

Recent ICRU activities

Thomas Otto, ICRU and CERN

BIPM – 25th Meeting of the Consultative Committee for Units



ICRU Report 92 (2019)

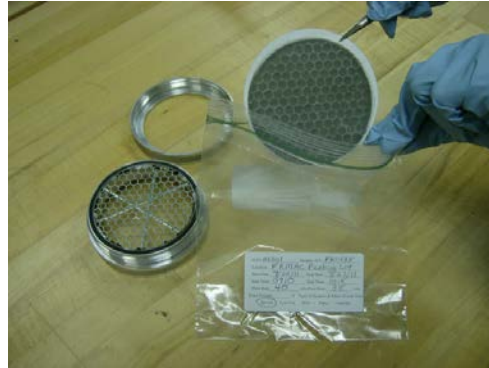
Radiation Monitoring for Protection of the Public after Major Releases of Radionuclides to the Environment



- Major Radioactive Releases to the environment
- Monitoring Programs
- Monitoring Systems and Methods
- Quantities used in Radiation Protection
- Appendices - Examples
- Extensive list of references and bibliography



ICRU 92 – Monitoring Systems and Methods



- Overview of dosimeters, monitors and systems for
 - Early warning
 - Area monitoring
 - External radiation
 - Airborne radiation
 - Ground Contamination
 - Personal monitoring
 - External radiation
 - External contamination
 - Internal contamination
- with extensive references to original literature

ICRU Report 93

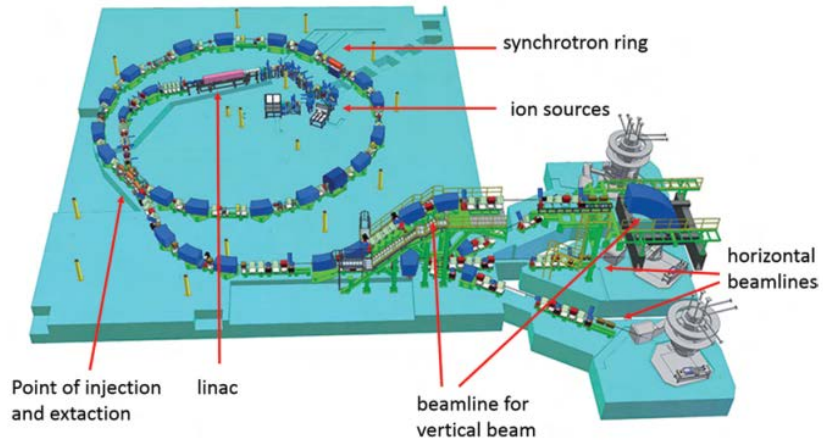
Prescribing, Recording and Reporting Light Ion Therapy



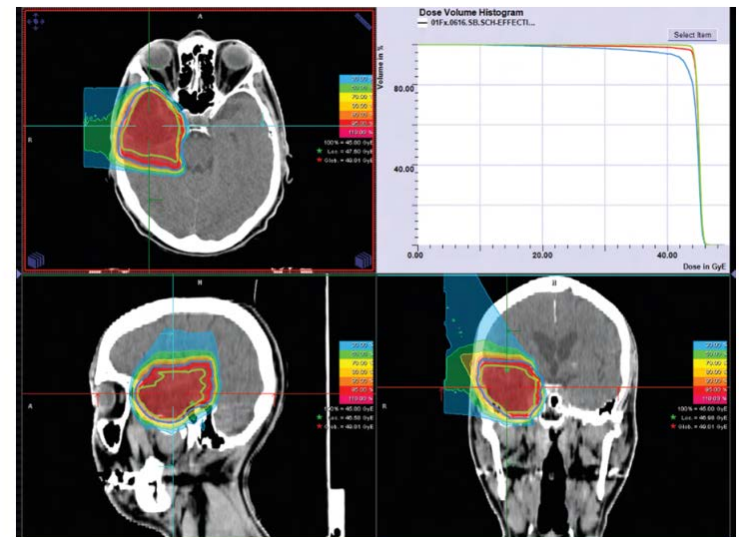
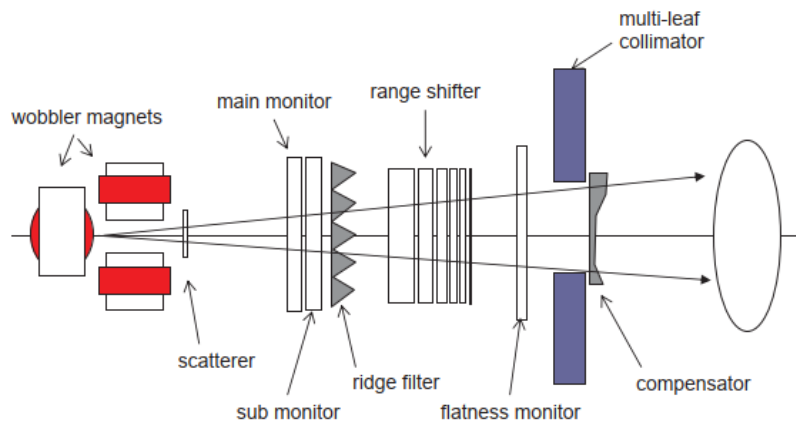
- Radiation biology
- Beam delivery
- Dosimetry
- Volumes in ion therapy
- Treatment planning
- Management of patient and organ motion
- Estimation of uncertainty
- Quality assurance
- Prescribing, recording and reporting treatment



