Research Institute for Nuclear Systems for low-carbon Energy Production

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Meeting of FUTTA III Consortium – 21st November 2024

Positioning of the Institute

R&D within the Energy Division

Study of nuclear systems for low carbon energy production integrated into an energy system.

Expertise and innovation for nuclear systems :

- Fuels (Department of Fuels Studies)
- Reactors (Department of Reactor Studies)
- Systems and Technologies (Department of Nuclear Technology)

Applications for a low carbon mix :

- Complementarities of nuclear and renewable energies
- Energy vectors, storage, coupling and cogeneration

Transversal R&D actions of the three departments within IRESNE :

- Instrumentation and measurement
- Development of the multiphysics approach
- Innovation in nuclear systems
- Experimental platform for energy systems

Our missions

Research on current and future nuclear systems.

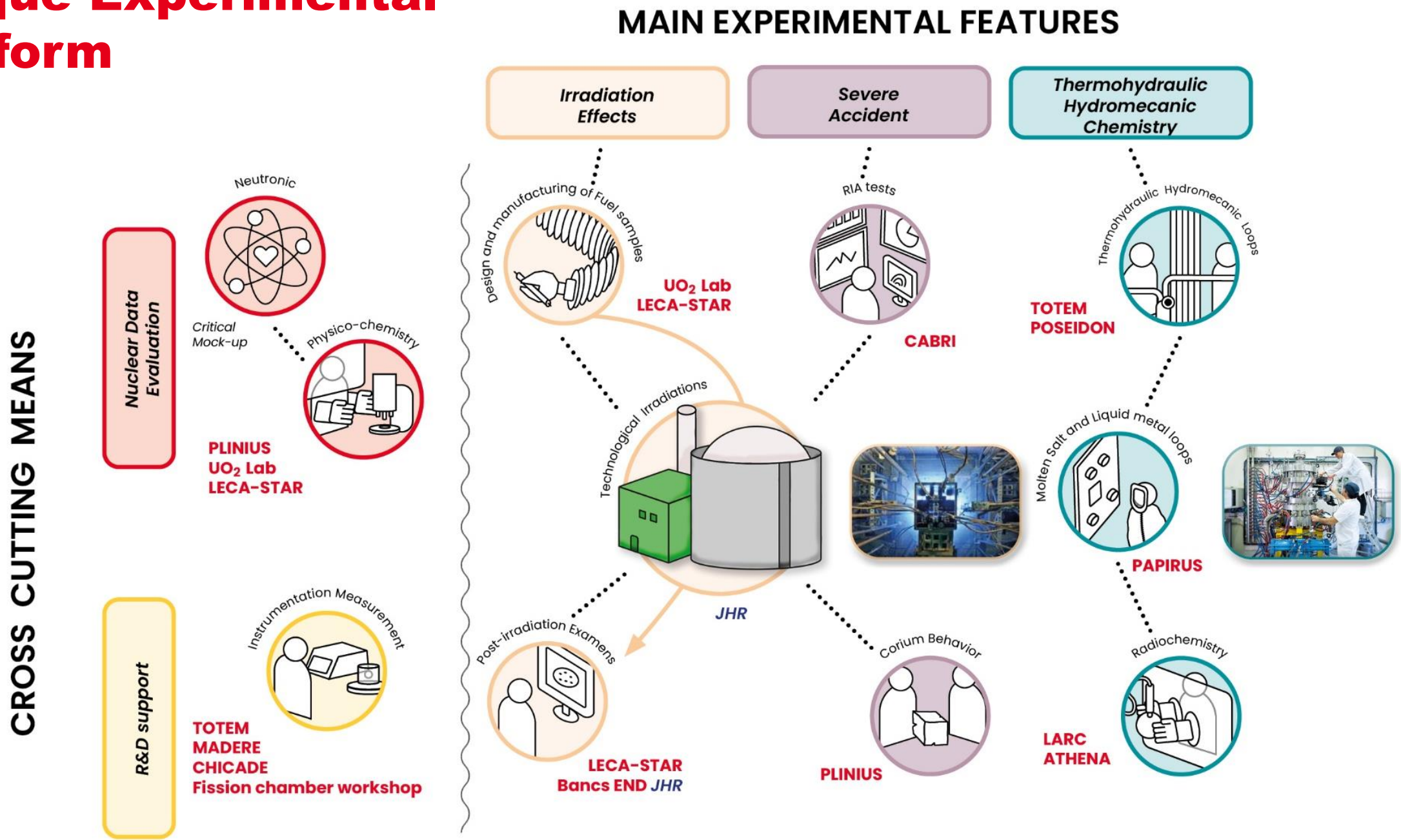
- Enhancing safety and security
- Increasing duration and performance
- Studying the systems of tomorrow: 3rd generation, 4th generation and SMR

Integration into a power system.

