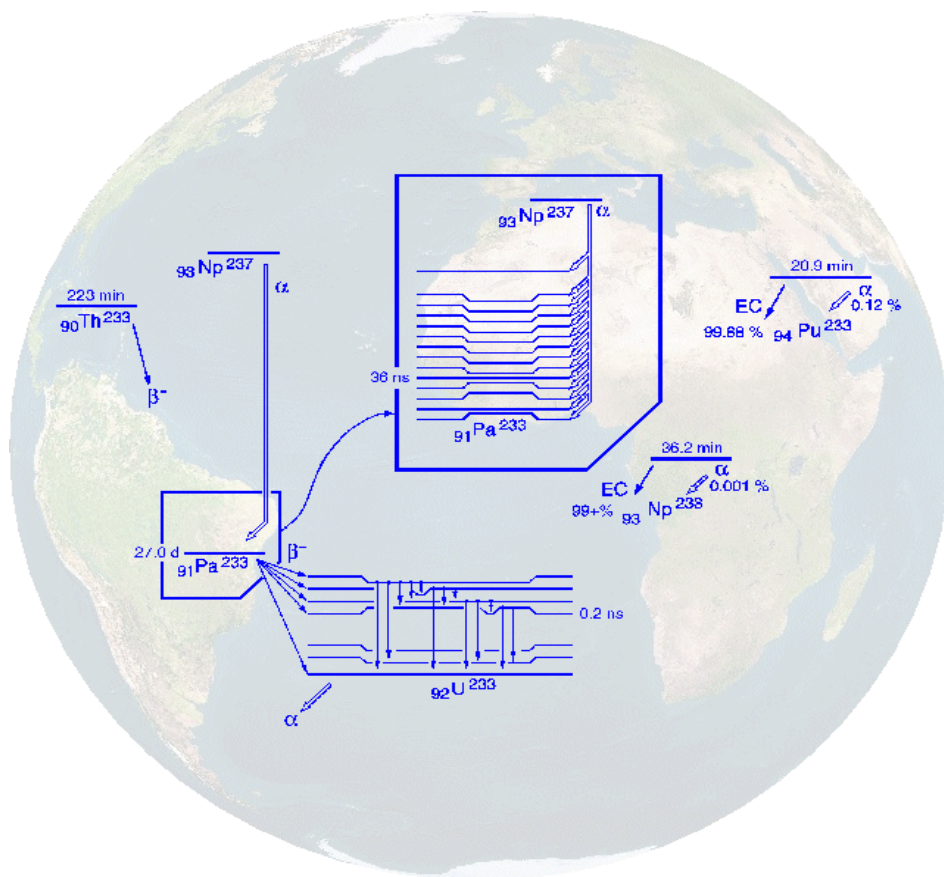


ICRM NEWSLETTER

Issue 23 – March 2009



International Committee for Radionuclide Metrology

Editor : Marie-Martine Bé



LABORATOIRE NATIONAL
HENRI BECQUEREL

**International Committee for
Radionuclide Metrology
ICRM**

**ICRM NEWSLETTER
Issue 23**

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March 2009

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CONTRIBUTIONS

- *Argentina*
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 - Radiation Metrology, ANSTO, Lucas Heights
- *Austria*
 - IAEA Nuclear Data Section, Vienna
 - Bundesamt für Eich- und Vermessungswesen, BEV, Vienna
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- *Belgium*
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- *Czech Republic*
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- *France*
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- ***United Kingdom*** • National Physical Laboratory, NPL Teddington
- ***United States of America*** • National Institute of Standards, NIST Gaithersburg

EDITORIAL

This newsletter was established in response to a recommendation of the International Committee for Radionuclide Metrology made during its General Meeting in Grenoble 1985. It is meant to serve as a medium for informal exchange of information between workers active in the field of Radionuclide Metrology.

The scope of the Radionuclide Metrology Newsletter is to describe briefly current activities in the following topics:

- foil and source preparation;
- α -, β - and γ -ray spectrometry including spectrum evaluation;
- improvement and development of radionuclide measurement techniques;
- measurement and evaluation of radionuclide data;
- low-level radioactivity measurement techniques;
- life-sciences;
- quality assurance and traceability.

In order to ensure that the Newsletter is as comprehensive and informative as possible, contributions are sought from all laboratories known to be engaged in measurements and data evaluation techniques relevant to Radionuclide Metrology.

All previous contributors will be informed concerning the deadline for the next issue. New contributing Radionuclide Metrology laboratories are welcome. Please contact the editor.

Any comments on this issue or suggestions for improvement will be welcome.

At the ICRM General Meeting in Paris 1995, it was decided that the ICRM Newsletter would also allow for the distribution of Progress/Planning Reports SA1 and SA2.

From the experience of this issue, we have the following situation : Laboratories regard their normal Newsletter contribution as the fulfilment of SA1/SA2. In this case this is indicated on the contribution by "SA1/SA2". Or laboratories provide (additionally) the traditional SA1/SA2 reports which should not be longer than 2 pages. In the latter case it should be mentioned in the accompanying letter, that the SA1/SA2 contributions be intended for publication in the Newsletter.

For economy reasons, at the ICRM General Meeting in Dublin 2003, it was agreed that the ICRM Newsletter would be put in the LNE-LNHB (former BNM-LNHB) web site (http://www.nucleide.org/Publications/icrm_newsletter.htm) distributed in hard copy, or CD-rom only to those whom have asked for it.

- Contributions may be sent by E-mail as an attachment in MS Word or as plain text file.

INSTRUCTIONS TO CONTRIBUTORS

This Newsletter is realised with no alterations by the editor. To ensure readability and avoid unnecessary work by the editor, it is suggested that :

- Contributions should be typed on plain white A4 paper (21 cm x 29,7 cm) **format** inside a box of **15,5 cm x 20 cm** which should be situated **4,5 cm** from the upper and **3 cm** from the left margin. Please use font **Times New Roman** size **12**. The format indicated below should be followed.
- Contributions should contain **no** page number, date, signature, or any correspondence references typed on this sheet. Correspondence to the editor must be on a separate sheet.
- Contributions should be in English and carefully proofread by the authors.
- References to publications or reprints should be completed as required by the Physical Review.
- Complete mailing address and the name of a person who can be contacted for additional information by those desiring it should be given at the end.
- Please use the “**contribution.dot**” file.
- Please note that only files on “Word” format will be accepted.

Contribution Format

LABORATORY	Name of laboratory
NAMES	If more than one laboratory is involved identify affiliation through abbreviations (ORNL, LASL, etc.). Visitors can also be identified with asterisks.
KEYWORDS	Alpha spectrometry, beta spectrometry, calorimetry, (anti) coincidence method, cryogenic detector, data evaluation, data measurement, Euromet, gamma-ray spectrometry, gas proportional counter, ionisation chamber, life sciences, liquid scintillation, low-level, NaI well counter, neutron measurement, radioactive gas, radiochemistry, simulation code, SIR, source preparation, X-ray spectrometry, radionuclide by name (e.g. ^{55}Fe or Fe-55). Choose the good ones
APPARATUS ACTIVITY	Choose one; the former for experiments and the latter for compilations, calculations, or theory.
RESULTS	Use this for experimental results.
PUBLICATIONS	Use Physical Review style. Include only published materials.
IN PROGRESS	Use this for description of the current work.
INFORMATION SOURCE	Use this for evaluations or compilations.
IN PREPARATION	Use this to also indicate papers submitted for publication.
OTHER RELATED PUBLICATIONS	Optional.
ADDRESS	Mailing address. Give also telephone, telex, fax numbers and E-mail.
CONTACT	Single contact person.

General information on ICRM (President's Message)

The International Committee for Radionuclide Metrology (ICRM) is an association of radionuclide metrology laboratories whose membership is composed of delegates of these laboratories together with other scientists (associate members) actively engaged in the study and applications of radioactivity. It explicitly aims at being an international forum for the dissemination of information on techniques, applications and data in the field of radionuclide metrology. This discipline provides a range of tools for tackling a wide variety of problems in numerous other fields, for both basic research and industrial applications.

There are 38 institutions now represented by delegates in the ICRM. The ICRM has no membership fee and no paid secretariat or other staff. Its overall direction is determined by the delegates in General Meetings, which convene usually every two years, where organizational guidelines and directions for the working programs are agreed upon. The following officers of ICRM are presently serving on the Executive Board:

President	Yoshio Hino ¹
Vice-President	Uwe Wätjen ²
	Guy Ratel ³
	Carlos José da Silva ⁴
Secretary	Pierino De Felice ⁵
Past-President	Mike Woods ⁶

The Executive Board heavily on the Nominating Committee which has the objective of ensuring the continuity of purpose and vigour of ICRM. It does this by soliciting from the membership, and by itself proposing, the names of eligible candidates to fill vacancies about to occur on the Executive Board and the Nominating Committee. The current membership of this committee is:

Chairperson	Bruce Simpson ⁷
Members	Maria Sahagia ⁸
	Herbert Janßen ⁹

Plenary meetings of the ICRM are held biennially, and have developed into a successful instrument of communication among various specialists, thus encouraging international co-operation. The most recent series of ICRM meetings was at the 16th International Conference on Radionuclide Metrology and its Applications (ICRM 2007), which took place on 3 - 7 September 2007 at the Arabella Sheraton Grand Hotel in Cape Town, South Africa. The local organization was undertaken by the National Metrology Institute of South Africa (NMISA) in partnership with the iThemba Laboratory for Accelerator Based Sciences located near Cape Town.

Our appreciation and thanks go to all who contributed to this very successful and busy meeting. In particular we recognize the great contributions made by Dr. Bruce Simpson and his local organizing team, the Scientific Programme Committee, the referees and session chairmen and to the authors of papers.

ICRM activities are largely the responsibility of its working groups. Each group is guided by a co-ordinator who acts as a centre for ideas and communications and may organize conferences and workshops. There are now seven working groups with the following fields of interest:

- | | |
|---------------------------------------|---|
| (1) Radionuclide Metrology Techniques | http://users.skynet.be/icrmrmt/ |
| John Keightley ¹⁰ | <John.Keightley@npl.co.uk>,
 |
| Mike Unterweger ¹¹ | <michael.unterweger@nist.gov> |
| (2) Life Sciences | |
| Jeffrey T. Cessna ¹¹ | <jeffrey.cessna@nist.gov> |
| (3) Alpha-Particle Spectrometry | http://www.ciemat.es/sweb/metrologia/Alpha.html |
| Eduardo Garcia-Toraño ¹² | <E.garciatorano@ciemat.es> |
| (4) Gamma-Ray Spectrometry | http://www.nucleide.org/ICRM_GSWG.htm |
| Marie-Christine Lépy ¹³ | <marie-christine.lepy@cea.fr> |
| (5) Liquid Scintillation Techniques | http://www.nucleide.org/icrm.htm |
| Brian Zimmerman ¹¹ | <bez@nist.gov> |
| (6) Low-Level Measurement Techniques | |
| Dirk Arnold ⁹ | <dirk.arnold@ptb.de> |
| (7) Non-Neutron Nuclear Data | |
| Marie-Martine Bé ¹³ | <mmbe@cea.fr> |

We all thank above co-ordinators and also special thank Dr. Alan Nichols¹⁴, Dr. Brian Zimmerman¹¹ and Dr. Philippe Cassette¹³ for their great contributions as the chair of Non-Neutron Nuclear Data, Life Sciences and Liquid Scintillation Techniques until the last 16th ICRM meeting, respectively.

The next 17th international conference of ICRM 2009 will be held in September 2009 in Bratislava, Slovakia organized by the Slovak Institute of Metrology (SMU). This conference will include oral and poster presentations and business meetings of the ICRM Working Groups, in plenary format. More detailed information will be announced soon.

Finally, we express our heartfelt thanks to Dr. Marie-Martine Bé for compiling and upload this ICRM Newsletter, and also thanks to Dr. Lisa Karam¹¹ for maintaining our ICRM homepage.

January 2009

Yoshio HINO
President of ICRM

References

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6. Ionizing Radiation Metrology Consultants Ltd, 152 Broom Road, Teddington, Middlesex TW11 9PQ, U.K.
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8. National Institute of C&D for Physics and Nuclear Engineering (IFIN), P.O. Box MG-6, RO-76900 Bucharest, Romania.
9. Physikalisch-Technische Bundesanstalt (PTB), Bundesallee 100, D-38116 Braunschweig, Germany.
10. National Physical Laboratory (NPL), Hampton Road, Teddington, Middlesex, TW11 0LW, UK.
11. National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, 20899-8462, U.S.A.
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14. International Atomic Energy Agency (IAEA), Wagramerstrasse 5, A-1400 Vienna, Austria.

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(abstracts, manuscripts, proceedings)
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Deadlines and Dates

2008-Sep-26 Submission of pre-registration form
to receive 2nd announcement
2009-Jan-31 Deadline for submission of abstracts
2009-Mar-20 Notification of acceptance of abstracts
2009-Apr-03 Second announcement
2009-Jun-15 Deadline for early conference
registration and submission of
accepted papers
2009-Sep-7 Start of conference
2009-Sep-11 End of conference
2009-Sep-11 General Meeting of ICRM
2009-Nov-20 Submission of final version of papers

Pre-Registration Form

In order to receive the next announcement, please complete and send back this form to the Conference Secretariat by September 26, 2008.