ICRU 93 – Facilities and Treatment plans



- Comprehensive report on this cancer treatment modality
- Guideline for new centers



ICRU Report 94 (2019)

Methods for Initial-Phase Assessment of Individual Doses following Acute Exposure to ionizing Radiation



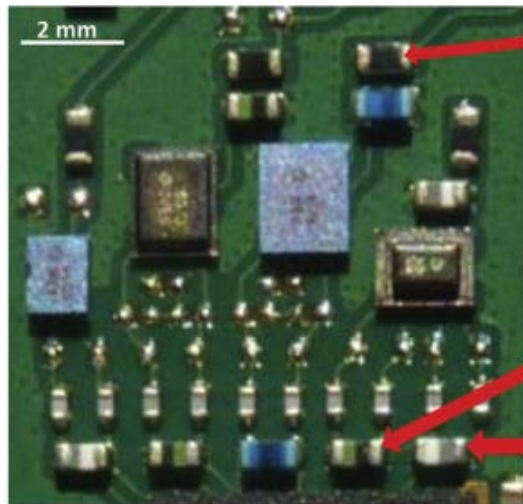
- Quantities
- Biodosimetry
- Physical Dosimetry
- Neutron Activation, Bioassay
- Radiation Field Mapping
- Applications



ICRU 94 – Bio- and Fortuitous Dosimeters



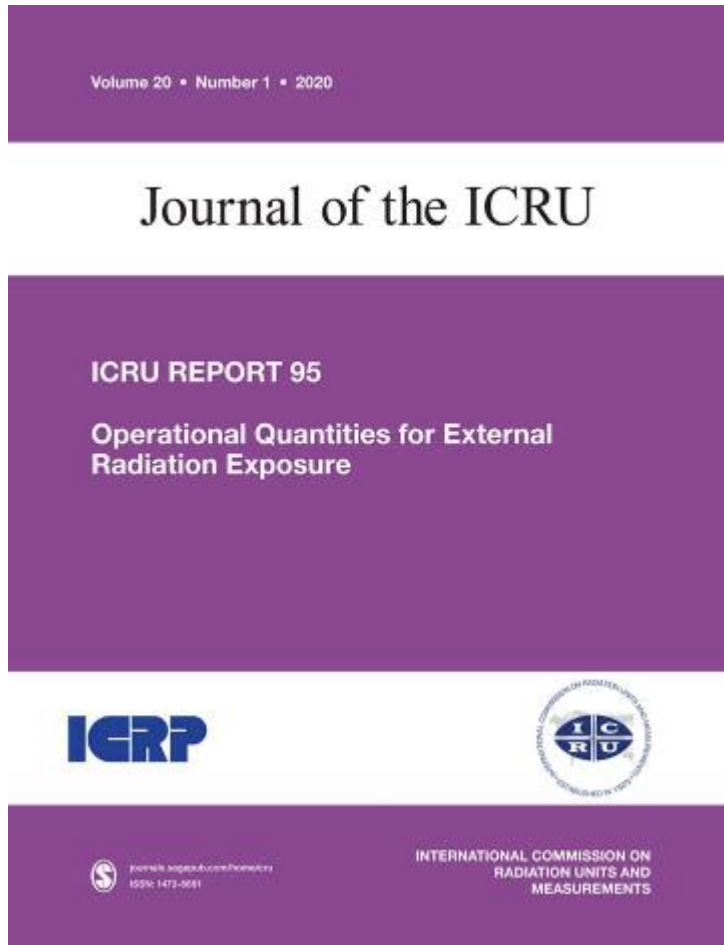
- EPR: Principle similar to NMR (RF resonance in B-field)
- Body Dosimeters: bone, teeth, nails
- Fortuitous Dosimeters: sugar, glass, cotton, plastic
- few Gy – 100s of Gy



