

Current and Recent ICRU Activities in Radiation Protection Dosimetry and Measurements

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**International Commission on
Radiation Units and Measurements
(ICRU)**





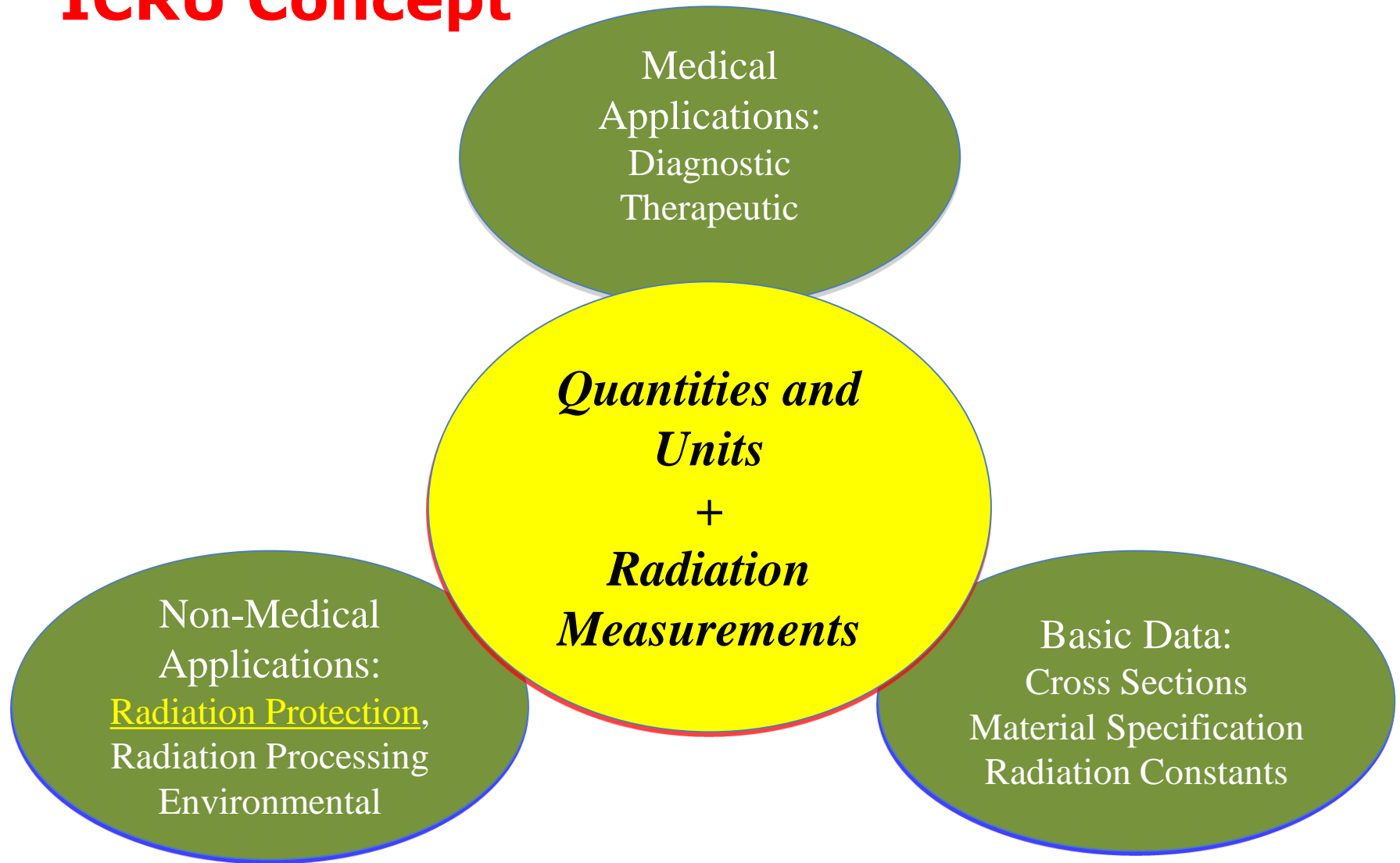
International Commission on Radiation Units & Measurements

The principal objective of ICRU is the development of *internationally accepted recommendations* on:

