The Abdus Salam
International Centre
for Theoretical Physics
www.ictp.it

United Nations
Educational, Scientific and
Cultural Organization

IAEA
International Atomic Energy Agency

JOINT ICTP-IAEA INTERNATIONAL TRAINING WORKSHOP ON

ACCURACY REQUIREMENTS AND UNCERTAINTIES IN RADIATION THERAPY

9 - 13 December 2013

Miramare, Trieste, Italy

There have been major advances in radiation oncology-related technology in recent years. These technological developments have allowed for a transition from conventional two-dimensional (2-D) radiation therapy to three-dimensional (3-D) conformal radiation therapy (CRT), intensity-modulated radiation therapy (IMRT), image-guided radiation therapy (IGRT), adaptive radiation therapy (ART), and four-dimensional (4-D) imaging and motion management in radiation therapy. Brachytherapy procedures have also evolved both for high dose rate (HDR) techniques as well as permanent implants, especially for prostate cancer treatments. Multiple imaging modalities are now available for target volume and normal tissue delineation for radiation treatment planning both for external beam radiation therapy (EBRT) and brachytherapy. These new technologies are often combined with an integrated computerized radiation information system allowing cancer centres to evolve into fully networked environments. The pace of new advancements in technologies and the expectation of improved outcomes in both external beam and brachytherapy, has resulted in a recognized need for greater accuracy and oversight in the radiation treatment process.

The degree of application of the various technologies within radiation therapy varies dramatically across the world. These variations not only occur from one nation to another, but there are also very large variations within individual nations. Independent of the level of technological sophistication, accuracy in radiation therapy and the means by which it is achieved and maintained remain central to the treatment process. In order to sustain the required accuracy in dose delivery, all steps of the radiation therapy process should be covered by comprehensive quality assurance (QA) programmes. It is well recognized that there is a need to evaluate the influence of different factors affecting the accuracy of radiation dose delivery and to define the actions necessary to maintain treatment uncertainties at acceptable levels. Guidance on accuracy requirements and uncertainties in radiation therapy is needed in order to promote awareness and encourage quantification of uncertainties in order to promote safer and more effective patient treatments

This Workshop will be preceded by the two-week Training Course on “Medical Physics for Radiation Therapy Dosimetry and Treatment Planning for Basic and Advanced Applications”. Participants can apply for both courses.

PARTICIPATION

This course seeks to target clinically qualified radiotherapy medical physicists. Scientists and students from all countries which are members of the United Nations, UNESCO or IAEA may attend the course. As it 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 research workers from developing countries, through a programme of training activities within a framework of international cooperation, 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 from developing countries, to be selected by the organizers. 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?2502

Once in the website, comprehensive instructions will guide you step-by-step, on how to fill out and submit the application form.

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IAEA

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TOPICS

The radiotherapy process (external beam radiation therapy and brachytherapy)

Definitions and terminology

Basic frameworks for considering accuracy requirements:

- **Radiobiology**
- **Clinical**

Practically achievable levels of accuracy

- **Reference dosimetry**
- **Relative dosimetry**
- **Patient set-up**
- **Imaging systems**
- **Treatment delivery**
- **Combining accuracy**

Determining uncertainty
Managing uncertainty
Reducing uncertainty
Recording and reporting uncertainty

Case studies/practical exercises

APPLICATION DEADLINE

25 July 2013