- Luminescence: Principle similar to TLD or OSL: light emission after stimulation
- Fortuitous Dosimeters: Chip cards, Integrated Circuits, LCD display, Touchscreen, ...
- 10s of mGy to 10s of Gy

ICRU Report 95 (2020)

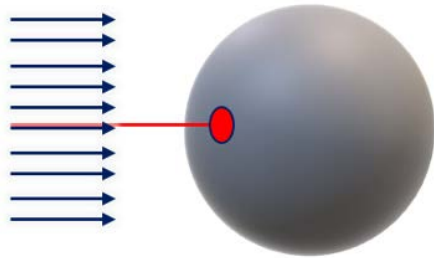
Operational Quantities for External Radiation Exposure



- Previous quantities (ICRU 39 and 51)
- Operational Quantities for external exposure
- Conversion Coefficients
- Practical Consequences
- Appendices
 - Values of Conversion coefficients
 - Computer Codes

ICRU 95 – New Operational Quantities

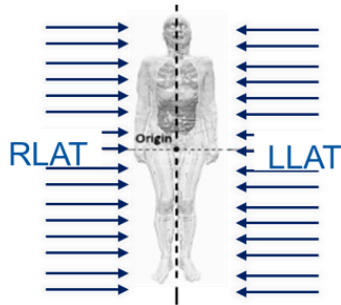
$H^*(10)$ Ambient dose equivalent



Change from ICRU sphere



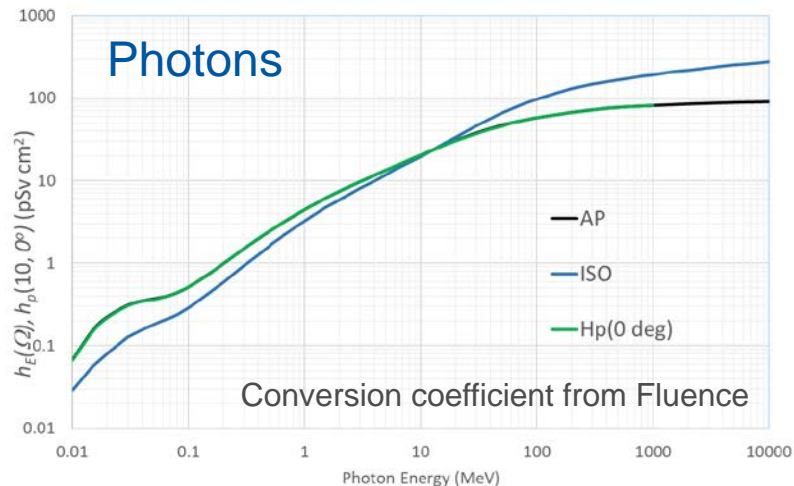
H^* : Ambient Dose



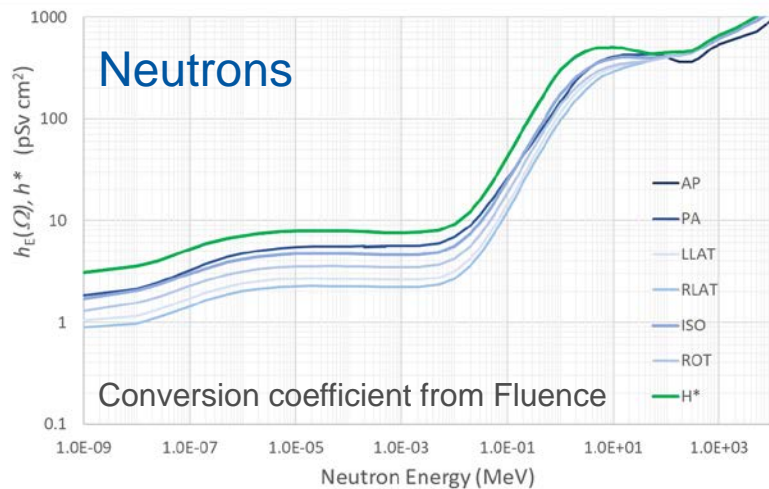
Conversion coefficients on anthropomorph phantom for orientation of maximal effective dose

- Definition of operational quantities with help of the same numerical phantoms as for protection quantities
 - H^* - Ambient dose
 - H_p - Personal dose
- Leads to **simplification of the system and better coherence**
- Also new definition of operational quantities for eye lens, skin and extremities

ICRU 95 – Conversion Coefficients



- By definition, conversion coefficients to the new quantities **fit the energy-dependence of the protection quantities**
- Conversion coefficients for many radiation types and extended energy range
 - H^* up to 10 GeV
 - H_p up to 1 GeV





Thank you for your Attention