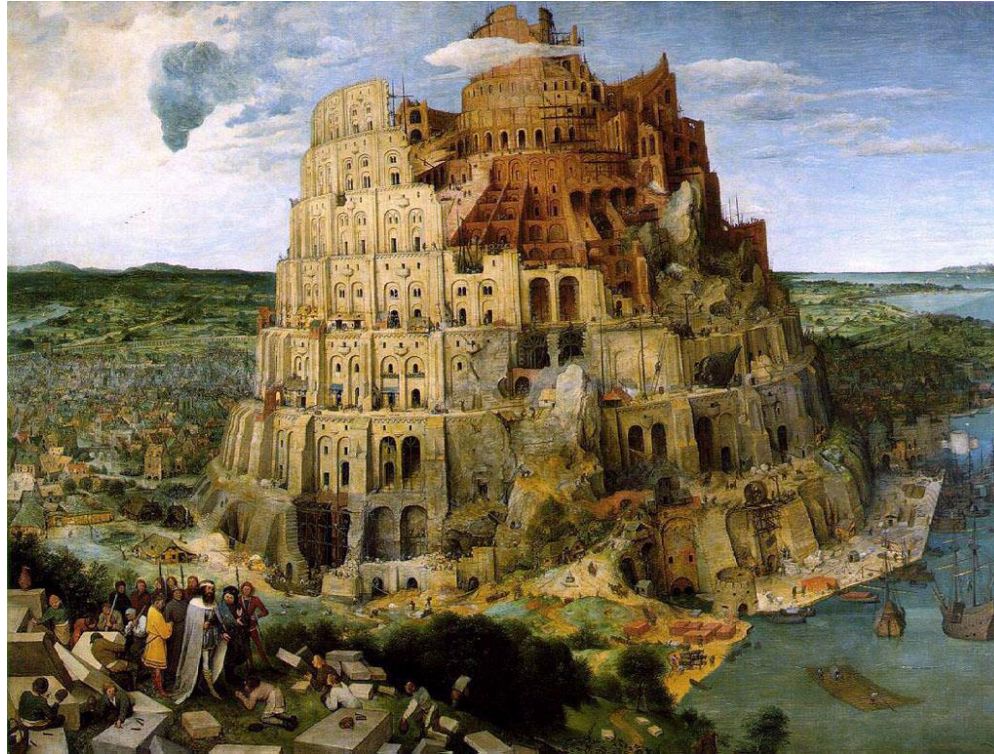
- **Quantities and units** of radiation and radioactivity.
- Procedures suitable for the **measurement** and application of these quantities in
 - radiation medicine,
 - radiation protection,
 - industrial and environmental activities.
- Basic **physical data** needed in the application of these procedures.



ICRU Concept



The communication problem in: multidisciplinary disciplines, or **Why do we need quantities and units?**



**The continuous and growing need
for a common language**



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Why do we need Quantities and Units ?

The definition of appropriate quantities, and their associated units, is a fundamental necessity for any scientific endeavour and for any practical applications of scientific knowledge.

For **radiation protection** a **dosimetric quantity** is needed which is related to the probability (or severity) of the induced effect, ideally a single quantity applicable for most types of radiations and conditions.



International Commission on
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The First International Congress of Radiology London 1925

The urgent need for an internationally recognized **unit** for radiation exposure in medicine led to the creation of the
International X-Ray Unit Committee

(1950 renamed: Int. Commission for
Radiological Units and Measurements,
ICRU)



A brief history of quantities and units (ICRU)

- The unit **Röntgen** was first introduced in 1928 (first meeting of ICRU) and finally in **1938**.
- **Absorbed dose** was introduced by ICRU in **1953** with the unit rad (=100 ergs/g). In 1974, the unit Gray (J/kg) was introduced to comply with the SI system.
- The quantity **dose equivalent** was introduced in **1962** as a product of absorbed and a quality factor Q.



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Journal of the ICRU

ICRU REPORT 85

Fundamental Quantities and Units for
Ionizing Radiation

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MEASUREMENTS



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System of dosimetric quantities for external radiation

(ICRP 74 and ICRU 57 (1997))

