

NIST – BIPM Workshop

New electrical current measurement technologies

The next generation of ionization chambers for radionuclide metrology

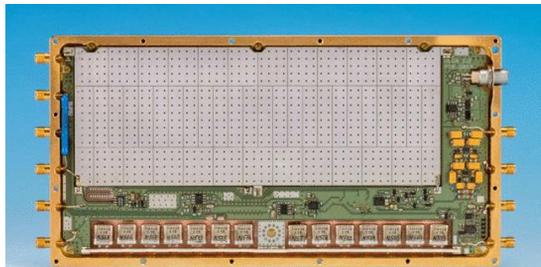
Nuclear medicine is expanding rapidly, driven by the need for early diagnosis and the demand for better cancer therapies. To comply with pharmaceutical regulations, measurements of the activity content (Bq) of radiopharmaceuticals must be traceable to national and international standards.

The international traceability scheme for radioactivity is heavily reliant on ionization chambers as transfer instruments – robust and reproducible, the chambers are the ‘memory’ of primary standards that are time-consuming to replicate. NMIs, Dis, and the BIPM all rely on these instruments.

This workshop aims to investigate whether recent advances in low electrical current measurement could be adopted for ionization chambers, leading to more reliable, simpler, higher accuracy, future-proof systems.

Aim of the workshop

To identify technologies that could replace electrical current measurement systems on ionization chambers – and remain accurate and traceable to the SI for the next 30 years



New current measurement technologies

Most high precision ionization chambers use a current measurement system based on a Townsend induction balance. Advances in the measurement of low current (such as advanced high precision low noise current amplifiers) may be able to replace such systems, have better linearity, avoid the need to calibrate capacitors, and link more directly to the SI ampere.

The problems with existing ionization chamber systems

Ionization chambers have been used in radionuclide metrology for more than 50 years. The electrical current measurement systems often use obsolete electrometers. There can be non-linearities when changing ranges to cover the wide range needed (10^{-13}A to 10^{-8}A), so the systems rely on sets of sealed radioactive sources as reference points – there is pressure to end the reliance on such ageing artifacts due to increasingly stringent regulations.



Format of the workshop

The workshop will be interactive, with the aim of building a project group from the radionuclide metrology and electrical metrology communities to develop and test new methods in practice.

How to register

The workshop will be held at NIST Gaithersburg on Thursday September 13th 2018. Attendance is open to a maximum of 30 staff from NMIs or Dis.

To register, please visit:

<https://www.nist.gov/news-events/events/2018/09/radionuclide-metrology-meetings-nist>