

Ionizing Radiation

The Consultative Committee for Ionizing Radiation (CCRI)



The CCRI vision is a world in which the many benefits of ionizing radiation for healthcare, industry and technology can be realized by accurate, scientifically-rigorous measurement, confident that the associated risks are minimized.

A new strategy to address new challenges in the field

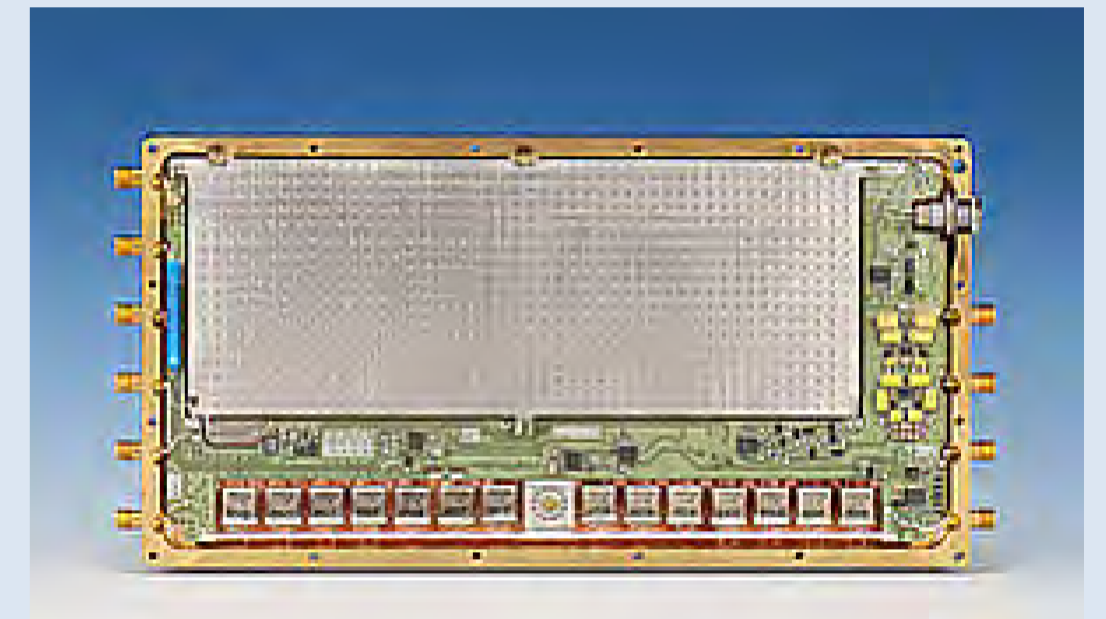
Developing metrology to support radiopharmaceutical therapy and quantitative imaging in nuclear medicine

The Radionuclide Therapy and Quantitative Imaging Working Group was formed in late 2019 and brings together international experts from the fields of radionuclide metrology and nuclear medicine to **address key measurement issues in image-guided radionuclide-based therapies**. This is done primarily through the organization of webinars and publication of guidance documents. The Working Group reports to CCRI and its sections and makes **recommendations for best practices** at both the NMI/DI and end-user levels, **promotes dissemination** of data and information on radioactivity measurement advances in nuclear medicine, and **makes recommendations for comparisons** to Section (II).