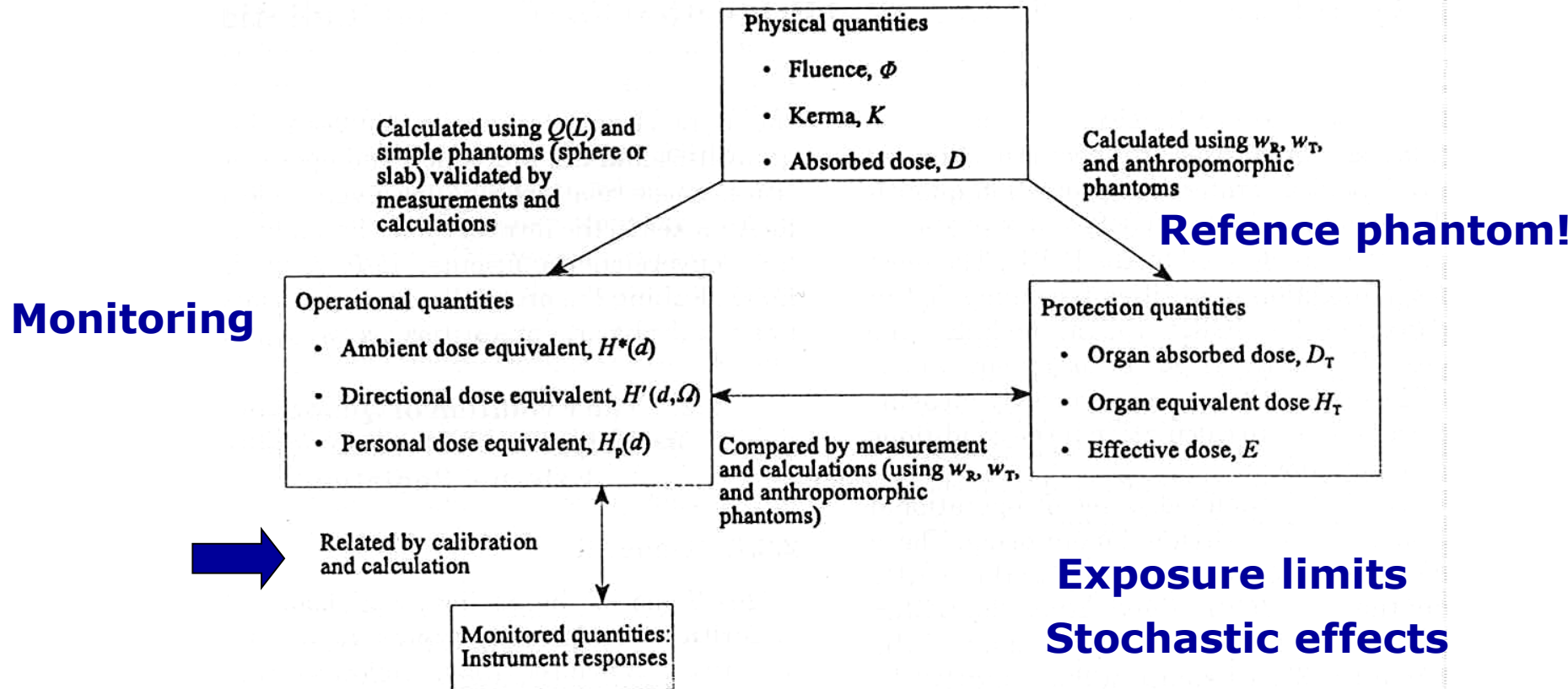


Fig. 1. Relationship of quantities for radiological protection monitoring purposes.

ICRU Reports on Radiation Measurements



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ICRU Report No. 53 (1994)

ICRU REPORT 53

Gamma-Ray Spectrometry in the Environment

- Ground level spectrometry
- Airborne spectrometry
- Determination of dose quantities