Last name:

First name:

Title(s):

Organisation:

Address:

Country:

Telephone:

Telefax:

E-mail:

I intend to submit a paper: yes no

Topic:

Accompanying person(s): yes no

I need a hard copy of the second announcement:

yes no



FIRST ANNOUNCEMENT
AND CALL FOR PAPERS

17th International Conference on Radionuclide Metrology and its Applications

ICRM 2009

September 7 – 11, 2009
Bratislava
Slovak Republic

Organized by
International Committee for Radionuclide
Metrology (ICRM)

Hosted by
Slovak Institute of Metrology (SMU)
and supported by

Office for Standardisation, Metrology and Testing of
the Slovak Republic



ICRM 2009

Conference Description

The International Committee for Radionuclide Metrology is pleased to announce that its next conference will be held at the Slovak Institute of Metrology in Bratislava, Slovak Republic, in September 7-11, 2009.

The goal of ICRM 2009 is to provide an opportunity for the exchange of information on techniques and applications of radionuclide metrology, and to encourage international cooperation in this field. This biennial conference was recently held in September 2007 in Cape Town, South Africa.

The conference will include oral and poster presentations and business meetings of the ICRM Working Groups.

Conference topics

- Aspects of international metrology
- Intercomparisons
- Measurement standards and reference materials
- Radionuclide metrology techniques
- Alpha-particle and beta-particle spectrometry
- Gamma-ray spectrometry
- Liquid scintillation counting techniques
- Nuclear decay data
- Low level measurements
- Life sciences
- Source preparation techniques
- Quality assurance and uncertainty evaluation in radioactivity measurements

Additional activities during the conference will be the meeting of the ICRM Executive Board, the General Meeting of ICRM members, a visit to the laboratory facilities of the Slovak Institute of Metrology and social events.

Conference Venue

Slovak Institute of Metrology
Karloveská 63
Bratislava, Slovak Republic

Conference web page

<http://www.ICRM2009.sk/>

Conference Language

The official language of the conference is English. All abstracts and presentations must be in English.

Participation

All those interested in participating in the conference are asked to return the overleaf Pre-Registration Form, duly completed as soon as possible to the Conference Secretariat but not later than September 26, 2008.

Call for Papers

Contributed papers on the topics listed above are welcome. Authors wishing to submit a paper should send an Abstract to the Scientific Secretariat by January 31, 2009.

The abstracts must be sufficiently detailed and informative to allow the Scientific Committee to judge the scientific merit of the papers and their suitability for the conference programme. The authors are requested to follow and keep the abstract submission form available at the conference web page.

Notification of acceptance will be sent to authors until March 20, 2009. Authors must submit the final text of accepted papers to the Scientific Secretariat by June 15, 2009. Authors should anticipate discussing their papers with the referees before conference, and making any editorial and/or technical modifications resulting from those discussions by November 20, 2009.

Proceedings

Conference proceedings are planned to be published in the journal APPLIED RADIATION AND ISOTOPES. Manuscripts in English must comply with guidelines which will be sent to the authors together with the information on acceptance of the paper.

Acceptance of a paper for presentation at the conference does not automatically imply that it will be published in the proceedings. Publication of the manuscripts is subject to the result of a refereeing procedure.

Scientific Committee

Dirk Arnold, PTB (Germany)
Marie-Martine Bé, LNE-LNHB (France)
Philippe Cassette, LNE-LNHB (France)
Pierino De Felice, ENEA (Italy)
Eduardo Garcia-Toraño, CIEMAT (Spain)
Yoshio Hino, NMIJ (Japan)
Mikael Hult, IRMM (EU)
Lisa Karam, NIST (USA)
John Keightley, NPL (UK)
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Guy Ratef, BIPM (International)
Carlos da Silva, IRD (Brazil)
Bruce Simpson, NMISA (South Africa)
Mike Unterweger, NIST (USA)
Uwe Wätjen, IRMM (EC)
Mike Woods, IRMC (UK)
Brian Zimmerman, NIST (USA)

Registration Fees and Accommodations

Details will be available soon at the conference web page and will be distributed with the second announcement.

ICRM

CONTRIBUTIONS

Coordinator's Report

ICRM Liquid Scintillation Counting Working Group

Two main activities were carried out by the Liquid Scintillation Counting (LSC) Working Group (WG) in the past year. The first was the organization of a comparison aimed at investigating sources of uncertainty, including inter-laboratory variability in analyzing data acquired using the Triple-to-Double Coincidence Ratio (TDCR) method. The specific goals of the comparison were to:

1. Study differences in calculation results from different TDCR analysis programs using a single set of data,
2. Investigate differences in analysis techniques and uncertainty assessment philosophies between laboratories using the TDCR method, and
3. Study effect of not taking asymmetry of PMT efficiencies into account on calculated activity.

To achieve this, a set of TDCR data for the pure beta emitter ^{99}Tc , acquired on the NIST TDCR system, was distributed to the participants, who were to analyze the data according to their normal procedures and report the activity concentration of the ^{99}Tc solution from their results.

The preliminary observations from the comparison were:

- Existing programs, when used with the appropriate input data, appear to give essentially the same activity value.
- Choice of correct shape factor for ^{99}Tc is necessary to obtain correct results; assumption of same shape as 1^{st} forbidden-unique is invalid.
- For TDCR systems with large asymmetry in phototube efficiency, it is crucial to take this into account. Failure to do so in this case leads to a +0.6 % systematic error.
- In terms of uncertainty assessment, very different philosophies regarding uncertainty assessments exist between the various laboratories. The rigor taken in the assessment of uncertainty components appeared to be correlated with level of experience with the TDCR method.

The other main activity of the WG in the past year was the organization of an interim meeting on 10-11 November at the National Physical Laboratory in Teddington, UK. Experience has shown that the format of WG meetings held in conjunction with the General ICRM meeting provide minimal opportunity for discussion and interaction. The interim meeting was attended by 12 participants from 6 laboratories. Participants were encouraged to give short presentations on their current work, including work currently in progress. The specific topics of the presentations were:

- Instrumentation for TDCR, new counting systems, commercial LS counters
 - Field Programmable Gate Array (FPGA)-based acquisitions systems
 - New TDCR systems (including commercial versions)
 - Count-rate dependence (non-linearity) issues in commercial counters
- Recent Standardizations/Measurements using LSC (6 presentations)
- Other topics
 - LS counting of electron-capture nuclides
 - Compositions of commercial LS cocktails
 - New cocktails for specific applications

- Preliminary results of ^{99}Tc TDCR data comparison
- Efficiency variation in TDCR: how do we analyze the data?
- Problems with photon emitters in applying the TDCR method
- Cocktail stability when measuring short-lived radionuclide
- Study of Light Emission Processes in Liquid Scintillation Counting

In terms of outputs of the meeting, it was agreed that a follow-up comparison of TDCR data would be carried out late in 2009. In this case, the data set would consist of data acquired for tritiated water using the LNHB TDCR systems. Additionally, it was agreed that the results of the upcoming CCRI(II) Key Comparison of ^{177}Lu would provide a preliminary indication as to the applicability of the TDCR method to radionuclides that emit both beta particles and high-energy (non- x ray) photons.

A CD of the presentations will be prepared and sent to the participants. Additional copies may be obtained from the ICRM Secretary once they are available. It is also planned to post the presentations on the LSCWG web site.

The next meeting of the LSCWG will be held in conjunction with the biennial ICRM general meeting in September 2009 in Bratislava, with the exact date and format to be decided in early March 2009. It is expected that due to time constraints, the only topics that will be presented will be an update of the November LSCWG meeting in Teddington and perhaps one or two short presentations on works in progress. Details will be sent to ICRM members in due course prior to the ICRM meeting.

B. E. Zimmerman, Coordinator

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Report on the Activities of the Low-Level Measurement Techniques Working Group

In the period since the last report (i.e. from 1st January 2008-31st December 2008) the main activity of the LLMT-WG was to organize the ICRM-LLRMT'08 conference. The conference followed on from earlier events, held in Monaco (1991), Seville (1995), Mol (1999) and Vienna (2003). The measurement of low levels of radioactivity in a wide variety of matrices has been of interest to the scientific community since the beginning of the 'nuclear age' and techniques have always been developed to enable the detection of ever lower amounts of radioactivity in smaller samples and for many new applications. This conference had a look at the latest developments in this area with reference to and emphasis on the metrology and quality of measurements. The conference topics were:

- **Radiochemical Techniques**

Fission Products, Actinides, Activation Products, Rapid Methods

- **Applications**

NORM, TENR, Decommissioning, Food Safety, Safeguards, Remediation, Emergency Response, Waste Management, Support Measurements for Astroparticle Physics, etc.

- **Radiometrics**

α -Particle Spectrometry, Liquid Scintillation Counting, 'Conventional' and Ultra Low-Level γ -Ray Spectrometry, Other Radiometric Techniques

- **Non-radiometric measurements**

Mass Spectrometry – ICP, Thermal Ionisation, Accelerator Based

- **Radon**

Rn-Isotopes and their Decay Products

- **Quality**

Traceability, Reference Materials, Proficiency Tests, Intercomparisons, Quality Assurance

The most recent ICRM-LLRMT conference (ICRM-LLRMT'08) took place on 22-26 September 2008 at the Physikalisch-Technische Bundesanstalt (PTB). The conference was attended by 120 participants from 25 countries worldwide. We had in total 43 oral- and 42 poster-presentations. Our appreciation and thanks go to all who contributed to this successful meeting, in particular to the authors of the papers, the conference organizing team and to the members of the Scientific Committee for selecting and refereeing the papers.

Scientific Committee

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Mikael Hult	EC-JRC-IRMM Geel, Belgium
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Ken Inn	NIST Gaithersburg, USA
Simon Jerome	NPL Teddington, UK
Matthias Köhler	VKTA Dresden, Germany
Matjaz Korun	JSI Ljubljana, Slovenia
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Marie-Christine Lépy	CEA-LNHB Saclay, France
Franz-Josef Maringer	BEV Vienna, Austria
Annette Röttger	PTB Braunschweig, Germany
Umberto Sansone	IAEA Seibersdorf, Austria
Herbert Wershofen	PTB Braunschweig, Germany

Proceedings

The conference proceedings will be published in the journal APPLIED RADIATION AND ISOTOPES. The manuscripts were submitted to the publisher and the production process has already started.

Dirk Arnold, Physikalisch-Technische Bundesanstalt, 38118 Braunschweig, Germany

Coordinator's Report

ICRM Life Science Working Group

The purpose of the Life Sciences Working Group is to provide a forum for ICRM members to address radionuclide metrology issues as they relate to the life sciences. Issues may include, but are not limited to: development of methodologies to calibrate short-lived radionuclides of interest in nuclear medicine, measurement of decay properties (half-lives, decay energies and probabilities, etc.) of radionuclides used in nuclear medicine and biological research, and development of measurement methodologies for transferring National Measurement Standards to the clinic and research laboratory. The Working Group will facilitate finding solutions to these problems through workshops, publications, electronic communications (i.e., email), and collaborative work.

During 2008, a meeting of the Life Sciences Working Group (LSWG) was held at the National Physical Laboratory in Teddington 12-13 November 2008, immediately following the meeting of the Liquid Scintillation Counting Working Group. The meeting was attended by 9 participants from 5 institutions. The format consisted of a number of presentations from each laboratory, followed by a discussion period. The topics covered during the meeting included:

- Quality Assurance, Standards, and Metrology
- Inter-laboratory comparisons
- Recent standardizations and measurements of radionuclides used in radiation medicine
- Radionuclide calibrators; and
- Developing, funding, and communicating the importance of metrology programs in the Life Sciences

Specific action items from previous meetings

- Collecting activity calibrator factors for medical radionuclides in different ionization chambers. (Status: An extensive reference list has been collected. Factors are being summarized to be posted on the Life Sciences web page.)

Specific action items that arose from the meeting

- Expand the information available on the working group web page
- Recommend that laboratories with stability data on their ionization chambers actively measure half lives
- Publish a review of the determination of calibration figures for radionuclide calibrators

A CD of the presentations, along with those from the Liquid Scintillation Counting Working Group meeting, is being prepared and will be made available from the ICRM Secretary. It is also planned to post the presentations of the LSWG web site.

Following the meeting in Bratislava, the next interim meeting of the LSWG is being planned for mid-2010 to take place at the Physikalisch-Technische Bundesanstalt in Braunschweig.

