



## *Course on Natural Circulation Phenomena and Passive Safety Systems in Advanced Water Cooled Reactors*

**17 – 21 May 2010**

*(Miramare – Trieste, Italy)*

The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, in co-operation with the International Atomic Energy Agency (IAEA), Vienna, Austria, is organizing a Course on Natural Circulation Phenomena and Passive Safety Systems in Advanced Water Cooled Reactors, to be held at ICTP, Trieste, from **17 to 21 May 2010**.

Passive safety systems based on natural circulation are key to the heat removal from core or containment in many evolutionary and innovative water-cooled reactor designs. Some designs also utilize natural circulation to remove core heat during normal operation.

The objectives of the Course are to provide participants with instruction on:

- natural circulation during reactor start-up and operation, methods of analyses and governing equations, passive system initiation and operation, flow stability, scaling laws for experiments;
- phenomena that influence natural circulation (e.g. behaviour in large pools of liquid, effects of non-condensable gases on condensation heat transfer; condensation on containment structures, behaviour of containment emergency systems, thermo-fluid dynamics and pressure drops in various configurations, steam-liquid interaction, gravity driven cooling, liquid temperature stratification, behaviour of emergency heat exchangers and isolation condensers, stratification and mixing of boron);
- experimental databases for these phenomena;
- methodology for determining the reliability of passive systems that utilize natural circulation

### **PARTICIPATION**

Scientists and students from all countries which are members of the United Nations, UNESCO or IAEA may attend the Course subject to approval by the Course Directors. A basic knowledge in thermo-hydraulics, fluid mechanics and heat transfer is required. A science or engineering degree (e.g. in physics, mechanical, chemical or nuclear engineering) or equivalent qualification is necessary. Logistics limit the number of participants to 25. As the Course will be conducted in English, participants should have an adequate working knowledge of that language. Although the main purpose of the Centre is to help research workers from developing countries, through a programme of training activities within a framework of international cooperation, a limited number of students and post-doctoral scientists from developed countries are also welcome to attend.

As a rule, travel and subsistence expenses of the participants should be borne by the home institution. Every effort should be made by candidates to secure support for their fare (or at least half-fare). However, limited funds are available for some participants who are nationals of, and working in, a developing country, and who are not more than 45 years old. Such support is available only for those who attend the entire activity. There is no registration fee.

### **HOW TO APPLY FOR PARTICIPATION**

The application form can be accessed at the activity website <http://agenda.ictp.it/smr.php?2152>

Once in the website, comprehensive instructions will guide you step-by-step, on how to fill out and submit the application form. Closing date for receipt of the applications is **19 February 2010**.

### **ACTIVITY SECRETARIAT:**

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E-mail: [smr2152@ictp.it](mailto:smr2152@ictp.it)    ICTP Home Page: <http://www.ictp.it/>

### **DIRECTORS:**

**Jong Ho CHOI**

**Sama BILBAO Y LEON**  
*(IAEA, Vienna, Austria)*

### **LOCAL ORGANIZER:**

**Claudio TUNIZ**

*(ICTP, Trieste, Italy)*

### **INSTRUCTORS:**

**Prof. J. Reyes**

*(Oregon State Univ., USA)*

**Prof. F. D'Auria**

*(Univ. of Pisa, Italy)*

**Dr. N. Aksan**

*(Formerly PSI, Switzerland)*

**Prof. Y.A. Hassan**

*(Texas A&M Univ., USA)*

**Dr. P.K. Vijayan**

*(BARC, India)*

**Dr. J.C. Ferreri**

*(NRA, Argentina)*

**Dr. M. Marques**

*(CEA, France)*

### **Deadline**

**for requesting participation:**

**19 February 2010**