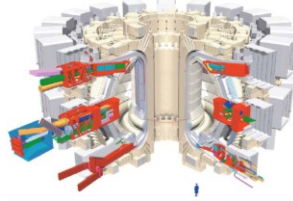
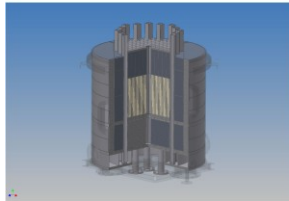
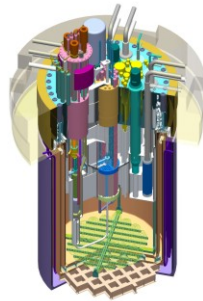




INSTITUTE FOR

## ADVANCED NUCLEAR SYSTEMS



Within ANS, 7 expert groups do research on the development and the testing of technologies and instrumentation for new reactors. New nuclear measuring techniques, reactor modelling and reactor safety are also examined. These competences are aimed at the realisation of an innovative research installation.

### GENERAL OBJECTIVE

The institute ANS shall increase the expertise and Belgian involvement, both technically and economically, in the field of fourth generation fission reactors and fusion reactors ITER-DEMO. Based on modelling, experimentation and numerical simulation, ANS shall produce the design for a fast spectrum facility with a European dimension at the Mol-site (the MYRRHA-project). Furthermore, ANS will develop and test technologies and instrumentation for innovative reactors, in collaboration with industry and other international research groups. The institute ANS shall provide services and support to industry and nuclear installations on a national and international level.

These objectives will be accomplished in synergy with the institutes NMS (Nuclear Materials Science) and EHS (Environment, Health & Safety) by calling on their expertise and experimental techniques where appropriate, and by providing support and services to them.

### STRATEGIC PRIORITIES

- MYRRHA: further development of the MYRRHA/XT-ADS design for a fast spectrum facility with a European dimension by completing the conceptual design, preparing the construction and conducting the necessary R&D support programme. This R&D support programme covers liquid lead-bismuth technology, advanced instrumentation for MYRRHA (LIDAR and Ultrasonic visualisation) and a fuel and material testing and validation programme;
- GEN IV: greater participation in GEN IV activities with an emphasis on the further development of GEN IV Lead Fast Reactors;
- GEN II & III: support to the GEN II & III industry, and commercialization of SCK•CEN's research activities in the area of GEN II & III;
- fusion: contribute to fusion research, and prepare SCK•CEN, with the collaboration of Belgian and international players, to become a partner in the realisation of large components for ITER;
- experimental devices: development of new experimental devices (with advanced experimentation) for large research reactors such as the materials test reactors BR2 and the Jules Horowitz Reactor, and the multi-purpose facility MYRRHA.

## EXPERT GROUPS

The institute of Advanced Nuclear Systems consists of seven expert groups:

### *Reactor Modelling & Safety (RMS)*

- comprising experts in reactor physics, neutronics, reactor safety, radiation shielding and thermal-hydraulics;
- RMS provides services in the fields of:
  - Neutronic calculation of critical and sub critical reactor cores;
  - Gamma and neutron shielding calculations;
  - Thermal-hydraulics calculations for reactor safety evaluations.
- RMS carries out the development and maintenance of neutronic codes.

### *Research Reactor Operation (RRO)*

- comprising nuclear reactor engineers, nuclear reactor operators and technicians;
- RRO guarantees the safe operation of the BR1 and VENUS research reactors;
- RRO performs the necessary maintenance and modifications of the installations, particularly in the framework of the GUINEVERE project.

### *Reactor Technology Design (RTD)*

- comprising project engineers with expertise in the fields of mechanical, electrical, nuclear and chemical engineering;
- RTD's main activities are to conceive, design, fabricate and test experimental devices for large research reactors, particularly BR2.

### *Drawing & Engineering Office (DEO)*

- comprising design engineers and technical draughtsmen with expertise in mechanical, electro-mechanical, thermal and nuclear engineering, and design codes such as ASME;
- DEO provides technical assistance during the design of new items and produces the detailed drawing of the new designs.

### *Reactor Technology Research (RTR)*

- comprising physicists, engineers and highly qualified technicians with expertise in the fields of nuclear physics, thermal-hydraulics and electronics;
- RTR provides the necessary R&D support for the development of the fast spectrum facility MYRRHA and the construction of new experimental devices.

### *Reactor & Nuclear Measurements (RNM)*

- comprising physicists, engineers and highly qualified technicians with expertise in preparing and performing experiments in the field of nuclear measurements and nuclear dosimetry in various radiation fields : neutrons, photons, as well as charged particles;
- RNM performs nuclear measurements, based on gamma spectroscopy and neutron measurements, on environmental samples, samples activated in the BR1 reactor and waste drums;
- RNM participates in experimental programmes at research reactors such as BR1 and VENUS.

### *Advanced Reactor Instrumentation (ARI)*

- comprising physicists, engineers and highly qualified technicians with expertise in the fields of advanced instrumentation for application in fission and fusion reactors;
- ARI is involved in the development and characterisation of advanced instrumentation (optical fibre sensors, neutron detectors, ultrasonic sensors, LIDAR). Attention will focussed on the specific conditions of mixed radiation fields e.g. neutron-gamma generated by fission or fusion;
- ARI will be involved in the development of large components for ITER-DEMO.

## Contact

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