J.T. Cessna, Coordinator

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Non-Neutron Nuclear Data Working Group (3NDWG): Report, December 2008

Coordinator: Marie-Martine Bé

Key words: decay data; evaluations; nuclear decay data requirements

1. The primary aim of the 3NDWG is to provide the worldwide scientific community with an appropriate environment for communications between specialists in the field of non-neutron nuclear data measurements and evaluations so that they can learn more about each others' work, liaise and combine forces to undertake research programmes of mutual interest, and organise multinational efforts to produce recommended sets of non-neutron nuclear data.
2. 3NDWG members continue to be involved in the evaluation efforts of the Decay Data Evaluation Project (DDEP). Communications between decay data evaluators are encouraged through this project (coordinator: E. Browne, ebrowne@lbl.gov). Details of this work and the recommended decay data can be found on the Internet: http://www.nucleide.org/DDEP_WG/DDEPdata.htm. A second working meeting of the DDEP was organized in May 2008 by IFIN in Bucharest. Minutes of the meeting can be requested to A. Luca.
3. 3NDWG members continue to evaluate decay schemes for specific actinides and their decay products as part of an agreed IAEA Coordinated Research Project on "Updated decay data library for actinides" (2005-09). Last meeting was held in October, 2008. Contact: M. A. Kellett (e-mail: m.kellett@iaea.org). Summary Report 2nd coordination meeting, INDC(NDS)-0508
4. Noteworthy achieved or on-going work by 3NDWG members include the following:
 - (a) issue of a new volume of Monographie BIPM-5 was published in December 2008, it includes both updated and completely new decay scheme evaluations (M.-M. Bé);
 - (b) forthcoming 3NDWG-based workshops include ENSDF- Nuclear Structure Data to be organised by IFIN in Romania, 30 Mars - 3 Avril 2009.
 - (c) Handbook of Nuclear Data for Safeguards : database extensions, August 2008, was published by A.L. Nichols, D.L. Aldama, M. Verpelli, IAEA INDC(NDS)-0534.
5. The work of the 3NDWG was re-endorsed at the 2007 ICRM General Meeting (7 September 2007, Cape Town, South Africa). Alan Nichols (IAEA) relinquished his role as coordinator of the 3NDWG at this meeting; new coordinator is Marie-Martine Bé (LNHB, CEA Saclay, France).

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10 January 2009

LABORATORY	RADIOISOTOPE METROLOGY LABORATORY - CNEA, ARGENTINA
NAMES	P. ARENILLAS, C. BALPARDO, M. E. CAPOULAT, D. RODRIGUES
ACTIVITY	1. Absolute activity measurements 2. Participation in international comparisons
KEYWORDS	Alpha spectrometry, beta spectrometry, coincidence method, data evaluation, data measurement, gas proportional counter, liquid scintillation, NaI well counter, simulation code, TDCR counter
RESULTS	1. Improvement of a HPPC-NaI(Tl) coincidence system with the TAR module. 2. Participation in a TDCR code comparison. 3. Standardization of ^{241}Am , $^{90}\text{Sr}/^{90}\text{Y}$ and ^{67}Ga . 4. Beta emission determination in extended sources of ^{137}Cs and ^{90}Sr . 5. Characterization of the Low Geometry Defined Solid Angle System for alpha counting.
PUBLICATIONS	“General data analysis code for TDCR liquid scintillation counting” D. Rodrigues, P. Arenillas, M.E. Capoulat, C. Balardo. Applied Radiation and Isotopes Volume 66, Issues 6-7, June-July 2008, Pages 1049-1054.
IN PROGRESS	1. Improvement of source preparation and characterization for the defined solid angle system for alpha counting. 2. Application of the Anticoincidence Counting and Correlations Technique. 3. Standardization of several radionuclides 4. Efficiency Monte – Carlo calculations of a (HP)Ge detector and a 4π -gamma detector. 5. Participation in the SIR 6. Participation in the 2008/9 International Comparison of Activity Measurements of a solution of ^3H organised by BIPM". Ongoing SIR
INFORMATION	
SOURCE IN PREPARATION	1. “Standardization of ^{67}Ga by Digital Coincidence Counting”. Roteta M., Balardo C., Rodrigues D., Arenillas, P.
OTHER RELATED PUBLICATIONS	
ADDRESS	Comisión Nacional de Energía Atómica, Centro Atómico Ezeiza. Av. del Libertador 8250 (C.P.1429) - Buenos Aires - ARGENTINA Telephone/Fax: (54-11) 6779-8279/8554 e-mail: arenilla@cae.cnea.gov.ar
CONTACT	P. A. ARENILLAS

LABORATORY	RADIOISOTOPE METROLOGY LABORATORY - CNEA, ARGENTINA
NAMES	G..L. CERUTTI, C. GUARDO, E. CIRELLO, L. RAMÍREZ, G.R. BOCCA
ACTIVITY	Measurement of natural and artificial radionuclides in environmental samples and others
KEYWORDS	Gross alpha determination, gross beta determination, liquid scintillation, low-level, radiochemistry, gamma spectrometry
RESULTS	<ol style="list-style-type: none"> 1. Set into operation of an ultra-low background liquid scintillation counter 2. Incorporation of CNEA to the IAEA Network ALMERA (Analytical Laboratories for the Measurement of Environmental Radioactivity) 3. Participation in the IAEA environmental activity comparison (IAEA-CU-2007-03) 4. Activity determinations of ^{90}Sr in 200 samples of milk powder, maize, soybean meal, wheat, cheese, fish and meat. 5. Activity determinations of ^{241}Am and ^{239}Pu in 200 milk powder, maize, soybean meal, wheat and cheese samples. 6. Analysis in samples of water by high resolution gamma spectrometry 7. Analysis of ^{60}Co and ^{137}Cs by NaI(Tl) detector for surface contamination testing 8. Routine measurements and certifications of non radioactive contamination in exported foodstuffs (about 3200 samples)
PUBLICATIONS	
IN PROGRESS	Implementation of a quality system based on Guide ISO 17025.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	<p>Comisión Nacional de Energía Atómica, Centro Atómico Ezeiza. Av. del Libertador 8250 (C.P.1429) - Buenos Aires - ARGENTINA e-mail: cerutti@cae.cnea.gov.ar Telephone/Fax: (54-11) 6779-8408</p>
CONTACT	G. L. CERUTTI

LABORATORY	RADIOISOTOPE METROLOGY LABORATORY - CNEA, ARGENTINA
NAMES	G.L. CERUTTI, F.A. IGLICKI, C. GUARDO.
ACTIVITY	1. Preparation, quality control, standardisation and issue of : - Standard point sources and solutions of several radionuclides for gamma-ray and alpha spectrometry. - Large area standard sources of alpha, beta and gamma emitters. 2. Development of standard sources.
KEYWORDS	Gamma-ray spectrometry, source preparation, radioactive standards
RESULTS	1. Preparation and calibration of 200 radioactive sources. 2. Re-accreditation of "Preparation and calibration of radioactive standards" by the Argentinean Accreditation Body (OAA) 3. Development of sealed gamma emitter sources in acrylic cylinders and open point sources of alpha emitters 4. Development of WINGELI program for activity and efficiency calculations 5. Participation in a comparison organised by BIPM for ^{85}Kr
PUBLICATIONS	
IN PROGRESS	1. Development of simulated water standards. 2. Characterisation of a metrological ionisation chamber
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Comisión Nacional de Energía Atómica, Centro Atómico Ezeiza. Av. del Libertador 8250 (C.P.1429) - Buenos Aires – ARGENTINA e-mail: cerutti@cae.cnea.gov.ar Telephone/Fax: (54-11) 6779-8408
CONTACT	G. L. CERUTTI

LABORATORY	RADIOISOTOPE METROLOGY LABORATORY - CNEA, ARGENTINA
NAMES	M.I. MILA, M. CAPOULAT, L. BERGAMINI, M. ROLDAN
ACTIVITY	<ol style="list-style-type: none"> 1. Routine metrological assessment of radionuclide calibrators used in Nuclear Medicine. 2. Preparation, quality control and standardisation of standard sources for Nuclear Medicine. 3. Organisation of comparisons for activity measurements among Nuclear Medicine Centres in Argentina.
KEYWORDS	Ionisation chamber, life sciences.
RESULTS	<ol style="list-style-type: none"> 1. Assessment of 13 Nuclear Medicine Centre calibrators for ^{18}F, ^{32}P, ^{67}Ga, ^{90}Y, $^{99\text{m}}\text{Tc}$, ^{99}Mo, ^{131}I and ^{153}Sm. 2. Assessment of 34 commercial calibrators for ^{67}Ga, $^{99\text{m}}\text{Tc}$, ^{111}In, ^{131}I, ^{153}Sm and ^{32}P. 3. Preparation and calibration of 49 radioactive solutions to perform the assessment of calibrators. 4. Re-accreditation of "Activimeters calibration" by the Argentinean Accreditation Body 5. Development of a new method for the calibration of ionization chambers (^{15}N). 6. Participation in the "XVI Congreso de la Asociación Argentina de Biología y Medicina Nuclear", Buenos Aires, Argentina. October 31 – November 02, 2008.
PUBLICATIONS	
IN PROGRESS	<p>Re-calibration of the LMR's Reference Ionization Chamber.</p> <p>Calibration of the LMR's Reference Ionization Chamber for ^{11}C</p>
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	<p>Comisión Nacional de Energía Atómica, Centro Atómico Ezeiza. Av. del Libertador 8250 (C.P.1429) - Buenos Aires - ARGENTINA Telephone/Fax: (54-11) 6779-8491/8554 e-mail: mila@cae.cnea.gov.ar</p>
CONTACT	M. I. MILA

LABORATORY	BEV – Bundesamt für Eich- und Vermessungswesen, AUSTRIA
NAMES	F:J. Maringer, R. Brettner-Messler, M. Kreuziger, P. Michai
ACTIVITY	<p>Metrological and applied research</p> <p>Participation in international comparison - EURAMET, CCRI(II) and bilateral comparisons</p> <p>Participation in ICRM LLRMT, Braunschweig, Germany, Sep. 2008</p> <p>Routine certification and legal verification (medical activity meter, surface contamination monitors)</p> <p>Calibration services</p>
KEYWORDS	<p>National Metrology Institute</p> <p>Radioactivity laboratory with low-level facilities</p> <p>Calibrated $4\pi\gamma$ ionisation chambers</p> <p>HPGe detectors for gamma-ray spectrometry</p> <p>Low-level anti-compton HPGe gamma-ray spectrometer</p> <p>Multiwire proportional chamber</p> <p>Radon ionisation chambers</p>
RESULTS	<p>CCRI(II)-K2.Cs-134</p> <p>CCRI(II)-K2.Ce-139</p> <p>Comparison in radon activity concentration in air</p> <p>Comparison in gamma-ray spectrometry</p> <p>Monte Carlo calculations of ionisation chamber and HPGe detector response to emerging gamma and beta emitters</p>
PUBLICATIONS	<p>F.J. Maringer (2008): Radon in Austria: metrology and practice. KERNTECHNIK, 73, 127-130; ISSN 0932-3902</p> <p>Maringer, FJ, Kaineder, H, Nadschlaeger, E, Sperker, S (2008): Standards and experience in radon measurement and regulation of radon mitigation in Austria. APPL RADIAT ISOTOPES, 66, 1644-1649; ISSN 0969-8043</p> <p>T. Vidmar, I. Aubineau-Laniece, M.J. Anagnostakis, D. Arnold, R. Brettner-Messler, D. Budjas, M. Capogni, M.S. Dias, L-E. De Geer, A. Fazio, J. Gasparro, M. Hult, S. Hurtado, M. Jurado Vargas, M. Laubenstein, K.B. Lee, Y-K. Lee, M-C. Lepy, F-J. Maringer, V. Medina Peyres, M. Mille, M. Moralles, S. Nour, R. Plenteda, M.P. Rubio Montero, O. Sima, C. Tomei, G. Vidmar (2008): An intercomparison of Monte Carlo codes used in gamma-ray spectrometry. APPL RADIAT ISOTOPES, 66, 764-768; ISSN 0969-8043</p> <p>Seidel C., Gruber V., Baumgartner A., Idinger J., Fürst A., Maringer F.J. (2008): Impact of environmental change on the radioecology of spruce trees in Upper Austria. In: Proceedings of IRPA 12, Oct 19-24, 2008, Buenos Aires, Argentina. International Radiation Protection Association.</p>
IN PROGRESS	Development of a primary standard for particle emission rate for large area sources

