

The SIR Transfer Instrument

Developed for short-lived radionuclides (nuclear medicine radiopharmaceuticals)

To date in the KCDB (K1 comparisons based on SIR) :

^{153}Sm ($T_{1/2} = 46$ h) Intercontinental (5 NMIs)
 $^{99}\text{Tc}^m$ ($T_{1/2} = 6.0$ h) Europe (6 NMIs)
 ^{18}F ($T_{1/2} = 1.8$ h) Western Europe (6 NMIs) + 2 RMO KCs

Other important radionuclides
for PET imaging

^{11}C ($T_{1/2} = 20$ min), ^{13}N ($T_{1/2} = 10$ min)
No degrees of equivalence !

The SIR at the BIPM



Ionization chambers
 ^{226}Ra reference sources

$$A_e = [A / (I_{\text{amp}} / I_{\text{Ra}})]$$

I = ionization current

Transportable instrument



NaI(Tl) detector
 ^{94}Nb reference source

$$A_E = [A / (R_{\text{amp}} / R_{\text{Nb}})]$$

R = count rate

Linking factor

$$L = A_e / A_E$$

Measured for $^{99}\text{Tc}^m$
thanks to LNE-LNHB
and NPL ampoules.

NMIs close
to the BIPM

First intercontinental K4 comparison
for $^{99}\text{Tc}^m$ at NIST in May 2009
was successful

NMI i far from the BIPM

K4 comparison result $A_{E,i}$
linked to K1
by $A_{e,i} = A_{E,i} \times L$