

EURADOS Working Group 6

Computational Dosimetry

Motivation

Computational methods are indispensable tools in the field of radiation dosimetry, with a wide variety of applications ranging from simulation of the response of radiation detectors, simulation of radiation transport in complex geometrical setups to obtain the radiation fluence at a region of interest, to the assessment of dose quantities in exposed humans. A large variety of computer codes are available for these purposes of which many have developed to versatile, easy-to-use tools for 'everybody' while others require more expertise already in their operation.

Aims

As a pool of European expertise in this field, Working Group 6 promotes good practice in the field of computational methods in radiation dosimetry for radiation protection and applications in radiation medicine. It carries out scientific research and development as well as knowledge transfer activities in the area of computational dosimetry. While Monte Carlo simulations are the dominant method, other aspects of computational dosimetry such as spectra unfolding or the proper use of voxelized geometrical models are also considered.

The focus on techniques rather than scientific topics implies a cross-sectional role of WG6 and collaboration with other EURADOS WGs, covering a large number of up-to-date topics in radiation dosimetry. Furthermore, knowledge transfer on the competent use of Monte Carlo codes and other computational techniques by training courses and comparison exercises are key aspects of the WG6 scope.

Actions

Completed

- Modelling of Bonner sphere responses for high energy neutrons (with WG11) - 2010
- Training School on the development of voxel human geometries for MC codes, IRSN – 2011
- Lung in vivo measurements complemented with MC simulations (collaboration with WG7-Internal Dosimetry) – 2012
- Winter School *Status and Future Perspectives of Computational Micro- and Nanodosimetry* – AM2013
- Knee in vivo measurements complemented with MC simulations (collaboration with WG7-Internal Dosimetry) – 2014
- Training School on the development of voxel human geometries for MC codes, HMGU – 2014

- Challenges in Micro- and Nanodosimetry for Ion Beam Cancer Therapy (MIND-IBCT), Workshop co-organized by EURADOS – 2014
- Intercomparison exercise on ²⁴¹Am activity determination in the skull (with WG7) – 2014
- Comparison exercise on the design and dosimetry assessment of a LINAC facility – 2017
- Training School on the development of voxel human geometries for MC codes – KIT 2018
- Training course on the Application of Monte Carlo Methods for Dosimetry of Ionizing Radiation in Individual monitoring – KIT 2018
- Modelling dose enhancement around gold nanoparticles (with WG7) – 2018
- Development of a standard for reporting DNA damage from Monte Carlo simulations – 2018
- Precursor study for development of a reference computational skin model – 2018

In Progress and ongoing

- Comparison exercise on reconstructing neutron spectra from the knowledge of the system response function and the values of counts obtained with a set of Bonner Spheres
- Micro- and nanodosimetry issues
 - Fundamental issues in track structure calculations
 - Uncertainty Exercise for micro- and nanodosimetric problems
 - Satellite workshop on micro- and nanodosimetry to the 3rd International Conference on Dosimetry and Applications, May 2019, Lisbon
- Individual monitoring
 - Workshop in the role of computational methods in individual monitoring
 - Conversion coefficients from mobile phones to organ doses (with WG 10)
 - Calculation of protection quantities for emergency/accident dosimetry
- VOXEL Phantoms
 - Intercomparison on the implementation of the ICRP reference voxel phantoms
 - Contribution to the 7th International Workshop on Computational Phantoms: July 2019, Neuherberg
- High energy fields
 - Investigation of the discrepancies due to the different models employed in the various high energy codes to generate cross-section data for the whole MeV-GeV energy domain. (with WGs 9 and 11)
- Nuclear Medicine – collaboration with the EANM

Members

Chairperson

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Full members

- Working Group 6 has currently 29 full members from 9 countries

Corresponding members

- Working Group 6 has currently 9 corresponding members

Additional information

See EURADOS web site (www.euroados.org).