	<p>Research co-operation with:</p> <ul style="list-style-type: none"> • BOKU - University of Natural Resources and Applied Life Science Vienna • TU VIE - Technical University of Vienna • ARC - Austrian Research Centers Seibersdorf • IAEA – International Atomic Energy Agency <p><i>3 thesis and 2 research projects in the field of radionuclide metrology in progress</i></p>
INFORMATION	82 CMC's in radioactivity measurements
SOURCE IN PREPARATION	Planned participation (2009) in CCRI(II).K for Lu-177, Pb-210
OTHER RELATED PUBLICATIONS	<p>Andreas Steurer, Arnold Leitner, Franz Josef Maringer (2008): Different Values for Dose Rate Constants in Radiation Protection Literature – Reasons and Consequences in Practice. In: Proceedings of IRPA 12, Oct 19-24, 2008, Buenos Aires, Argentina. International Radiation Protection Association.</p> <p>Andreas Baumgartner, Andreas Steurer, Franz Josef Maringer (2008): Advance of the Austrian Absorbed Dose to Water Primary Standardisation System. In: Proceedings of IRPA 12, Oct 19-24, 2008, Buenos Aires, Argentina. International Radiation Protection Association.</p> <p>Gruber, V, Baumgartner, A, Seidel, C, Maringer, FJ (2008): Radon risk in Alpine regions in Austria: risk assessment as a settlement planning strategy. RADIAT PROT DOSIM, online, 1-4; ISSN 0144-8420</p> <p>Zehetner F., Lair G.J., Maringer F.-J., Gerzabek M.H., Hein T. (2008): From sediment to soil: floodplain phosphorus transformations at the Danube River. BIOGEOCHEMISTRY, 88, 117-126; ISSN 0168-2563</p> <p>Valeria Gruber, Claudia Seidel, Franz Josef Maringer (2008): Assessment of radon exposure in Austria based on geology and settlement. In: Proceedings of IRPA 12, Oct 19-24, 2008, Buenos Aires, Argentina. International Radiation Protection Association.</p>
ADDRESS	<p>BEV – Bundesamt für Eich- und Vermessungswesen Section Ionising Radiation and Radioactivity Arltgasse 35, 1160 Wien, AUSTRIA</p>
CONTACT	<p>Assoc. Prof. Dr. Franz Josef Maringer Tel.: +43 1 21110 6372 Fax: +43 1 21110 6000 E-mail: franz-josef.maringer@bev.gv.at www.bev.gv.at</p>

LABORATORY	IAEA Nuclear Data Section, Vienna, Austria; Serco Assurance, Winfrith Science Centre, Dorchester, UK
NAMES	A.L. Nichols (IAEA), M.A. Kellett (IAEA) and R.J. Perry (Serco Assurance)
ACTIVITY	Decay data evaluations and database preparation
KEYWORDS	Data evaluation, data measurement, ^{67}Ga , $^{83\text{m}}\text{Kr}$, ^{93}Zr , $^{93\text{m}}\text{Nb}$, ^{98}Tc , ^{101}Rh , $^{101\text{m}}\text{Rh}$, ^{109}Pd , ^{115}Cd , $^{115\text{m}}\text{Cd}$, ^{132}Te , $^{129\text{m}}\text{Xe}$, $^{134\text{m}}\text{Xe}$, ^{141}Nd , $^{141\text{m}}\text{Nd}$, ^{167}Tm , ^{183}Re , ^{189}Ir , $^{193\text{m}}\text{Ir}$, $^{194\text{m}}\text{Ir}$, $^{194\text{n}}\text{Ir}$, ^{208}Tl , $^{207\text{m}}\text{Pb}$, ^{212}Pb , ^{212}Bi , ^{215}Bi , ^{212}Po , ^{216}Po , ^{211}At , ^{219}At , ^{219}Rn , ^{220}Rn , ^{224}Ra , ^{228}Th , $^{242\text{m}}\text{Am}$
RESULTS	Decay data evaluations completed in 2008 for the JEFF library: ^{67}Ga , $^{83\text{m}}\text{Kr}$, ^{93}Zr , $^{93\text{m}}\text{Nb}$, ^{98}Tc , 101 , $^{101\text{m}}\text{Rh}$, 115 , $^{115\text{m}}\text{Cd}$, $^{129\text{m}}$, $^{134\text{m}}\text{Xe}$, 141 , $^{141\text{m}}\text{Nd}$, ^{167}Tm , ^{183}Re , 189 , $^{193\text{m}}$, $^{194\text{m}}$, $^{194\text{n}}\text{Ir}$, $^{207\text{m}}\text{Pb}$
PUBLICATIONS	M.A. Kellett, F.G. Kondev and A.L. Nichols, <i>IAEA Coordinated Research Project: Updated Decay Data Library for Actinides</i> , Appl. Radiat. Isot. 66 (2008) 694-700.
IN PROGRESS	Decay data evaluations for DDEP: ^{109}Pd , ^{132}Te Decay data evaluations for IAEA CRP "Updated Decay Data Library for Actinides": ^{208}Tl , ^{212}Pb , 212 , ^{215}Bi , 212 , ^{216}Po , 211 , ^{219}At , 219 , ^{220}Rn , ^{224}Ra , ^{228}Th , $^{242\text{m}}\text{Am}$
INFORMATION	A.L. Nichols will retire from the IAEA, end of April 2009.
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	F.G. Kondev, I. Ahmad, M.P. Carpenter, C. Chiara, J.P. Greene, R.V.F. Janssens, T.L. Khoo, T. Lauritsen, C.J. Lister, E.F. Moore, D. Seweryniak, S. Zhu, S.W. Yates, Z.M. Koenig, A.L. Nichols, M.A. Kellett, C.E. Porter and L.K. Felker, <i>Studies of Nuclear Structure and Decay Data Properties of Actinide Nuclei</i> (invited paper), presented at 13th International Symposium on Capture Gamma-ray Spectroscopy and Related Topics (CGS-13), 25 – 29 August 2008, Cologne, Germany. F.G. Kondev, I. Ahmad, M.P. Carpenter, C.J. Chiara, J.P. Greene, R.V.F. Janssens, M.A. Kellett, C.J. Lister, A.L. Nichols, G. Savard, D. Seweryniak and S. Zhu, <i>Decay Studies of Minor Actinide Nuclides, and Future Opportunities for Improving the Decay Data of Neutron-rich Fission Products</i> , and A. Mengoni, R. Capote, M.A. Kellett and A.L. Nichols, <i>International Efforts to Measure, Model and Evaluate Nuclear Data for Minor Actinides</i> , both presented at Int. Conf. Reactor Physics, Nuclear Power: a Sustainable Resource, PHYSOR-2008, 14 – 19 September 2008, Interlaken, Switzerland.
ADDRESS	IAEA, Nuclear Data Section, Department of Nuclear Sciences and Applications, P.O. Box 100, Wagramerstrasse 5, A-1400 Vienna, AUSTRIA
CONTACT	Dr Mark A. Kellett (m.a.kellett@iaea.org)

Summary of the research program related to radionuclide metrology
for the years 2008 and 2009

within the Research Groups “Isotopenforschung” (Isotope Research) and “Kernphysik” (Nuclear Physics) of the Faculty of Physics at the University of Vienna, Austria
Währingerstrasse 17, A-1090 Wien; Tel: +43-1-4277-51754, FAX: +43-1-4277-51752
<http://physics.univie.ac.at/index.php?id=627>
<http://isotopenforschung.univie.ac.at/index.php?id=832>
<http://physics.univie.ac.at/index.php?id=625>
<http://kernphysik.univie.ac.at/>

[also to be regarded as contribution according to the ICRM standing actions SA1 and SA2]

Some activities of the two research groups concentrate on the improvement and development of atomic and nuclear measuring techniques and data handling procedures for basic physics and interdisciplinary applied physics work with special emphasis on the detection of long-lived radionuclides, particularly in the very-low-level range. Nuclear-decay-counting techniques have been widely replaced by mass-spectrometric techniques with high selectivity and high sensitivity. More detailed information is also provided via the home pages given above.

Names: K. Buczak, F. Dellinger, F. Eder, O. Forstner, E. Friedl, H. Friedmann, R. Golser, J. Gröller, P. Hille, D. Imrich, J. Kühtreiber, W. Kutschera, C. Lederer, St. Lehr, J. Liebl, J. Lukas, M. Martschini, K. Melber, Ph. Müllner, E. Pak, A. Pavlik, A. Priller, F. Quinto, L. Reichart, K. Rumpelmayr, G. Schätzel, P. Steier, S. Tagesen, P. Törnström, H. Vonach, A. Wallner, F. Weninger, E. Wild, G. Winkler

Facilities, projects, tasks:

1. The tandem-accelerator mass-spectrometry facility VERA (Vienna Environmental Research Accelerator) and its use:

For details on the experimental equipment see:

<http://isotopenforschung.univie.ac.at/index.php?id=1571>.

Accelerator mass spectrometry (AMS) injecting negative ions into a tandem accelerator and stripping them to positive ions is the major tool for research. With AMS, radionuclides are measured by direct atom counting; selectivity is achieved employing energy-, momentum- and velocity-selecting devices (electrostatic, magnetic, velocity and time-of-flight filters) and using ion detectors for counting, discrimination and final energy measurement. The interesting nuclides (with extremely small radioisotope-to-stable-isotope ratios in the 10^{-10} to 10^{-16} range) cannot be measured at natural levels through radioactive-decay counting, particularly for small samples in the milligram range, typically containing only 10^5 to 10^8 radionuclide atoms. Predominantly isotope ratios are measured relative to appropriate standards.

Typically, in the light-ion region atoms like ^{14}C (5.7×10^3 a) for radiocarbon dating, atmospheric science, paleoclimatic studies, ^{10}Be ($T_{1/2} = 1.5 \times 10^6$ a) and

^{26}Al ($T_{1/2}=7.2\times 10^5$ a) [both, e.g., for applications in geology, atmospheric and climate research, in particular employing $^{26}\text{Al}/^{10}\text{Be}$ ratios], heavy long-lived radionuclides such as ^{129}I ($T_{1/2}\approx 1.6\times 10^7$ a), ^{236}U ($T_{1/2}\approx 23\times 10^6$ a) [in natural and anthropogenic environmental samples], ^{239}Pu (2.4×10^4 a) [together with ^{236}U in uranium ores], ^{244}Pu ($T_{1/2}\approx 81\times 10^6$ a) [for research on e.g. interstellar medium grains], ^{242}Pu ($T_{1/2}\approx 3.8\times 10^5$ a) and ^{182}Hf ($T_{1/2}\approx (9\pm 2)\times 10^6$ a) [of interest in astrophysics and geophysics, requiring new isobar separation methods] are counted in natural samples with an excellent suppression of isobaric background. Also, AMS studies with ^{41}Ca and ^{60}Fe atoms were performed. Recently, Laser techniques were tried to assist isobar suppression in AMS.

Recent publications involving AMS measurements are, e.g.:

NATURAL AND ANTHROPOGENIC ^{236}U IN ENVIRONMENTAL SAMPLES,
Peter Steier, Max Bichler, L. Keith Fifield, Robin Golser, Walter Kutschera, Alfred Priller, Francesca Quinto, Stephan Richter, Michaela Srncik, Philippo Terrasi, Lukas Wacker, Anton Wallner, Gabriele Wallner, Klaus M. Wilcken, Eva Maria Wild,
Proceedings of the 9th International Conference on the Application of Accelerators in Research and Technology, Florence, Italy, September 3-7, 2007; Nucl. Instr. and Meth. **B 266** (2008) 2246-2250

APPLICATIONS OF A COMPACT IONIZATION CHAMBER IN AMS AT ENERGIES BELOW 1 MeV/amu,
O. Forstner, L. Michlmayr, M. Auer, R. Golser, W. Kutschera, A. Priller, P. Steier, A. Wallner,
Proceedings of the 9th International Conference on the Application of Accelerators in Research and Technology, Florence, Italy, September 3-7, 2007; Nucl. Instr. and Meth. **B 266** (2008) 2213-2216

ISOBAR SUPPRESSION IN AMS USING LASER PHOTODETACHMENT,
O. Forstner, P. Andersson, C. Diehl, R. Golser, D. Hanstorp, W. Kutschera, A. Lindahl, A. Priller, P. Steier, A. Wallner,
Proceedings of the XVth International Conference on Electromagnetic Isotope Separators and Techniques Related to their Applications, Deauville, France, June 24-29, 2007; Nucl. Instr. and Meth. **B** (2008) accepted manuscript, DOI 10.1016/j.nimb.2008.05.080

MEASUREMENT OF THE STELLAR CROSS SECTIONS FOR THE REACTIONS $^9\text{Be}(n,\gamma)^{10}\text{Be}$ and $^{13}\text{C}(n,\gamma)^{14}\text{C}$ via AMS,
A. Wallner, L. Coquard, I. Dillmann, O. Forstner, R. Golser, M. Heil, F. Käppeler, W. Kutschera, A. Mengoni, M. Paul, A. Priller, P. Steier,
Journal of Physics G **35** (2008) 014018

$^{40}\text{Ca}(\alpha,\gamma)^{44}\text{Ti}$ AND THE PRODUCTION OF ^{44}Ti IN SUPERNOVAE,
C. Vockenhuber, C.O. Ouellet, L.-S. The, L. Buchmann, J. Caggiano, A.A. Chen, H. Crawford, J.M. D'Auria, B. Davids, L. Fogarty, D. Frekers, A. Hussein, D.A. Hutcheon, W. Kutschera, A.M. Laird, R. Lewis, E. O'Connor, D. Ottewell, M. Paul, M.M. Pavan, J. Pearson, C. Ruiz, G. Ruprecht, M. Trinczek, B. Wales, and A. Wallner,
Journal of Physics G **35** (2008) 014034

MEASUREMENT OF THE THERMAL NEUTRON CAPTURE CROSS SECTION AND THE RESONANT INTEGRAL OF RADIOACTIVE ^{182}Hf ,
C. Vockenhuber, M. Bichler, A. Wallner, W. Kutschera, I. Dillmann, F. Käppeler,
Phys. Rev. **C 77** (2008) 044608

SEARCH FOR SUPERNOVA-PRODUCED ^{60}Fe IN A MARINE SEDIMENT,
C. Fitoussé, G.M. Raisbeck, K. Knie, G. Korschinek, T. Faestermann, S. Goriely, D. Lumney, M. Poutivtsev, G. Rugel, C. Waelbroeck, A. Wallner,
Physical Review Letters **101** (2008) 121101.

