

## Special issue on radiation dosimetry

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2009 Metrologia 46

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## EDITORIAL

# Special issue on radiation dosimetry

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This special issue of *Metrologia* on radiation dosimetry is the second in a trilogy on the subject of ionizing radiation measurements, a field that is overseen by Sections I, II and III of the CIPM's Consultative Committee for Ionizing Radiation (CCRI). The work of Section II, on radionuclide metrology, was covered in issue 44(4), published in 2007, and that of Section III, on neutron metrology, will be covered in a special issue to be published shortly. This issue covers the work of Section I (x-rays and  $\gamma$  rays, and charged particles).

The proposal to publish special issues of *Metrologia* covering the work of the CCRI Sections was first made in 2003 and refined at the two subsequent meetings of the CCRI in 2005 and 2007. The overall aim is to present the work of the CCRI to a wider metrological audience and to highlight the relevance and importance of the field. The main focus of our special issue on dosimetry metrology is on the 'state of the art' in the various areas covered, with an indication of the current developments taking place and the problems and challenges that remain. Where appropriate, this is set in a brief historical context, although it is not the aim to give a historical review.

The need for accurate measurement has been appreciated from the pioneering days of the use of ionizing radiation in the early 20th century, particularly in the fields of diagnostic and therapeutic medicine. Over the years, the range of applications for ionizing radiation has expanded both in scope and in the types and energies of radiation employed. This has led to the need to develop a wide variety of measurement techniques and standards covering fields ranging from the low doses experienced in environmental and protection applications to the extremely high doses used in industrial processing. The different types of radiation employed give rise to the need for dose measurements in radiation beams whose effective penetration through a material such as water ranges from a few micrometres to several metres.

The wide variety of radiation types and dose ranges posed a particular problem in selecting the topics to be included in this special issue and has inevitably meant that some fields of application have received less attention than others. It is hoped, however, that the topics covered are broad and varied enough to provide useful information for those with an interest in radiation dosimetry, both experienced practitioners and those entering the field. The extensive reference lists also provide a valuable resource.

The issue begins with the important topic of mutual recognition of dosimetry standards and the procedures that have been put in place to achieve this, and continues with contributions on the principal measurement techniques employed: free-air chambers, air-kerma cavity standards, photon absorbed-dose standards and absorbed-dose standards for electron beams. The topics of brachytherapy and radiation protection dosimetry are covered in separate articles, and the issue concludes with a review of the mathematical modelling techniques that underpin much of the recent work described in the preceding sections.

The work involved in the production of a document such as this is considerable and we have been extremely fortunate in securing the involvement of many of the acknowledged experts in the field of ionizing radiation dosimetry, both as named

authors and serving as anonymous referees. The editors would like to thank all those who have given their time and commitment to producing this special issue, and particularly Professor Georgio Moscati, former President of the CCRI, and Dr Penny Allisy-Roberts, Executive Secretary of the CCRI, for their support and encouragement.