

# Workshop on

## Nuclear Reaction Data and Nuclear Reactors: Physics, Design and Safety

**16 February - 12 March 2004**  
(Miramare - Trieste, Italy)

The International Atomic Energy Agency (IAEA, Vienna - Austria), in co-operation with the Abdus Salam International Centre for Theoretical Physics (ICTP, Trieste - Italy), and the Ente per le Nuove Tecnologie, l'Energia e l'Ambiente (ENEA, Rome - Italy), is organising a "Workshop on Nuclear Reaction Data and Nuclear Reactors: Physics, Design and Safety", to be held at the ICTP in Trieste from 16 February to 12 March 2004. The Workshop will be directed by **Professors: A. L. NICHOLS** (IAEA, Vienna), **A. TRKOV** (IAEA, Vienna), **J. KUPITZ** (IAEA, Vienna) and **A. GANDINI** (University of Rome and ENEA). The Local Organizer is **Mr. B. STEWART** (ICTP, Trieste).

### **BACKGROUND**

The Workshop represents a unique forum where scientists and engineers can get extensive and up-to-date information on the whole 'know-how', from the physics of nuclear reactions to nuclear reactor calculations. The scope and format of the Workshop follow a successful pattern established by the previous activities in 2000 and 2002. In the era of vanishing expertise and infrastructure due to low support for nuclear reactor activities, this type of training is important, particularly in view of better prospects for the revival of the nuclear option for energy production, emerging innovative fuel cycle concepts, enhanced safety requirements and radioactive waste incineration.

Nuclear energy has important economical and environmental implications. It has proved to be a technically and economically viable source of electricity, playing a significant role in meeting energy demands of many countries, while at the same time helping to reduce carbon dioxide emissions and other forms of air pollution. At present, there are about 800 nuclear power and research reactors operative, constructed or planned in over 70 countries, including 45 developing countries.

These facilities and related activities require a wide spectrum of scientific and technical personnel. Expertise is needed in physics of nuclear reactions and particle transport, in use and handling of nuclear data, as well as in all engineering and safety principles needed to make nuclear reactors a fully viable and economic source of energy, meeting the highest safety and environmental standards. In addition, new demands are emerging from 21-st century technologies.

## **OBJECTIVE**

The objective of the Workshop is to train scientists and engineers from both developing and developed countries in modern nuclear reaction theory, nuclear data production and data use, with particular emphasis on applications in nuclear reactor physics, design and safety. Participants will gain experience in the practical use of modern computer codes relevant to these topics. Furthermore, they will be introduced to the rapidly advancing information technology for retrieval of nuclear data, as well as new trends in advanced nuclear systems for energy generation.

## **PROGRAMME**

The Workshop will be structured on the basis of 5 working days a week. The theoretical lectures will be held in the mornings, while afternoons will be mostly dedicated to computer exercises. The programme of the Workshop will include:

### **Week 1: Reactions I**

- Analysis of neutron resonances
- Direct reactions and optical model
- Physics of nuclear fission

### **Week 2: Reactions II**

- Statistical theory of nuclear reactions
- Pre-equilibrium models (multistep processes)
- On-line nuclear data retrieval

### **Week 3: Processing**

- Nuclear data formatting and processing
- Application of nuclear data for transport and lattice calculations
- Research reactors

### **Week 4: Reactors**

- Advanced nuclear systems in the 21-st century
- Reactor design and safety
- Reactor operation and performance analysis

## **PARTICIPATION**

Scientists and engineers from all countries that are members of the UN, UNESCO or IAEA can attend the Workshop. They should hold a university degree in nuclear physics, nuclear engineering or related subjects and preferably have several years of professional experience in one of the main topics of the Workshop (nuclear reactions, nuclear data processing, nuclear reactor physics). As the activity will be conducted in English, participants should have an adequate working knowledge of this language. Although the main purpose of the Centre is to help scientists from developing countries, graduate students and post-doctoral scientists from developed countries would equally benefit from the Workshop and are encouraged to apply.

As a rule, travel and subsistence expenses of the participants should be covered by their home institutions. 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, to be selected by the Organizers. Travel expenses will be granted only in exceptional cases. Every effort should be made by candidates to secure support for their fare (or at least half-fare) from their home country. It is stressed that participants whose travel expenses are paid by ICTP are required to attend the entire course. The closing date for receipt of requests for participation is **10 OCTOBER 2003**. There is no registration fee for attending the Workshop.

The Application Form is obtainable from the ICTP WWW server:  
**<http://agenda.ictp.trieste.it/agenda/current/fullAgenda.php?email=0&ida=a0335>**  
(which will be constantly up-dated)

and the IAEA NDS server:  
**<http://www-nds.iaea.org/>**

It should be completed and returned before **10 OCTOBER 2003** to:

**the Abdus Salam ICTP  
(SMR.1555)  
(c/o Ms. Doreen Sauleek)  
Strada Costiera 11  
I-34014 Trieste, Italy**

The decision of the Organizers will be communicated to all candidates as soon as possible.  
If sending your application by e-mail, please save and send file attachments in RTF format.

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**Trieste, July 2003**