TOWARDS MORE PRECISE ^{10}Be AND ^{36}Cl DATA FROM MEASUREMENTS AT THE 10^{-14} LEVEL: INFLUENCE OF SAMPLE PREPARATION,

S. Merchel, M. Arnold, G. Aumaître, L. Benedetti, D.L. Bourlès, R. Braucher, V. Alfimov, P.H.T. Freeman, P. Steier, A. Wallner,

Nuclear Instruments and Methods in Physics Research B (2009), in Press

Recent projects involving radiocarbon measurements are, e.g.,

THE ANTHROPOGENIC INFLUENCE ON CARBONACEOUS AEROSOL IN THE EUROPEAN BACKGROUND,

Barbara May, Dietmar Wagenbach, Samuel Hammer, Peter Steier, Hans Puxbaum, Casimiro Pio, Tellus (2009) in press.

RADIOCARBON (^{14}C) DATING IN ARCHAEOLOGY AND OTHER FIELDS,

W. Kutschera,

In: G. Pfenning, C. Normand, J. Magill, T. Fanghänel, eds., Karlsruher Nuklidkarte, Commemoration of the 50th Anniversary, Institute for Transuranium Elements, Karlsruhe (2008) 262-267.

A unique signature to date young carbon-containing samples is utilizing the ^{14}C nuclear bomb peak due to the redistribution of $^{14}\text{CO}_2$ into the other carbon archives on Earth (biosphere, oceans) after the atmospheric Nuclear Test Ban Treaty in 1963. This signal was used, e.g., in collaboration with the Forensic Medicine Department to determine the date of death of people who died in the late 1980s, and is now intended to develop methods at VERA for ^{14}C measurements on ultra-small DNA samples originating from small regions of the human brain.

Atomic and molecular physics

The molecule H_2 (of interest in the cooling phase of the early universe) was unambiguously detected. The existence of rare exotic negatively-charged molecular ions was also studied via AMS:

IDENTIFICATION OF THE SiF_6^{2-} DIANION BY ACCELERATOR MASS SPECTROMETRY AND A FULLY RELATIVISTIC COMPUTATION OF ITS PHOTODETACHMENT SPECTRUM, H. Gnaser, R. Golser, M. Pernpointner, O. Forstner, W. Kutschera, A. Priller, P. Steier, A. Wallner, Phys. Rev. A **77** (2008) 053203

The AMS accelerator has also been used for PIXE measurements employing a very low-current proton beam externally:

PIXE MEASUREMENTS OF RENAISSANCE SILVERPOINT DRAWINGS AT VERA
P. Milota, I. Reiche, A. Duval, O. Forstner, H. Guicharnaud, W. Kutschera, S. Merchel, A. Priller, M. Schreiner, P. Steier, E. Thobois, A. Wallner, B. Wünschek, R. Golser, Proceedings of the 9th International Conference on the Application of Accelerators in Research and Technology, Florence, Italy, September 3-7, 2007; Nucl. Instr. and Meth. **B 266** (2008) 2279-2285

2. Other recent radionuclide measurements and evaluation methods

VERTICAL DISTRIBUTION OF ^{238}Pu , $^{239(40)}\text{Pu}$, ^{241}Am , ^{90}Sr AND ^{137}Cs IN AUSTRIAN SOIL PROFILES,

M. Srncik, E. Hrnccek, P. Steier, A. Wallner, G. Wallner, P. Bossew, Radiochim. Acta 96 (2008) 733–738.

A major contribution was given to the recently completed "National Survey of Indoor Radon Concentration", a large-scale investigation on the impact of natural radioactivity on the Austrian population [H. Friedmann].

3. Work and co-operation on special reports and standard concepts, training tasks

Co-operation with the *Austrian Standards Institute* (OENORM) in fields related to radionuclide metrology (e.g., low-level measurements, Radon) is continued.

Students' training in the field of general experimental physics, quantum physics, atomic physics, nuclear physics, ion physics and radioactivity measurements is taken care of by the staff of the Isotope Research and Nuclear Physics Group.

4. Participation in international organisations dealing with radionuclide metrology

- International Committee for Radionuclide Metrology (ICRM) [G. Winkler]
- Consultative Committee for Ionising Radiation (CCRI), Section II (Measurement of Radionuclides) at the BIPM, Sèvres, France [personal member: G. Winkler]

February 2009

Gerhard Winkler

LABORATORY	European Commission - Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Radionuclide Metrology Sector
NAMES	Timotheos Altzitzoglou, Uwe Wätjen
ACTIVITY	<ul style="list-style-type: none"> * Liquid Scintillation Counting and TDCR * Gamma-ray spectrometry * Nuclear decay data measurement
APPARATUS	<ul style="list-style-type: none"> * 4 HPGe detector systems (incl. low background detectors). * 2 Low and Ultra low level liquid scintillation spectrometers. * Facilities for radiochemical separations. * Quantitative radioactive source preparation facilities.
KEYWORDS	Beta spectrometry, coincidence method, data evaluation, data measurement, Euromet, gamma-ray spectrometry, life sciences, liquid scintillation, low-level, simulation code, SIR, source preparation, traceability, X-ray spectrometry
RESULTS	<ul style="list-style-type: none"> * U. Wätjen, Y. Spasova, T. Altzitzoglou and H. Emteborg, S. Pommé, Evaluation of EC measurement comparison for ^{137}Cs, ^{40}K and ^{90}Sr in milk powder, Report EUR 23270 EN (2008). * EUROMET project 907: Measurement of ^{124}Sb activity and determination of photon emission probabilities. * ICRM LSCWG comparison: Calculation of the activity concentration of a ^{99}Tc solution, measured by the TDCR method.
PUBLICATIONS	<ul style="list-style-type: none"> * T. Altzitzoglou, A. Bohnstedt, Characterisation of the IAEA-152 milk powder reference material for radioactivity with assigned values traceable to the SI units, Appl. Radiat. Isot. 66 (2008) p. 1702-1705. * T. Altzitzoglou, Radioactivity determination of individual radionuclides in a mixture by liquid scintillation spectra deconvolution, Appl. Radiat. Isot. 66 (2008) p. 1055-1061. * Sibbens G, Altzitzoglou T, Benedik L, Pomme S, Van Ammel R. Alpha-Particle and Gamma-Ray Spectrometry of a Plutonium Solution for Impurity Determination. Appl. Radiat. Isot. 66 (2008) p. 813-818. * Vasile M, Altzitzoglou T, Benedik L, Waetjen U. Radiochemical Separation and Determination of ^{228}Ra in Mineral Waters by Low-level Liquid Scintillation Counting. Poster presentation in: LSC 2008: Advances in Liquid Scintillation Spectrometry; 25 May 2008; Davos (Switzerland). * S. Pommé, T. Altzitzoglou, R. Van Ammel, G. Sibbens, A. Verbruggen, R. Eykens, J. Camps, K. Kossert, H. Janssen, Eduardo García Toraño, T. Durán and F. Jaubert; Experimental determination of the U-233 half-life, Appl. Radiat. Isot. (in press).
IN PROGRESS	<ul style="list-style-type: none"> * EUROMET project no 749: Alpha-particle emission probabilities and energies in the decay of ^{240}Pu; gamma-ray emission probability measurements. * International comparison of the activity of ^3H. * Development of a new TDCR Liquid Scintillation Counter.
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	Tel. +32 14 571 266 - Fax +32 14 584 273 e-mail: timotheos.altitzoglou@ec.europa.eu
CONTACT	Timos Altitzoglou

LABORATORY	European Commission - Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Radionuclide Metrology Sector
NAMES	Mikael Hult, Gerd Marissens, Elisabeth Wieslander, Joël Gasparro, Raquel Gonzalez de Orduña, Necati Çelik
APPARATUS ACTIVITY	Seven HPGe-detectors for ultra low level gamma-ray spectrometry in the underground laboratory HADES. Two low-background HPGe-detectors above ground.
KEYWORDS	Underground gamma-ray spectrometry, anti-coincidence method, data evaluation, data measurement, low-level, NaI well-type counter, neutron measurement, simulation code, SIR, source preparation, Plastic Scinillators, muon shield, In-115, Sn-122, Ta-180m,
RESULTS	<ul style="list-style-type: none"> * Results from 3rd experiment at JET aiming at quantifying the loss of charged particles from the plasma * Results from 4th experiment to use radionuclides as a means to check authenticity of organic farming * Measurements of rare decays from $^{180}\text{Ta}^m$ and ECEC of ^{112}Sn and $\beta\beta$ of ^{124}Sn. * Determination of the half-life and Q-value of the decay with Nature's lowest Q-value: $^{115}\text{In}(\beta^- 57 \text{ eV}) ^{115}\text{Sn}^*$ * Radiopurity measurements of various materials for the GERDA experiment and ultra low-background detector development in HADES. * Radium in water
PUBLICATIONS	<ul style="list-style-type: none"> * Hult, Gasparro, Lindahl, Marissens, Fessler, Johnston. On the use of mercury as a means of detecting background sources in low-level gamma-ray spectrometry. Appl. Radiat. Isot. 66/6-7 (2008)829. * Lövestam, Hult, Fessler, Gasparro, Kockerols, Okkinga, Tagziria, Vanhavere and Wieslander "Neutron fluence spectrometry using disk activation", Radiation Measurements (2009) in press. * Wieslander, Hult, Bonheure, Arnold, Laubenstein, Marissens and Vermaercke, "Low-level gamma-ray spectrometry for analysing fusion plasma conditions", NIM-A 591(2008)383. * Gasparro, Hult, Johnston, and Tagziria "Monte Carlo modelling of Ge crystals that are tilted and have rounded front edges" NIM-A 594(2008)196. * Bonheure, Wieslander, Hult, Gasparro, Marissens, Arnold, Laubenstein, Popovichev, Murari, Lengar, "Mega-Electron-Volt Ion Loss Measurements in JET D-^3He Plasmas Using Activation Technique" Fusion Science and Technology 53-3 (2008)806. * Vidmar et al. "An intercomparison of Monte Carlo codes used in gamma-ray spectrometry". Appl. Radiat. Isot. 66(2008)764. * Wieslander, Hult, Marissens, Gasparro and Misiaszek " The Sandwich spectrometer for ultra low-level γ-ray spectrometry", Appl. Radiat. Isotop. Accepted for publication * Budjáš, Laubenstein, Hult et al. "γ-ray spectrometry of ultra low-levels of radioactivity for the GERDA experiment". Appl. Radiat. Isotop. Accepted for

	<p>publication</p> <p>* Hult, Wieslander, Marissens, Gasparro and Misiaszek and Wätjen. " Search for the radioactivity of ^{180m}Ta using an underground sandwich spectrometer" Appl. Radiat. Isotop. Accepted for publ.</p>
IN PROGRESS	<p>* Decay data for long-lived radionuclides and double beta decay</p> <p>* Neutron cross sections of Re</p> <p>* 4th experiment for plasma characterisation at JET using activation of metal discs</p> <p>* Environmental radioactivity</p> <p>* Intercomparisons, reference materials and metrology</p> <p>* Ultra low background detector developments</p>
ADDRESS	<p>European Commission Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Retieseweg 111, B-2440 Geel, Belgium Tel. +32 14 571 269 - Fax +32 14 584 273 e-mail: mikael.hult@ec.europa.eu</p>
CONTACT	Mikael Hult