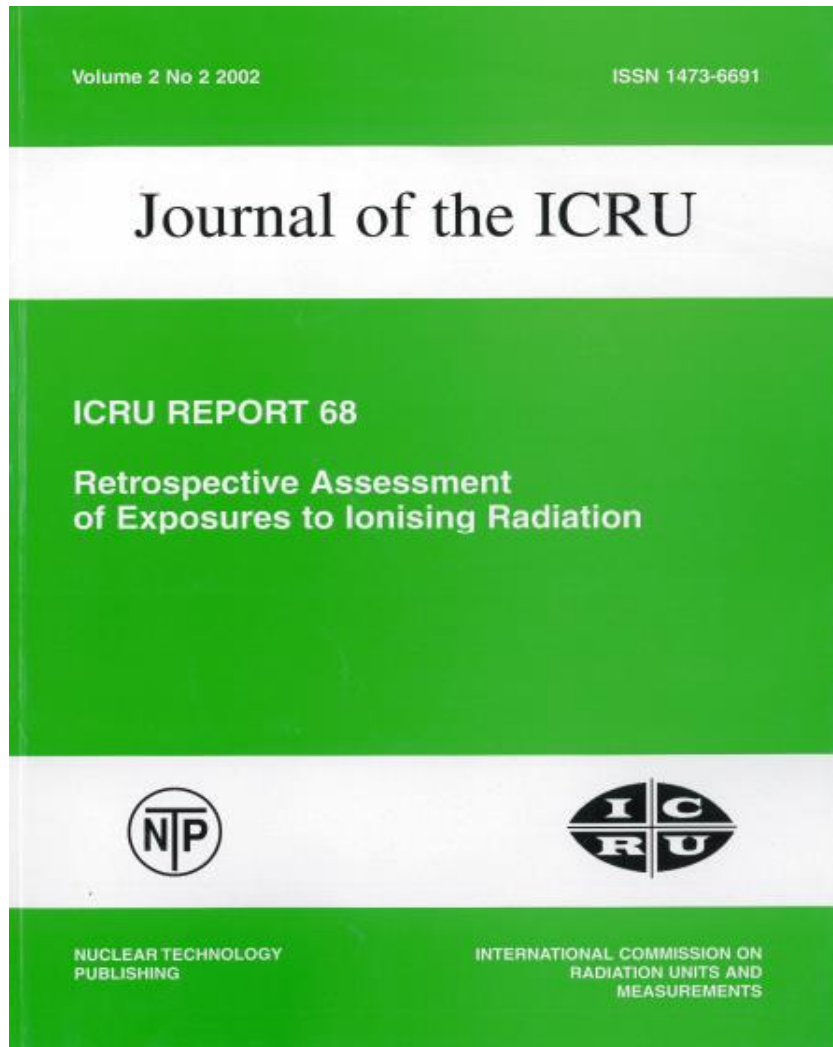


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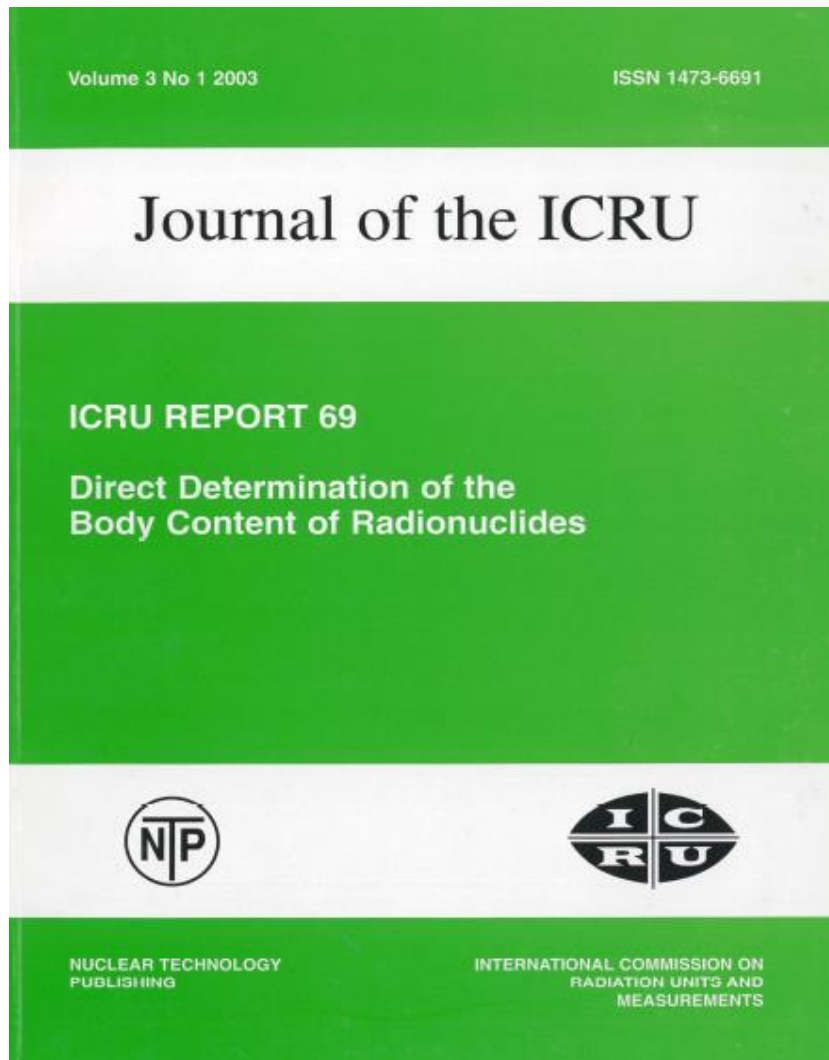
ICRU Report No. 68 (2002)



