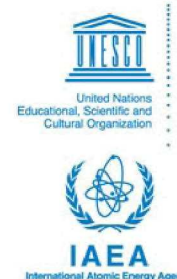




The Abdus Salam
International Centre for Theoretical Physics



**Joint ICTP/IAEA Workshop on
Effects of Mechanical Properties and Mechanisms
Governing the Irradiation-induced Embrittlement
of Pressure Vessel Steels**

23 – 27 November 2009

(Miramare – Trieste, Italy)

The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, in cooperation with the International Atomic Energy Agency (IAEA), Vienna, Austria, is organizing the Workshop on **Effects of Mechanical Properties and Mechanisms Governing the Irradiation-induced Embrittlement of Pressure Vessel Steels**, to be held at ICTP, Trieste, from **23 to 27 November 2009**.

Research on irradiation embrittlement of pressure vessel steels has been the subject of significant international research. The last decade has seen remarkable progress in developing a mechanistic understanding of irradiation embrittlement. This understanding has been exploited in formulating robust, physically-guided and statistically-calibrated models transition-temperature shifts. Over the past three decades, developments in fracture mechanics have led to a number of consensus standards and codes for determining needed fracture toughness parameters and associated uncertainties as derived from the embrittlement databases.

Even with this technical progress, there are still significant technical issues that need to be addressed to reduce the uncertainties in regulatory application. The key issues detailed in this chapter are those identified by a cross-section of researchers in the international community. Of the many significant issues discussed, those deemed to have the most impact on the current regulatory process are: material variability and surrogate materials; high fluence, long irradiation times, and flux effects; Master Curve fracture toughness and viability of the pre-cracked Charpy V-notch specimen; attenuation; high-nickel welds, and modeling and micro-structural analysis. Material variability and surrogate materials are the most overarching issues.

The scope of the Workshop is education, training and information exchange. Participants will be familiarized with the physics, materials and engineering aspects of structural materials used in current reactor designs. A comprehensive review of techniques used and under development for better understanding the processes at nanoscale and micro-structural level that are the driving force for changes in material at macro-structural level, will be given.

PROGRAMME:

The programme will consist of lectures, tutorials and computer demonstrations. Participants will also be invited to make short (10-15 minute) presentations covering their own research activities. The participants will study and discuss the theoretical foundation of all aspects related to the changes of a material due to irradiation including key issues, such as radiation effects on microstructure and properties, advanced post-irradiation methodologies and multi-scale modeling as well as qualification of new structural materials. In addition, the attendees will gain knowledge related to structural materials of selected reactor designs as well as most critical areas from a structural materials point of view. They will learn the principles of the qualification methodologies and become acquainted with the current status of R&D and new challenges in radiation material science.

PARTICIPATION:

Scientists and engineers from all member countries that are members of the United Nations, UNESCO or IAEA may attend. They should hold a university degree or postgraduate degree/diploma in physics, engineering or related subjects. The Workshop will be conducted in English and participants must therefore have adequate language knowledge. Although the main purpose of the Centre is to help researchers 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 borne by the home institution. Every effort should be made by candidates to secure support for their fare (or at least half-fare). Limited funds will be available for some participants, who are nationals of, and working in, a developing country, and who are not more than 45 years old. There is no registration fee.

HOW TO APPLY FOR PARTICIPATION:

Access to the Online **Application form** with comprehensive instructions on how to fill in and submit the application form are to be found on the website:

<http://agenda.ictp.it/smr.php?2067>

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Jointly with the
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KEY TOPICS:

Radiation Damage Phenomenon

**Micro-structures and Mechanical
Properties of Nuclear Power
Structural Materials**

**Multi-Scale Approach in
Modeling of Material Properties
Under Irradiation**

**Advanced Micro-structural
Probing Methods**

**Qualification of New Structural
Materials**

**Pathways to Development of New
Structural Materials**

**On-going Challenges in Radiation
Materials Science**

DEADLINE

7 August 2009