LABORATORY	European Commission - Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Radionuclide Metrology Sector
NAMES	S. Pommé, G. Sibbens, T. Altzitzoglou, R. Van Ammel, J. Paepen, T. Vidmar, U. Wätjen
ACTIVITY	Primary standardisation of activity and determination of nuclear decay data
KEYWORDS	Alpha spectrometry, coincidence counting, 4π CsI(Tl)-sandwich spectrometer, data evaluation, data measurement, defined solid angle (alpha and X-ray) counting, EURAMET projects, gamma-ray spectrometry, gas proportional counting (atmospheric, pressurised), ionisation chamber, life sciences, liquid scintillation, NaI well-type counter, simulation code, SIR, source preparation (quantitative drop deposition, IRMM source drying device, vacuum evaporation and electrodeposition), traceability, X-ray spectrometry
RESULTS	<ul style="list-style-type: none"> * U. Wätjen, Y. Spasova, T. Altzitzoglou, H. Emteborg and S. Pommé, Evaluation of EC measurement comparison for ^{137}Cs, ^{40}K and ^{90}Sr in milk powder, Report EUR 23270 EN (2008), ISBN 978-92-79-08500-0. * EUROMET project 907: Measurement of ^{124}Sb activity and determination of photon emission probabilities.
PUBLICATIONS	<ul style="list-style-type: none"> * S. Pommé and G. Sibbens, Alpha-particle counting and spectrometry in a primary standardisation laboratory, Acta Chimica Slovenica 55 (2008) 111-119. * S. Pommé, J. Camps, R. Van Ammel and J. Paepen, Protocol for uncertainty assessment of half-lives, J. Radioanal. Nucl. Chem. 276 (2008) 335-339. * S. Pommé and Y. Spasova, A practical procedure for assigning a reference value and uncertainty in the frame of an interlaboratory comparison, Accreditation and Quality Assurance 13 (2008) 83-89. * S. Pommé, E. García-Toraño, G. Sibbens, S. Richter, R. Wellum, A. Stolarz and A. Alonso-Muñoz, $^{234}\text{U}/^{235}\text{U}$ activity ratios as a probe for the $^{238}\text{U}/^{235}\text{U}$ half-life ratio, J. Radioanal. Nucl. Chem. 277 (2008) 207-210. * S. Pommé, Cascades of pile-up and dead time, Appl. Radiat. Isot. 66 (2008) 941-947. * G. Sibbens, T. Altzitzoglou, L. Benedik, S. Pommé, R. Van Ammel, α-particle and γ-ray spectrometry of a plutonium solution for impurity determination, Appl. Radiat. Isot. 66 (2008) 813-818.
IN PROGRESS	<ul style="list-style-type: none"> * Half-life determination of ^{55}Fe, ^{54}Mn, ^{109}Cd, ^{233}U, ^{235}U, ^{238}U. * Development of the new reference ionisation chamber. * Uncertainty calculations for counting at defined solid angle. * Development of software for $4\pi\gamma$-counting. * Improvement of ALPHA program for deconvolution of alpha-particle spectra.
INFORMATION	http://www.irmm.jrc.be/html/activities/radionuclide_metrology/index.htm
SOURCE IN PREPARATION	<ul style="list-style-type: none"> * S. Pommé, J. Camps, G. Sibbens, Y. Spasova, Some modifications to Sima's model for total efficiency calculation of well-type photon detectors, J. Radioanal. Nucl. Chem. (2009). * S. Pommé, T. Altzitzoglou, R. Van Ammel, G. Sibbens, R. Eykens, S. Richter, J. Camps, K. Kossert, H. Janssen, E. García-Toraño, T. Durán, F. Jaubert,

	<p>Experimental determination of the ^{233}U half-life.</p> <p>* S. Pommé, Detection efficiency calculation for photons, electrons and positrons in a well detector; Part I: Analytical Model, Nucl. Instr. and Meth. A (2009).</p> <p>* S. Pommé, G. Sibbens, T. Vidmar, J. Camps, V. Peyres, Detection efficiency calculation for photons, electrons and positrons in a well detector; Part II: analytical model versus simulations, Nucl. Instr. and Meth. A (2009).</p> <p>* J. Paepen, T. Altzitzoglou, R. Van Ammel, G. Sibbens, S. Pommé, Half-life measurement of ^{124}Sb.</p> <p>* G. Sibbens, S. Pommé, E. García-Toraño, H. Janssen, R. Dersch, A. Martín Sánchez, E. Leblanc, T. Semkow, Alpha-particle emission probabilities in the decay of ^{240}Pu.</p> <p>* J. Paepen, E. Boogers, A charge-sensitive preamplifier and signal mixer for 2-wire proportional counters.</p> <p>* R. Van Ammel, J. Paepen, S. Pommé, G. Sibbens, Measurements of the half-life of ^{54}Mn.</p> <p>* C. Michotte, S. Courte, G. Sibbens, J. Camps, J. Paepen, Study of self-attenuation in a solution of ^{237}Np measured in ionization chambers.</p>
ADDRESS	<p>European Commission Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Retieseweg 111, B-2440 Geel, Belgium Tel. +32 14 571 289 - Fax +32 14 584 273 e-mail: stefaan.pomme@ec.europa.eu</p>
CONTACT	Stefaan Pommé

LABORATORY	European Commission - Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Radionuclide Metrology Sector
NAMES	Ljudmila Benedik, Mirela Vasile, Yana Spasova, Timotheos Altitzoglou, Uwe Wätjen
ACTIVITY	<ul style="list-style-type: none"> * development of reference materials * organisation of measurement comparisons for EU member state laboratories monitoring radioactivity in the environment and food (ICS-REM) * facilities for radiochemical separations * quantitative radioactive source preparation facilities * large solid angle α-particle spectrometers * primary standardisation equipment when needed * HPGe detector systems and LSC when needed
KEYWORDS	Intercomparisons, proficiency tests, reference materials, traceability, environmental monitoring, source preparation, radiochemistry, low-level, liquid scintillation, alpha spectrometry, beta spectrometry, gamma-ray spectrometry,
RESULTS	<ul style="list-style-type: none"> * ICS-REM intercomparison "Ra and U in mineral waters" completed (3 mineral waters, ^{226}Ra, ^{228}Ra, ^{234}U and ^{238}U, 45 laboratories participated) * Workshop for laboratories participating in three ICS-REM comparisons for radioactivity organised at IRMM, Geel, 10-12 June, 2008 (50 participants) * Development of a novel radiochemical method for the sequential determination of ^{210}Po and uranium radioisotopes in water with alpha-particle spectrometry
PUBLICATIONS	<ul style="list-style-type: none"> * U. Wätjen, Y. Spasova, T. Altitzoglou, H. Emteborg and S. Pommé, Evaluation of EC measurement comparison for ^{137}Cs, ^{40}K and ^{90}Sr in milk powder, Report EUR 23270 EN (2008), ISBN 978-92-79-08500-0. * U. Wätjen, Y. Spasova and T. Altitzoglou, Measurement comparisons of radioactivity among European monitoring laboratories for the environment and food stuff, Appl. Radiat. Isot. 66 (2008) 742-749. * S. Pommé and Y. Spasova, A practical procedure for assigning a reference value and uncertainty in the frame of an interlaboratory comparison, Accreditation and Quality Assurance 13 (2008) 83-89. * U. Wätjen, European measurement comparisons of environmental radioactivity, in: Nuclear Proficiency Testing, Proc. of the 1st Intern. Workshop, eds. E. Cincu, I. Manea and M. Woods, AIP Conf. Proc. 1036 (2008) 85-99. * Y. Spasova, U. Wätjen and T. Altitzoglou, European measurement comparison of ^{137}Cs, ^{40}K and ^{90}Sr in milk powder, J. Radioanal. Nucl. Chem. 277 (2008) 211-215. * M. Vasile and L. Benedik, On the determination of ^{228}Ra, ^{210}Po, ^{234}U and ^{238}U in mineral waters, Report EUR 23683 EN (2008), ISBN 978-92-79-11126-6. * U. Wätjen (ed.), Participants' workshop – ICS-REM comparisons for radioactivity determination in the environment and food, June 10-12, 2008 – Presentations, Proceedings on CD-ROM (2008).

IN PROGRESS	<ul style="list-style-type: none"> * Development of reference material IRMM-426 "wild berries" certified for activity of ^{137}Cs, ^{40}K and ^{90}Sr * U. Wätjen, L. Benedik, M. Vasile, Y. Spasova and T. Altitzoglou, Evaluation of EC measurement comparison for ^{226}Ra, ^{228}Ra, ^{234}U and ^{238}U in three mineral waters, EUR report * Y. Spasova, L. Benedik, M. Vasile, M. Beyermann, U. Wätjen and S. Pommé, ^{234}U and ^{238}U in mineral water – reference value and uncertainty evaluation in the frame of an interlaboratory comparison, J. Radioanal. Nucl. Chem. * M. Vasile, T. Altitzoglou, L. Benedik, Y. Spasova and U. Wätjen, Radiochemical separation and determination of ^{228}Ra in mineral waters by low-level liquid scintillation counting, Radiocarbon * L. Benedik, M. Vasile, Y. Spasova and U. Wätjen, Sequential determination of ^{210}Po and uranium radioisotopes in drinking water by alpha-particle spectrometry, Appl. Radiat. Isot.
ADDRESS	<p>European Commission Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Retieseweg 111, B-2440 Geel, Belgium Tel. +32 14 571 882 - Fax +32 14 584 273 e-mail: uwe.waetjen@ec.europa.eu</p>
CONTACT	Uwe Wätjen

LABORATORY	SCK•CEN, Low Level Radioactivity Measurements (SA1/SA2)
NAMES	C. Hurtgen, F. Verrezen.
ACTIVITY	Gross alpha and beta, ^3H , ^{14}C , $^{89-90}\text{Sr}$, ^{131}I , ^{210}Po , ^{226}Ra and actinides activity measurements in environmental samples Assay of actinides (Th, U, Pu, Am...) in biological samples (urine, faeces) and environmental samples (water, sediment, soil ...) by alpha spectrometry and by KPA for U. Assay of ^{14}C , ^{63}Ni , ^{99}Tc , ^{129}I in low level waste
KEYWORDS	Alpha spectrometry, bioassay, environmental control, gas proportional counter, liquid scintillation, low-level, radiochemistry.
RESULTS	Comparative study of selected scintillation cocktails.
PUBLICATIONS	Verrezen, F., Loots, H., and Hurtgen C. (2008). "A performance comparison of nine selected liquid scintillation cocktails." <i>Appl. Radiat. Isot.</i> 66 (6-7): 1038-1042. Verrezen, F., Loots, H., and Hurtgen C. (2008). "A Performance Comparison of Nine Selected Liquid Scintillation Cocktails." SCK-CEN BLG-1052.
IN PROGRESS	Informatisation and integration of our ZnS α counting chain for low-level global α measurements into the QA system of our laboratory.
ADDRESS	Low Level Radioactivity Measurements SCK•CEN Boeretang 200 B-2400 Mol Belgium Telephone: (+32-14) 33 28 31 Telecopier: (+32-14) 32 10 56 E-mail: churtgen@sckcen.be Web: http://www.sckcen.be/lrm
CONTACT	C. Hurtgen

LABORATORY	SCK•CEN, Reactor & Nuclear Measurements (SA1/SA2)
NAMES	M. Bruggeman, P. Vermaercke, F. Farina, L. Sneyers, L. Verheyen, W. De Boeck, E. Boogers
ACTIVITY	γ -spectrometry, Preparation of Radioactive Standards, Neutron activation analysis with relative NAA and k_0 - method Non-destructive assay of nuclear wastes and special nuclear material (γ -spectrometry and neutron counting)
KEYWORDS	coincidence counting, gamma-ray spectrometry, gas proportional counter, ionisation chamber, low-level, NaI well counter, neutron measurement, simulation code, source preparation, X-ray spectrometry.
RESULTS	<ul style="list-style-type: none"> • k_0-based INAA method to determine $^{235}\text{U}/^{238}\text{U}$ ratios in samples in trace amounts; • MCNP based procedure for the computation of thermal and epithermal self-shielding factors; • Development of dedicated LIMS for the laboratories Gamma-ray spectrometry and Neutron Activation Analysis;
PUBLICATIONS	<p>Leal A., Menezes M., Rodrigues R., Andonie O., Vermaercke P., Sneyers L.- <i>A comparative neutron activation analysis study of common generic manipulated and reference medicines commercialized in Brazil.</i>- In: Applied Radiation and Isotopes, 66:10(2008), p. 1307-1312.- ISSN 0969-8043</p> <p>Vermaercke P., Robouch P., Sneyers L., De Corte F.- <i>Using synthetic multi-element standards (SMELS) for calibration and quality control of the irradiation facilities in the BR1 reactor.</i>- In: Journal of Radioanalytical and Nuclear Chemistry,, 276:1(2008), p. 235-241.- ISSN 0236-5731</p> <p>Vermaercke P., Robouch P.- <i>K0-NAA for the Determination of Trace Elements in a Synthetic Material: a Collaborative Study.</i>- In: 1st International Workshop on Nuclear Proficiency Testing, Bucharest, Romania, 6-9 October 2007, New York, United States, American Institute Physics, 2008, p. 149-154</p> <p>Wieslander JSE, Hult M., Bonheure G., Arnold D., Dombrowski H., Gasparro J., Laubenstein M., Marissens G., Vermaercke P. <i>Low-level gamma-ray spectrometry for analysing fusion plasma conditions.</i>- In: Nuclear Instruments and Methods in Physics Research A, 591:2(2008), p. 383-393</p>
IN PROGRESS	Re-determination of some suspicious k_0 factors;
ADDRESS	<p>Reactor and Nuclear Measurements SCK•CEN, GKD Boeretang 200, B-2400 Mol Belgium Telephone: (+32-14) 33 28 86, Telecopier: (+32-14) 32 10 56 E-mail: michel.bruggeman@sckcen.be; peter.vermaercke@sckcen.be</p> <p>Websites: http://www.gammaspectrometry.be/ http://www.k0naa.be/ http://www.nondestructiveassay.be/ http://www.radsources.be/</p>
CONTACT	M. Bruggeman, P. Vermaercke

