International Atomic Energy Agency

Coordinated Research Project (CRP) on "Analytical and Experimental Benchmark Analyses of Accelerator Driven Systems"

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Outline

- Coordinated Research Project (CRP) Mechanism
- Scope and Objective of the CRP on "Analytical and Experimental Benchmark Analyses of Accelerator Driven Systems"
- Planning of the CRP

Coordinated Research Projects (CRPs)

- Mechanism for collaborative R&D work through international team-building
- Implemented in relation to a well defined research topic on which an appropriate number of institutions are invited to collaborate
- Effective means of bringing together researchers in both developing and industrialized countries to solve a problem of common interest

Agency's Role in a CRP: Coordinate the R&D Carried out by the Selected Institutions

- Appointment of a Project Officer within the Technical Division initiating the specific research activities with demonstrated competence in the topic covered by the research
- Ensuring that the subject of research is clearly defined and that each research institution participating in the CRP undertakes research according to an agreed work plan

Agency's Role in a CRP (cont'd)

- Ensuring that the scientific and technical methodologies proposed by the participating national institutions are appropriate and relevant to the CRP's research topic
- Ensuring that the CRP's research will
  - Make optimum use of existing information and contribute to filling knowledge and/or technology gaps in the field of research
  - Permit a comparison of research results from different institutions

Agency's Role in a CRP (cont'd)

- Informing members of the CRP on important developments that affect the field of research concerned
- Assisting the participating institutions in obtaining information and, where necessary, materials needed for the CRP's research

Agency's Role in a CRP (cont'd)

- **Arranging Research Coordination Meetings (RCMs) of all scientists collaborating in the research**
- **Providing financial grants under contract to support the research (in developing countries), and inviting all participating scientists to attend RCMs at Agency's cost**

What is the Objective of this CRP?

- To provide an information exchange and collaborative research framework (as requested by interested Member Sates) for R&D efforts aiming at ensuring that the tools to perform detailed simulations of transmutation systems are available

What Do We Want to Achieve in this CRP?

- Improve understanding of physics of the coupling of external sources with sub-critical cores
- Use integrated calculation schemes to perform computational and experimental benchmark analyses
- Make use of experimental data to substantiate analytical benchmark exercises

What Is The Desired Outcome of this CRP?

- Contributing to the advancement of the efforts under way in the interested Member States towards the proof of practicality of transmutation concepts

What Will Be the Output of this CRP?

- **IAEA Technical Report that**
  - **Summarizes the analytical and experimental benchmarks**
  - **Concludes on the validation status of the integrated calculation and simulation schemes used**
  - **Identifies remaining open issue and R&D needs**
  - **Indicates possible future role for the Agency**
- **Publications in peer-reviewed journals and papers at international conferences**

Who Is Participating?

Contracts Summary as of 30 November 2005:

- ARG: CNEA, Bariloche
- BEL: SCK·CEN, Mol
- BRA: CNEN/IPEN/CEN, São Paulo
- BYE: NAS/JIPNR, Minsk
- CPR: CNNC/CIAEA, Beijing
- FRA: CEA, Cadarache
- FRA: CNRS/IN2P3
- GER: FZ Rossendorf
- GER: FZ Karlsruhe
- HUN: BUTE/INT, Budapest

Who Is Participating? (cont'd)

- ITA: Politecnico di Torino
- JPN: JAEA, Tokai-mura
- NEL: NRG, Petten
- PAK: PAEC/PINSTECH, Islamabad
- POL: AGH-UST, Krakow
- POL: IAE, Otwock-Swierk
- RUS: ITEP, Moscow
- RUS: Moscow Phys. Society
- RUS: KI/MUCATEX, Moscow
- JINR: Frank Laboratory of Neutron Physics, Dubna

Who Is Participating? (cont'd)

- SPA: Universidad Politécnica de Madrid
- SPA: CIEMAT, Madrid
- SWE: RIT, Albanova University Centre, Stockholm
- UKR: Kharkov Institute of Physics & Technology
- USA: Argonne National Laboratory

⇒**Bottom line: 25 Institutions in 18 Member States and 1 International Organization**

Planned Benchmark Exercises

- YALINA Booster ⇒ experiment analyses and comparisons calculation/experiment
- Spallation target parametric study with experimental validation
- Benchmarks on FEAT ⇒ energy dependence and source efficiency; TARC ⇒ neutron fluence and ^{99}Tc transmutation; and SAD shielding
- Analytical and numerical benchmarking of methods and codes for ADS kinetics

Planned Benchmark Exercises, cont'd

- Benchmark on the Kyoto University Critical Assembly (KUCA, 14 MeV neutrons/150 MeV protons) ⇒ analyses of the experiments and comparison calculation/experiment
- Kharkov Institute for Theoretical Physics (KIPT) electron based ADS benchmark ⇒ design analyses, comparison calculation/experiment for the target design
- ADS performance, burnup codes, and transmutation experiments ⇒ validation of burnup codes, minor actinide data, IBR-30 benchmark, etc

Implementation Plan

- **5 – 9 Dec. 2005: Kick-off research coordination meeting (RCM)**
  - **Agree upon the topical areas to be covered**
  - **Identify lead organisations (responsibilities)**
  - **Produce detailed task and work plans, as well as milestones and deadlines**
- **2007 and 2008: 2nd and 3rd RCM, respectively**
  - **Review progress**
  - **With particular consideration to the status of the experimental programmes, identify needed improvements/modifications to the tasks and/or work plans, in particular considering**

Implementation Plan, cont'd

- **2009: 4th RCM**
  - **Status review**
  - **Final inputs and final draft of the CRP report**
  - **Definition of open issues and R&D needs, as well as possible Agency role**
- **2010: Publication of final CRP technical report**

For more information, please visit

http://www.iaea.org/inis/aws/fnss/

Thank You !

…Atoms for Peace