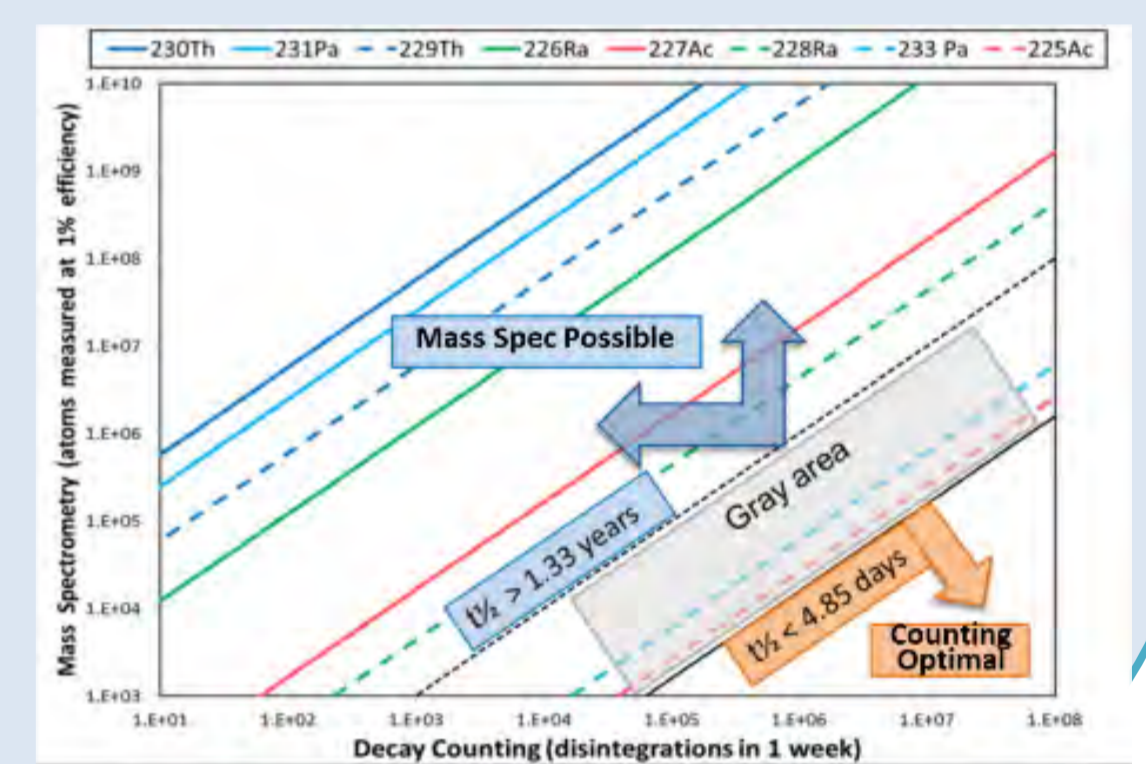
Harness developments in low current measurement to improve ionizing radiation measurements with ionization chambers (with CCEM)

A common CCRI-CCEM Task Group has been created to **guide the introduction of new technologies for the measurement of low electrical current for ionization chambers** used in the measurement of radionuclide standards. The Task Group comprises experts in the fields of **electrical metrology and radionuclide metrology**, and representatives from laboratories involved in validating the new techniques.



Explore best practice in the use of Mass Spectrometry for low-level and/or long-lived radionuclide metrology (with CCQM)

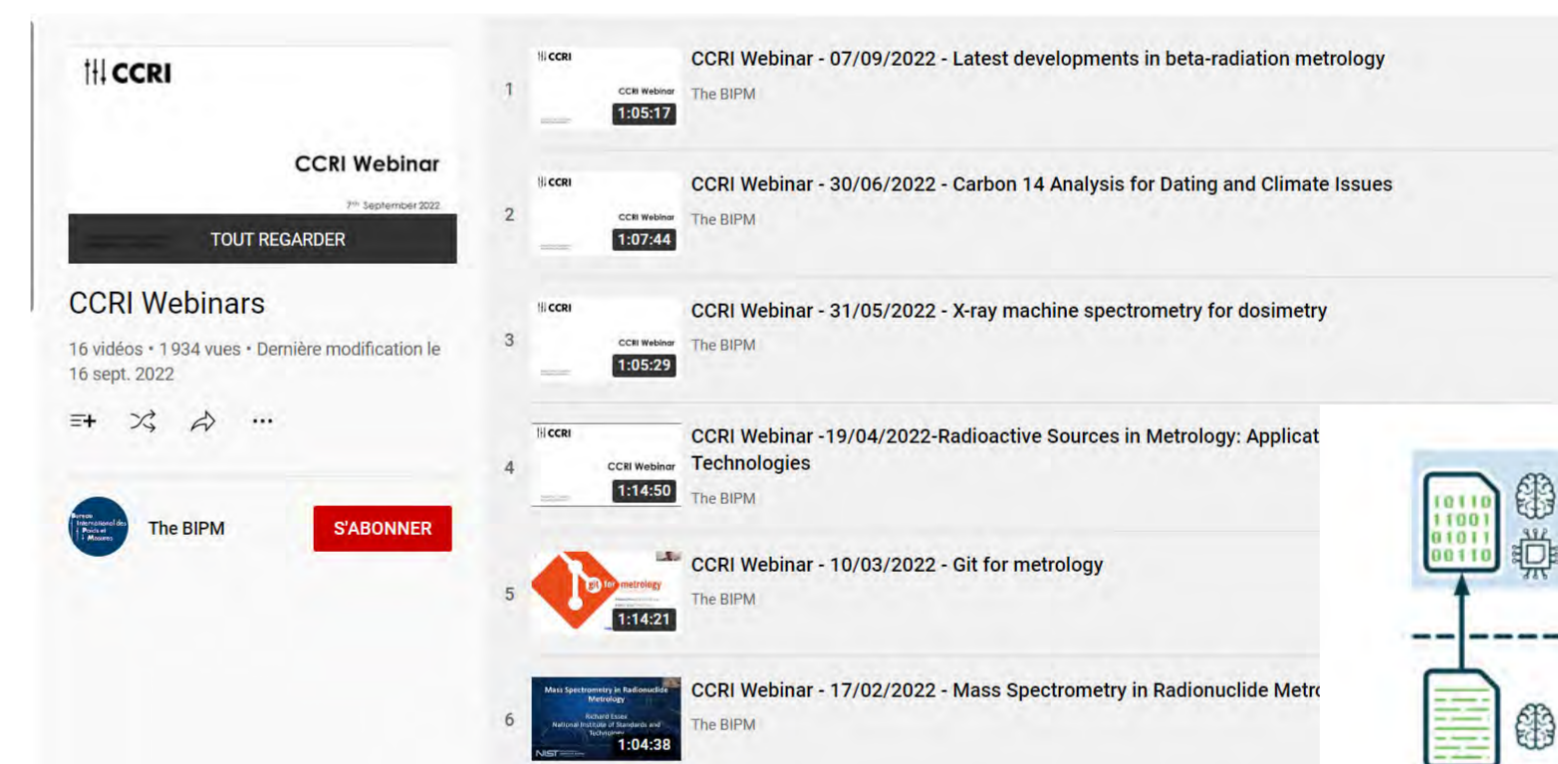
- Mass Spectrometry (MS) used as a tool in academia for **qualitative measurements of long-lived radionuclides** and is already in use at some NMIs/DIs to support radionuclide metrology (RM)
- **Expanding interest for various applications** (environmental, safeguards, decay data) suggest an increased role of MS in RM, needing expertise from CCRI and CCQM
- A webinar was held in early 2022; a **workshop** on activities, opportunities and challenges is **planned for February 2023**



