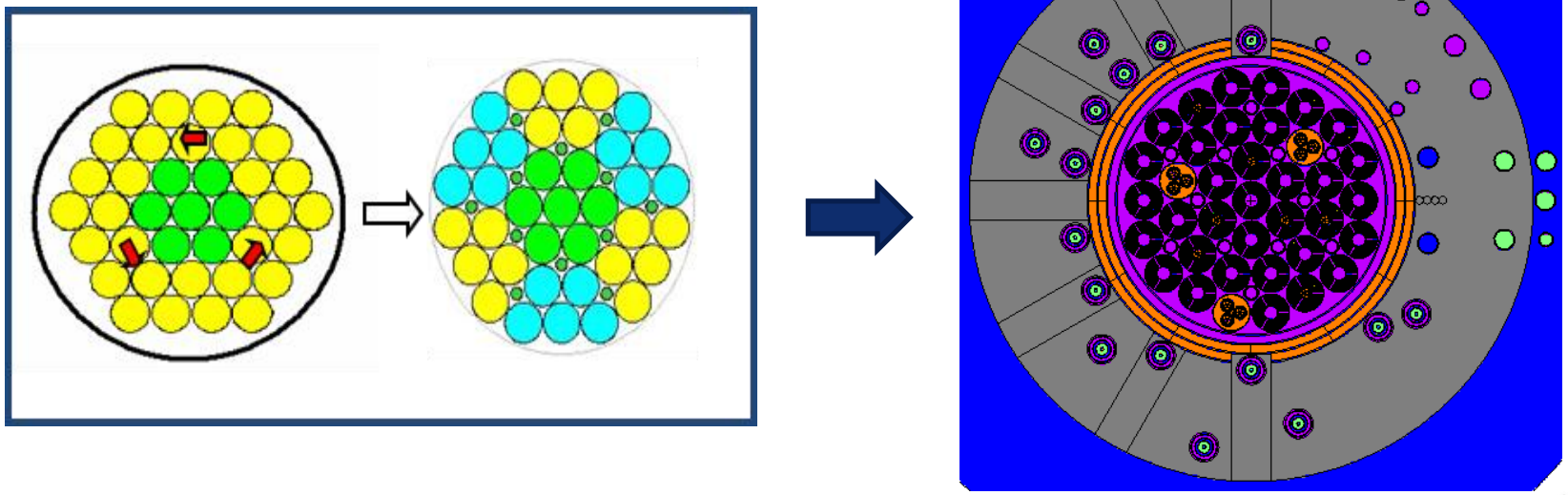
Experimental devices and core: top view

Final shape at mid core

Basic Design

- At this stage:
  - The vessel is between the core and the reflector
  - The in core experimental devices are well fed
  - The ex core experimental devices have to be better fed to improve the test performances
  - The interaction between in reflector experimental devices and the closing of the tank are to be taken into account for operational easiness and efficiency