LABORATORY	SCK•CEN, Radio-Chemical Analysis laboratories (RCA) (SA1/SA2)
NAMES	L. Adriaensen, M. Gysemans
ACTIVITY	<ul style="list-style-type: none"> • Destructive radiochemical analysis of spent fuels for the determination of burn-up and for spent fuel characterization programs • Determination of Pu and ²⁴¹Am concentration in MOX fuels (accredited according to ISO17025). • Radiochemical analysis of long-lived and radiotoxic nuclides in various types of radioactive waste such as resins, evaporator concentrates, filters, incinerator ashes... • Study of separation chemistry of actinides and specific radionuclides • Radiochemical analysis of reactor dosimeters and irradiated reactor materials.
KEYWORDS	Alpha spectrometry, beta spectrometry, gamma-ray spectrometry, low-level, NaI well counter, mass spectrometry, radiochemistry
RESULTS	<ul style="list-style-type: none"> • Burn-up determination and spent fuel characterization for the LWR-Deputy program • Dissolution and separation of thorium in Th-based spent fuels in the framework of LWR-Deputy, a program funded by the EC in FP6 • Optimisation of the radiochemical separation of ⁶³Ni in a stainless steel matrix
PUBLICATIONS	
IN PROGRESS	<ul style="list-style-type: none"> • Dissolution, separation and analysis of ³⁶Cl in radioactive concrete or metal samples • Dissolution, separation and analysis of ³⁶Cl, ¹⁴C, ³H, ⁶³Ni in radioactive graphite samples in the framework of Carbowaste, a project of the 7th EURATOM programme • Microwave dissolution of different types of waste materials
ADDRESS	Radio-Chemical Analysis SCK•CEN Boeretang 200, B-2400 Mol, Belgium Telephone: (+32-14) 33 32 26 Fax: (+32-14) 32 07 55 E-mail: ladriaen@sckcen.be
CONTACT	L. Adriaensen

LABORATORY	Laboratório Nacional de Metrologia das Radiações Ionizantes LNMRI/IRD/CNEN
NAMES	A. Iwahara, Antônio E. de Oliveira, C.J. da Silva, Estela M.O. Bernardes, P.A.L. da Cruz, J. dos S. Loureiro, José U. Delgado, R. Poledna, M.A.R.R. di Prinzio, Vanessa de Bonis.
ACTIVITY	1- Participation in international comparisons ; 2- Absolute activity measurements ; 3- Traceability program with Nuclear Medicine Services.
RESULTS	1- Standardization of ^{177}Lu , ^{57}Co , ^{233}U and ^{237}Np solutions; 2- Comparative performance of $4\pi\beta(\text{LSC})-(\text{NaI}(\text{Tl}))$ anti-coincidence and $4\pi\beta(\text{PC})-(\text{NaI}(\text{Tl}))$ coincidence systems; 3- Comparison run of activity measurements of $^{99}\text{Tc}^{\text{m}}$, with Nuclear Medicine Services; 4- Participation in the international comparison of ^{57}Co activity measurements organized by International Atomic Energy Agency.
PUBLICATIONS	1- L. Tauhata, A. Iwahara, A.E. de Oliveira, E.A. Rezende, J.A. dos Santos, I.G. Nícoli, F.G. Alabarse, A.M. Xavier. Proficiency test in the determination of activity of radionuclides in radiopharmaceutical products measured by nuclear medicine services in 8 years of comparison programmes in Brazil Appl. Radiat. Isot. 66 (2008) 981-987. 2- Carlos J. da Silva, A. Iwahara, R. Poledna, E.M. de O. Bernardes, M.A.R.R. de Prinzio, José U. Delgado and Ricardo T. Lopes. Standardization of ^{241}Am , ^{124}Sb and ^{131}I by live-timed anti-coincidence counting with extending dead time. Appl. Radiat. Isot. 66 (2008) 886-889. 3- Carlos J. da Silva, A. Iwahara, R. Poledna, E.M. de O. Bernardes, M.A.R.R. de Prinzio and Ricardo T. Lopes. Standardization of ^{67}Ga , ^{51}Cr and ^{55}Fe by live-timed anti-coincidence counting with extending dead time. Appl. Radiat. Isot. 66 (2008) 231-235.
IN PROGRESS	1- A. Iwahara, R. Poledna, C. J. da Silva, L. Tauhata. Primary activity standardization of ^{57}Co by sum-peak method. Submitted to Applied Radiation Isotopes. 2- A. Iwahara, L. Tauhata, A.E. de Oliveira, I.G. Nícoli, F.G. Alabarse, A.M. Xavier, M.L. de Oliveira, M. F. Koskinas, M.C.M. de Almeida. Proficiency Test for Radioactivity Measurements in Nuclear Medicine. Accepted to be published in Journal of Radioanalytical and Nuclear Chemistry. 3- Primary activity standardization of ^{177}Lu by coincidence and anti-coincidence counting methods. 4- Measurement of activity concentration of a solution of tritiated water in the frame of an international key comparison organized by Bureau International des Poids et Mesures.
ADDRESS	Instituto de Radioproteção e Dosimetria, Av. Salvador Allende, s/n, Recreio, CEP 22780-160, Rio de Janeiro, Brasil.Tel: ++55 21 2173 2879 Fax: ++55 21 2442 1605 e-maiL: iwahara@ird.gov.br
CONTACT	AkiraIwahara

LABORATORY	Laboratório Nacional de Metrologia das Radiações Ionizantes LNMRI/IRD/CNEN
NAMES	E.M.O. Bernardes, J.U. Delgado, M.A.R.R. di Prinzio, Maria C.M. de Almeida, R. Poledna and Ronaldo L. da Silva.
ACTIVITY	1 - Half-life determination. 2 - Impurities study by gamma-ray spectrometry. 3- Determination of photon emission probabilities
RESULTS	Measurements of nuclear data parameters in the standardization of ^{124}Sb .
PUBLICATIONS	1- A. Iwahara, J.U. Delgado, R. Poledna, C.J. da Silva, M.C.M. de Almeida, R.L. da Silva. Primary radioactivity standardization and gamma intensities determination of ^{124}Sb . Accepted to be published in Nuclear Instruments and Methods A.
IN PROGRESS	1- Determination of the half-life and photon emission probabilities of ^{177}Lu ; 2- Precise Determination of Ge Detector Efficiency Curves for Obtaining Activities in Gamma-Emitters Radionuclides.
ADDRESS	Instituto de Radioproteção e Dosimetria, Av. Salvador Allende, s/n, Recreio, CEP 22780-160, Rio de Janeiro, Brazil.Tel: ++55 21 3411 8173 Fax: ++55 21 2442 1605. e-mail: delgado@ird.gov.br
CONTACT	José U. Delgado

LABORATORY	Laboratório Nacional de Metrologia das Radiações Ionizantes LNMRI / IRD / CNEN
NAMES	Almir F. Clain, A.C.M. Ferreira, A.E. de Oliveira, L. Tauhata, M.E.C. Vianna, Maura J.C. S. de Bragança and Adelaide M.G.F.Azeredo.
ACTIVITY	1- Preparation of the spiked sources of beta, alpha and multi-gamma emitters in water matrix; 2- Participation in international comparison: Analysis of metals impurities in water and sediments. ARCAL RLA1/10, 2008. 3- Participation on meeting of the advisory group on the production characterization of reference materials of terrestrial origin; IAEA, Seibersdorf 2008.
RESULTS	1- Quality control program of environmental laboratories; 2- Preparation of a reference material soil of radionuclides from the uranium and thorium natural series from Poços de Caldas, Brazil; 3- Production of Air Filter Reference Material.
PUBLICATIONS	
IN PROGRESS	
ADDRESS	Instituto de Radioproteção e Dosimetria, Av. Salvador Allende, s/n, Recreio, CEP 22780-160, Rio de Janeiro, Brazil. Tel: ++55 21 3411 8154 Fax: ++55 21 2442 1605. e-mail : tauhata@ird.gov.br
CONTACT	Luiz Tauhata

LABORATORY	Laboratory for Radioecology
NAMES	Delko Barišić, Željko Grahek, Martina Rožmarić Mačefat, Ivanka Lovrenčić Mikelić, Marijana Nodilo, Tomislav Kardum, Rajko Kušić
ACTIVITY	<ul style="list-style-type: none"> • Measurement of ^3H, $^{89,90}\text{Sr}$ and gamma emitters in natural samples • Measurement of ^3H, ^{55}Fe, $^{89,90}\text{Sr}$ and gamma emitters in low level liquid waste • Participation in intercomparison exercises • Monitoring of NPP • Laboratory is accredited according to ISO 17025 • Participation in CIESM MEDITERRANEAN MUSSEL WATCH (including phase II Po-210 in mussels from the Adriatic sea) • Participation in project of radioactivity monitoring of marine indicator organisms • Monitoring of radioactivity in Danube river
APPARATUS	<ul style="list-style-type: none"> • Four Ge detectors for high resolution gamma spectrometry (Canberra) • Liquid scintillation analyser Packard TRI-CARB 2770 TR/SL • 2404F AUTOMATIC α/β Low Level Counting System • iMATIC α/β Low Level Counting System • Atomic Absorption Spectrometer 3110 • Alpha spectrometry system, Canberra
KEYWORDS	environmental monitoring, determination of radionuclides ^3H , ^{55}Fe , $^{89,90}\text{Sr}$ and gamma emitters, low level measurement
RESULTS	
PUBLICATIONS (for last 3 years)	<ol style="list-style-type: none"> 1. Grahek, Željko; Rožmarić Mačefat, Martina; Lulić, Stipe, Isolation of lead from water samples and determination of ^{210}Pb // <i>Analytica Chimica Acta</i> 560 (2006) 1/2 84-93 2. Grahek, Željko; Košutić, Katarina; Rožmarić Mačefat, Martina, Strontium isolation from natural samples with Sr resin and subsequent determination of ^{90}Sr // <i>Journal of Radioanalytical and Nuclear Chemistry</i> 268 (2006) 2 179-190 3. Lovrenčić, Ivanka; Volner, Matija; Barišić, Delko; Popijač, Marina; Kezić, Nikola; Seletković, Ivan; Lulić, Stipe, Distribution of Cs-137, K-40 and Be-7 in silver fir-tree (<i>Abies alba</i> L.) from Gorski Kotar, Croatia. // <i>Journal of Radioanalytical and Nuclear Chemistry</i> 275 (2008) 1 71-79 4. Thé bault, H.; Rodriguez y Baena, A. M.; Andral, B.; Barišić, Delko; Albaladejo, J. B.; Bologa, A. S.; Boudjenoun, R.; Delfanti, R.; Egorov, V. N.; El Khoukhi, T.; Florou, H.; Kniewald, Goran; Noureddine, A.; Patrascu, V.; Pham, M. K.; Scarpato, A.; Stokozov, N. A.; Topcuoglu, S.; Warnau, M, ^{137}Cs baseline levels in the Mediterranean and Black Sea: A cross-basin survey of the CIESM Mediterranean Mussel Watch programme. // <i>Marine Pollution Bulletin</i> 57 (2008) 6-12 801-806 5. Lovrenčić, Ivanka; Barišić, Delko; Oreščanin, Višnja; Lulić, Stipe. In situ determination of radon concentration and total gamma radiation in Kastel Gomilica, Croatia // <i>Nuclear Instruments and Methods in Physics Research Section B - Beam Interactions with Materials and Atoms.</i> 263 (2007) 1 186-190 6. Vaupotič, Janja; Barišić, Delko; Kopal, Ivan; Lulić, Stipe Radioactivity and Radon potential of the terra rossa soil // <i>Radiation measurements.</i> 42 (2007) 2 290-297 7. Cuculić, Vlado; Cukrov, Neven; Barišić, Delko; Mlakar, Marina, Uranium in sediments, mussels (<i>mytilus</i> sp.) and seawater of the Krka river estuary // <i>Journal of environmental radioactivity</i> 85 (2006) 1 59-70 8. Cukrov, Neven; Barišić, Delko, Spatial Distribution of ^{40}K and ^{232}Th in Recent Sediments of the Krka River Estuary // <i>Croatica chemica acta</i> 79 (2006) 1 115-118 9. Mikac, Nevenka; Foucher, Delphine; Kwokal, Željko; Barišić, Delko, Mercury and

	<p>radionuclides in sediments of the Kaštela bay (Croatia)- Evaluation of the sediment pollution history // <i>Croatica chemica acta</i> 79 (2006) 1 85-93</p> <p>10. Oreščanin, Višnja; Lovrenčić, Ivanka; Mikelić, Luka; Barišić, Delko; Matašin, Željka; Lulić, Stipe; Pezelj, Đurđica, Biomonitoring of Heavy Metals and Arsenic on the East Coast of the Middle Adriatic Sea Using <i>Mytilus Galloprovincialis</i> // <i>Nuclear instruments & methods in physics research Section B, Beam interactions with materials and atoms</i> 245 (2006) 2 495-500</p> <p>11. Oreščanin, Višnja; Mikelić, Luka; Lovrenčić, Ivanka; Barišić, Delko; Mikulić, Nenad; Lulić, Stipe, Environmental contamination assessment of the surroundings of the ex-ferrochromium smelter Dugi Rat, Croatia // <i>Journal of Environmental Science and Health. Part A</i> 41 (2006) 11 2547-2555</p>
IN PROGRESS	<ul style="list-style-type: none"> • Development of methods for uranium and thorium isotopes determination in natural samples by ICP MS • Development of methods for ³H and ⁹⁰Sr determination in wines • Development of methods for ²¹⁰Po determination in mussels
INFORMATION SOURCE	www.irb.hr
IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Željko Grahek, zgrahek@irb.hr