Adapted from Williams, R. W., Gaffney, A. M., Kristo, M. J., 2016, Guidance on Radiochronometry, Lawrence Livermore National Laboratory Report LLNL-706-7013379

Disseminating best practice and engaging with stakeholders

- Creation of a **CCRI Communication Working Group** to develop new tools and to review our whole communications approach in support of our mission.
- A **CCRI webinar programme** brought together more than 1 200 metrologists and stakeholders from 89 states and economies to share IR metrology challenges and best practice.
- Establishing a Task Group aiming to understand the implications of the **Digital Revolution for IR Metrology** and to coordinate the introduction of the SI Digital Framework in ionizing radiation metrology



Human- and machine-readable key comparison reports using the PDF/A-3 format

The BIPM is pleased to announce the publication of the first key comparison report embedding machine-readable (XML and JSON) versions of the document. Use of the PDF/A-3 standard in this way was originally suggested by METAS (Switzerland) in the context of Digital Calibration Certificates (DCC17). The recent update of the BIPM Bilateral Ca-139 comparison - using the BIPM's International Reference System (IRS) for radionuclide metrology - provided an opportunity to introduce this approach for the first time in reporting a key comparison.

Update of the BIPM comparison BIPM.R1(1)K1.Ce-139 of activity measurements of the radionuclide ¹³⁹Ce to include the 2019 result of the NIMSA (South Africa) and the 2022 result of the LNE-LNH (France)

Metrologia (2022) 59 08019

Romain Coulon, Carine Michotte, Sammy Courtois, Manuel Normis, Steven Jodts, Christa Thom, Christophe Babin, Carole Frachon, Milton van Rooij, Marlon van Gaalen, Justine Lubbe

Increase in comparison and publication output (compared to 2016-2019)

Despite the challenges of the pandemic the CCRI community are on track to deliver:

- **30 % increase** in the **number of comparisons** (80 % of which being BIPM bilateral comparisons) carried out, by 2023
- **75 % increase** in the **number of comparison reports** published in *Metrologia*, by 2023

Our work helps to maximize the benefits and minimize the risks of ionizing radiation in...



4 million cancer treatments per year



4 billion diagnostic images per year



11 million radiation workers



450 nuclear power plants, 11 % of the world's electricity