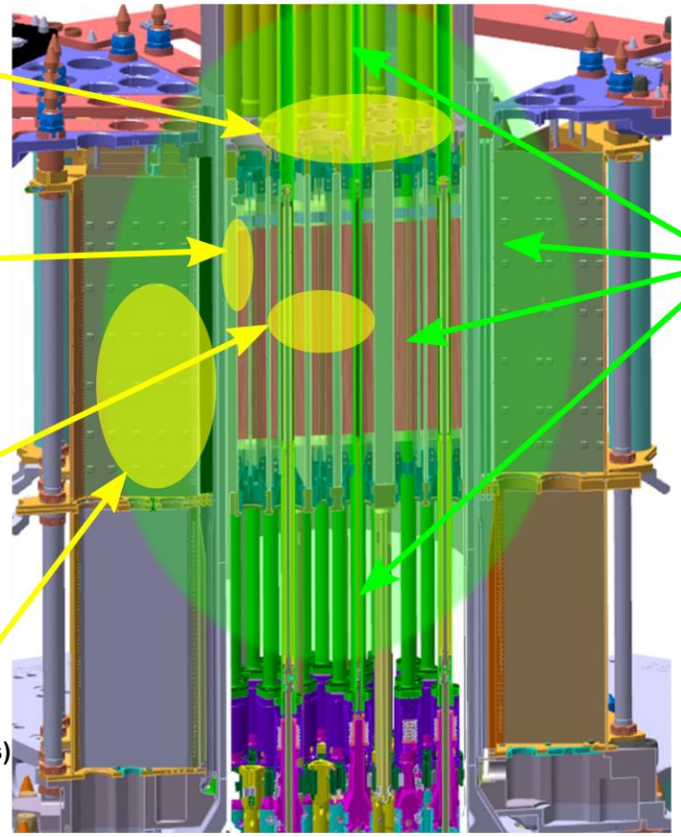
The solution: hexagonal to daisy shape



Detailed design and manufacturing

Detailed Design

- **Example: core data for mechanical detailed design (RCC-MX application)**

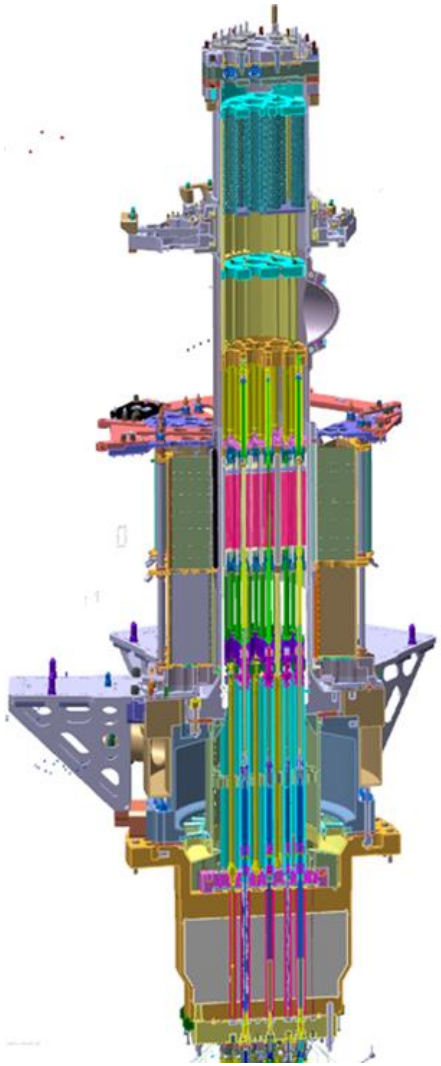


The opportunity of a full-scale utilisation of the RCC-MX and a new state-of-art for us

Core configurations: Beginning Of Cycle, Xenon equilibrium, Mid Cycle, End Of Cycle, Large West Raising

Detailed design and manufacturing

Detailed Design



Example of flexibility of the design after the basic design

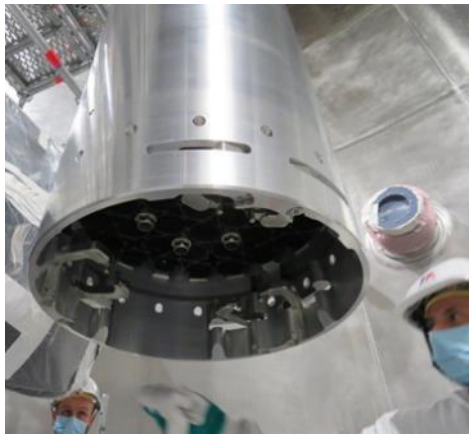
An initial mechanical constraint toward experimental load can be adapted during the detailed design to take advantage of the flexibility of Beryllium reflector

Concluding remarks

- The design is not only a matter of complex 3D calculations and detailed CAD mockup
- The detailed design is not only for detailed assessment and final licensing: some improvements of the performances have been made
- The manufacturing and licensing process of JHR reactor block had given to CEA, TA and the manufacturers (CNIM, Aubert et Duval, Forgital Maurice Dembiermon, CEZUS…) the opportunity of a full-scale utilisation of the RCC-MX and to renew our state-of-art
- Due to COVID constraints, this presentation was short but we propose you to develop these subjects during the next conferences

In manufacture

In JHR



Thank you for your attention

And stay safe