- Reactor flexibility and manoeuvrability for a nuclear and renewable energy mix
- Reactor power and heat generation capacity
- Green hydrogen production by High Temperature Electrolysis
- Storage of hydrogen and/or heat

900 employees	**300 experts**	**150 PhD students and post-doc**	**> 50 cooperation agreements**

Unique Experimental Platform



Technology transfer activities at IRESNE

- Expertise
- Engineering service
- Training service
- Grant of patent exploitation license, know-how, software
- R&D collaboration agreement
- Joint research laboratory with industrial

Technology transfers

Mainly, to great nuclear actors (EdF, Framatome, ANDRA, …) in the scope of large collaboration agreements

Some to non nuclear industrials

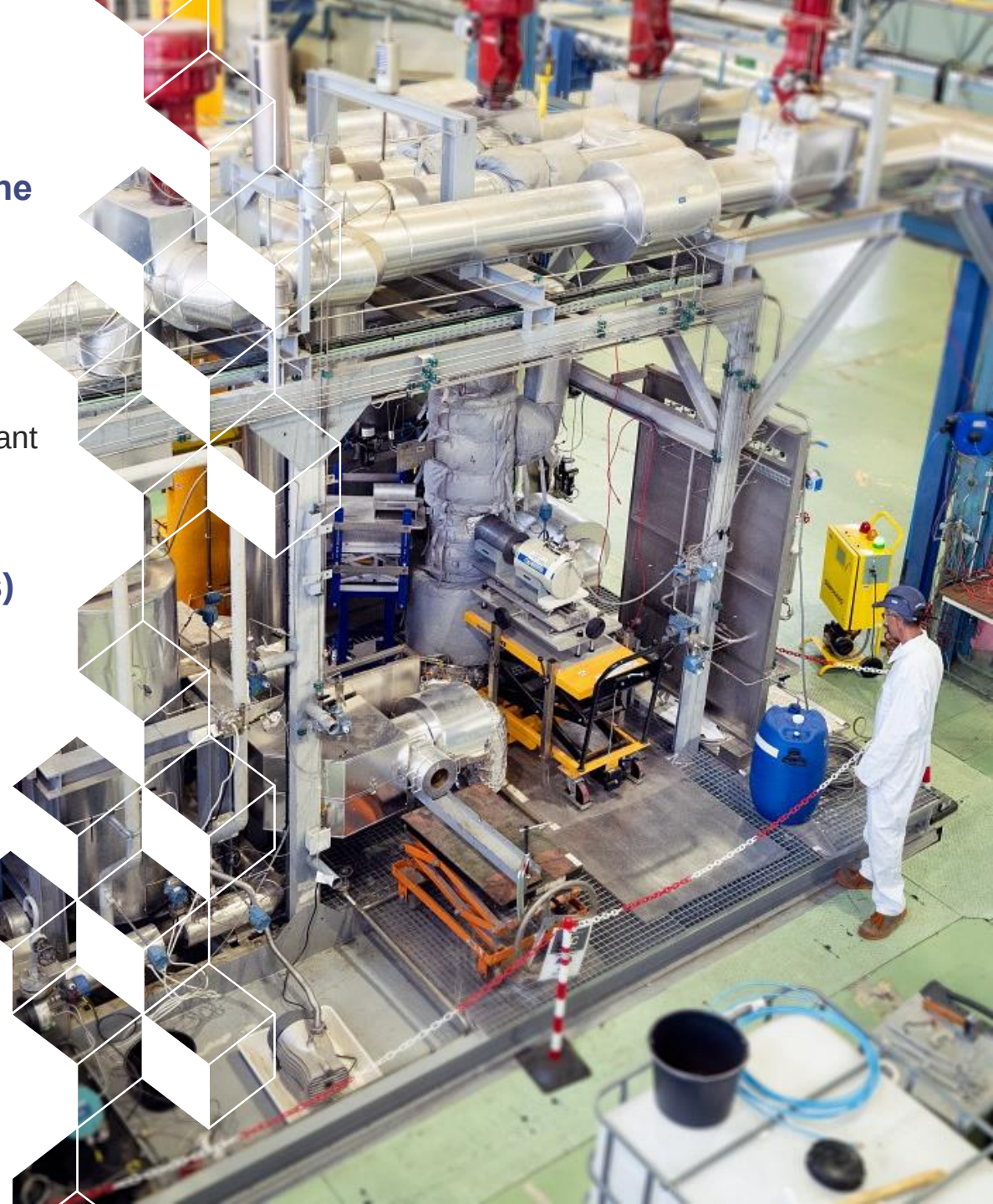
- Renault : heat transfer coefficient measurement for breaking systems design and qualification
- Vast-Solar (Australia) : sodium technologies for solar concentration power plant
- IRE/ASML (Belgium) : sodium technologies for spallation cooling target

To non-nuclear start-up, funded by IRESNE (MAGELLAN process)

- I-MC : robotic control of high-precision parts machining
- FLUIID : CT electrical impedance tomography for foreign body or fluid cavitation bubbles detection
- CRYSTTAL (CRYogenic Suspension for TreaTment And Loading) : powder micronisation and grinding

To innovative nuclear start-up (studies, expertise, transfer, …)

- From CEA : HEXANA, STELLARIA, OTRERA, BLUE CAPSULE
- Others : NUCLEO, JIMMY ENERGY, RENAISSANCE FUSION



Thank you for your attention

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