- Measurements on individuals (physical, biological)
- environmental measurements + modelling (luminescence, mass spectrometry)
- Radionuclides in environment



ICRU Report No. 69 (2003)



"Whole Body counter"

- Types of detectors
- Measurement geometries
- Background reduction
- Calibration



ICRU Report No. 75 (2006)

Volume 6 No 1 (2006)

ISBN
0199211418

JOURNAL OF THE ICRU

ICRU REPORT 75

SAMPLING FOR RADIONUCLIDES IN THE ENVIRONMENT

OXFORD
University Press



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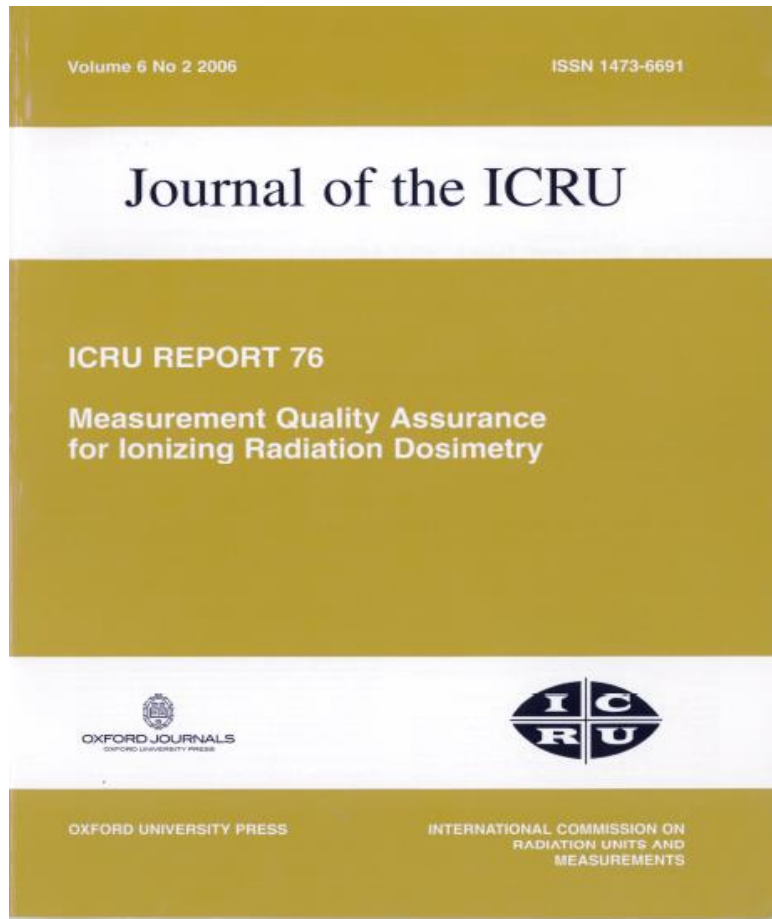
- General sampling concepts
- Statistical quantities
- Assessing spatial patterns
- Temporal + spatio-temporal sampling problems



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ICRU Report No. 76 (2006)

ICRU Report No. 84 (2011)



Joint ICRU / ICRP Reports

- Conversion Coefficients for Use in Radiological Protection against External Radiation
(ICRP 74, ICRU 57)
- Adult Reference Computational Phantoms (ICRP 110)
- Dose Conversion Coefficients for External Exposure (ICRP 116)
- Reference Data for the Validation of Doses from Cosmic-Radiation Exposure of Aircraft Crew (ICRU 84)



Reports on Basic data for Dosimetry

Report 31 Average Energy to Produce an Ion Pair (1979);

Report 37, Stopping Power for Electrons and Positrons (1984)

Report 46, Photon, Electron, Proton and Neutron
Interaction Data for Body Tissues (1992)

Report 49, Stopping Powers and Ranges for Protons and α Particles (1993)

Report 55, Second.Electron Spectra from Charged Particle Interactions
(1996)

Report 64, Dosimetry of High-Energy Photon Beams Based on Standards of
Absorbed Dose to Water (2001)

Report 73 Stopping of Ions Heavier Than Helium (2005)

Report 77 Elastic Scattering of Electrons and Positrons (2007)



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Ongoing ICRU Activities

- ▶ Measurement and Reporting of Radon Exposure
- ▶ Operational Radiation Protection Quantities for External Radiation
- ▶ Key Data for Measurement Standards in the Dosimetry of Ionizing Radiation



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with scientists and practitioners**

www.icru.org

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Thank you for attention



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