LABORATORY	Laboratory for Measurements of Low-level Radioactivity Ruđer Bošković Institute, Zagreb, Croatia
NAMES	Bogomil Obelić, Nada Horvatinčić, Ines Krajcar Bronić, Jadranka Barešić, Andreja Sironić, Anita Rajtarić
ACTIVITY	<ul style="list-style-type: none"> • Radiocarbon dating of archaeological, geological and paleontological samples • Preparation of graphite targets for AMS ^{14}C measurement • Tritium activity measurements of natural waters • Use of stable (^2H, ^{13}C, ^{18}O) and natural radioactive isotopes (^3H, ^{14}C) in hydrogeological studies • Use of isotopes in paleoclimatological studies • Use of isotopes in environmental and ecological studies • Monitoring of ^{14}C in biological samples around nuclear power plant • Physico-chemical and isotopic study of processes in karst environment, particularly in carbonate sediments, and water-sediment interaction • Participation in intercomparison exercises • Participation in IAEA/WMO project: "<i>Global Network of Isotopes in Precipitation (GNIP) and Isotope Hydrology Information System (ISOHIS)</i>". Data for stations Zagreb and Ljubljana since 1976 • Participation in ICRU project "Key Data for Measurement Standards in the Dosimetry of Ionizing Radiation"
APPARATUS	<ul style="list-style-type: none"> • Vacuum line for chemical preparation of methane from water for ^3H measurement • Electrolytic enrichment line for tritium water samples • Gas proportional counter for measurement of ^3H activity • Two vacuum lines for chemical preparation of benzene for ^{14}C measurement by LSC • Vacuum line for direct absorption of CO_2 for ^{14}C measurement by LSC • <i>Quantulus 1220</i> ultra low-level liquid scintillation counter (LSC) • Vacuum line for preparation of graphite targets from both carbonates and organic samples
KEYWORDS	(anti) coincidence method, data evaluation, data measurement,, environmental monitoring, gas proportional counter, liquid scintillation, accelerator mass spectrometry, dating, low-level, radionuclides C-14, H-3
RESULTS	<p>Vacuum line for preparation of graphite targets for AMS measurement of ^{14}C activity has been validated and put into operation, and the first samples have been measured. A system for electrolytic enrichment of water with tritium has been validated. Monitoring of ^3H in precipitation and that of ^{14}C in atmospheric CO_2 and in biological samples have been continued. Results of dating (^{14}C and ^{210}Pb) of lake sediments from several lakes in the National Park Plitvice Lakes were published, together with other comprehensive isotopic and geochemical analyses of the sediments.</p> <p>We organized IAEA Regional Training Course on Dating Techniques in Archeometry (within the IAEA Regional project of Technical Cooperation RER1006 "Nuclear Techniques for the Protection of Cultural Heritage Artefacts in the Mediterranean Region"), and Workshop on AMS within the FP6 project AMS-14C "Preparation of carbon samples for ^{14}C dating by the AMS technique".</p>

<p>PUBLICATIONS in 2008 only</p>	<ol style="list-style-type: none"> 1. Horvatinčić, N; Barešić, J; Babinka, S; Obelić, B; Krajcar Bronić, I; Vreča, P; Suckow, A. Towards a deeper understanding how carbonate isotopes (^{14}C, ^{13}C, ^{18}O) reflect environmental changes: A study with recent ^{210}Pb-dated sediments of the Plitvice Lakes, Croatia. <i>Radiocarbon</i>. 50 (2008) 233-253 2. Mandić, M; Bojić, D; Roller-Lutz, Z; Lutz, HO.; Krajcar Bronić, I. Note on the spring region of Gacka River (Croatia). <i>Isotopes in Environmental and Health Studies</i>. 44 (2008) 201-208 3. Vreča, P; Krajcar Bronić, I; Leis, A; Brenčić, M. Isotopic composition of precipitation in Ljubljana (Slovenia). <i>Geologija (Ljubljana)</i>. 51 (2008) 169-182
<p>IN PROGRESS</p>	<ol style="list-style-type: none"> 4. Barešić, J; Horvatinčić, N; Vreča, P; Sironić, A. Distribution of authigenic and allogenic fraction in recent lake sediment: isotopic and chemical composition. <i>Marine and Freshwater Research</i> (2009) in press. 5. Krajcar Bronić, I; Horvatinčić, N; Barešić, J; Obelić, B. Measurement of ^{14}C Activity by Liquid Scintillation Counting. <i>Applied radiation and isotopes</i>. (2009) (in press) 6. Krajcar Bronić, I; Horvatinčić, N; Sironić, A; Obelić, B; Barešić, J; Felja, I. A new graphite preparation line for AMS ^{14}C dating in the Zagreb Radiocarbon Laboratory. <i>Nuclear Instruments and Methods in Physics Research B - Beam Interactions with Materials and Atoms</i>. (2009) in press.
<p>INFORMATION SOURCE</p>	<p>http://www.irb.hr/-ONy8/-en/str/zef/z3labs/lna/</p>
<p>IN PREPARATION</p>	
<p>OTHER RELATED PUBLICATIONS</p>	<ol style="list-style-type: none"> 1. Breznik, B; Volčanšek, A; Božnar, M Z; Mlakar, P; Krajcar Bronić, I; Obelić, B. Verification of the dispersion model by airborne carbon ^{14}C. <i>IRPA 12 - Strengthening Radiation Protection Worldwide, Proceedings</i>, Buenos Aires, Argentina : IRPA, 2008. 2. Krajcar Bronić, I; Obelić, B; Sironić, A; Barešić, J; Breznik, B. ^{14}C in biological samples and in the atmosphere around Nuclear Power Plant Krško (NEK) in Slovenia, <i>IRPA 12 - Strengthening Radiation Protection Worldwide: Abstracts</i>, Buenos Aires, Argentina : 180-180 3. Krajcar Bronić, I; Minichreiter, K. New ^{14}C dates of the oldest Early Neolithic settlements in Croatia. <i>Radiocarbon and Archaeology – 5th International Symposium, Program and Abstracts</i>. Zurich, 2008. 79.
<p>ADDRESS</p>	<p>Laboratory for Measurements of Low-level Radioactivity (Radiocarbon and Tritium Laboratory) Rudjer Bošković Institute Bijenička 54 10000 Zagreb, Croatia phone: 00385 1 4680219, or 00385 1 4571 271 fax: 00385 1 4680 239</p>
<p>CONTACT</p>	<p>Ines Krajcar Bronić, krajcar@irb.hr 00385 1 4571 271</p>

LABORATORY	Czech Metrology Institute Inspectorate for Ionizing Radiation Prague, Czech Republic	
NAMES	J. Sochorová , M.Havelka, P. Auerbach	
APPARATUS	4 π (PC) β - γ coincidence equipment 4 π (PPC)X,e- γ coincidence equipment 4 π NaI(Tl) detector 4 π LS β - γ coincidence equipment TDCR	
RESULTS	Software coincidence counting system was used for more precise setting of coincidence parameters of nuclides with complex decay scheme, eg. ^{124}Sb , ^{152}Eu . New method for preparation of ^{124}Sb sources containing HCl was developed. Routine standardization of 28 radionuclides	
PUBLICATION	M.Havelka: Radon-in-water standard	
IN PROGRESS	Standardization of ^3H for international comparison	
ADDRESS	<p>ČMI - IIZ Radiová 1 CZ-102 00 Praha 10 Czech Republic</p>	<p>tel.: +420 266020497 fax: +420 266020466 E-mail: pdryak@cmi.cz</p>
CONTACT	P. Dryák	

LABORATORY	Czech Metrology Institute Inspectorate for Ionizing Radiation Prague, Czech Republic	
NAMES	P.Dryák, P.Kovář	
APPARATUS	coaxial HPGe detectors for gamma spectrometry BEGe detector for gamma and X-ray spectrometry Si and Si(Li) detectors for alpha and beta spectrometry DSPs 9660, AIMs 556A, GENIE2000	
RESULTS	Radionuclide impurities measurement Environmental samples measurement Standards production checking (activity measurement) Verification, type testing and calibration of alpha, beta and gamma spectrometers used in the Czech Republic, Slovakia and Bulgaria Noble gases standardization Monte Carlo calculation of coaxial Ge and BEGe detectors efficiency True summing corrections calculation	
PUBLICATION	P.Kovář, P. Dryák, J. Šuráň: Calibration and verification of noble gases monitors in nuclear facilities	
IN PROGRESS	MC efficiency calculation, true summing corrections calculation	
ADDRESS	ČMI - IIZ Radiová 1 CZ-102 00 Prague 10 Czech Republic	tel.: +420 266020497 fax: +420 266020466 E-mail:pdryak@cmi.cz
CONTACT	P.Dryák	

LABORATORY	Laboratoire National Henri Becquerel, France
NAMES	M.M. Bé, V. Chisté, C. Dulieu
ACTIVITY	Evaluation of Radionuclide Decay Data
KEYWORDS	data evaluation, ^{210}Tl , ^{210}Bi , ^{210}Po , ^{252}Cf , ^{139}Ce
RESULTS	Evaluation of ^{210}Tl , ^{210}Bi , ^{210}Po , ^{252}Cf , ^{139}Ce http://www.nucleide.org/DDEP_WG/DDEPdata.htm
PUBLICATIONS	<p>Monographie BIPM-5 – Table of Radionuclides, Volume 4 Marie-Martine BÉ, Vanessa CHISTÉ, Christophe DULIEU, Edgardo BROWNE, Valery CHECHEV, Nikolay KUZMENKO, Filip G. KONDEV, Aurelian LUCA, Monica GALAN, Andrew PEARCE, Xiaolong HUANG. Table of Radionuclides, Monographie BIPM-5, vol.4, ISBN 92-822-2230-6 (Vol. 4) et ISBN 92-822-2231-4 (CD), CEA/LNE-LNHB, 91191 Gif-sur-Yvette, France and BIPM, Pavillon de Breteuil, 92312 Sèvres, France. Includes : ^{133}I, ^{133}Xe, $^{133}\text{Xe}^m$, $^{135}\text{Xe}^m$, ^{139}Ce, ^{206}Tl, ^{210}Tl, ^{210}Pb, ^{210}Bi, ^{210}Po, ^{213}Po, ^{214}Pb, ^{214}Bi, ^{214}Po, ^{217}Rn, ^{218}Po, ^{218}At, ^{218}Rn, ^{221}Fr, ^{222}Rn, ^{226}Ra, ^{227}Ac, ^{232}U, ^{236}U, ^{237}Np, ^{238}Np, ^{239}Np, ^{239}Pu, ^{239}U, ^{241}Pu, ^{246}Cm, ^{252}Cf.</p> <p>M.M. Bé, C. Dulieu, V. Chisté NUCLÉIDE-LARA, Bibliothèque des émissions alpha, X et gamma classées par ordre d'énergie croissante. Rapport CEA-R-6201</p> <p>V. Chisté, M.M. Bé, C. Dulieu Evaluation de la chaîne du radium 226. Note technique LNHB 2008/59</p>
IN PROGRESS	Evaluation of : ^{124}Sb , ^{126}Sn , ^{75}Se , ^{186}Re , ^{243}Am .
INFORMATION	Pre study of : ^{67}Cu , ^{64}Cu , ^{211}At .
OTHER RELATED PUBLICATIONS	Publication of a pocket table of radionuclides, Mini Table de Radionucléides Publisher : EDP Sciences, ISBN 978-2-86883-973-2: http://www.nucleide.org/news.htm
ADDRESS	CE Saclay LNHB – PC 111 F- 91191 Gif sur Yvette Cedex Tel : +33 1 69 08 46 41 Fax : +33 1 69 08 26 19 E-mail : mmbe@cea.fr
CONTACT	Marie-Martine Bé

LABORATORY	Laboratoire National Henri Becquerel
NAMES	C. Bobin, B. Censier, C. Thiam (post-doc), J. Bouchard.
ACTIVITY	$4\pi\beta\text{-}\gamma$ coincidence and $4\pi\gamma$ measurements
KEYWORDS	(anti) coincidence method, liquid scintillation, NaI well-type counter.
RESULTS	
PUBLICATIONS	
IN PROGRESS	<ul style="list-style-type: none"> - The implementation of a digital system dedicated to $4\pi\gamma$ NaI(Tl) well-type measurements is ongoing; the aim of this project is to replace the « analog » system (MTR2) currently in use. The digital device combines the counting and the gamma spectrum acquisition using the live time technique. The metrological validation is underway; first results are encouraging. - A project has started this year to improve the anticoincidence system in use at LNHB with digital technology; the aim of this project is to develop a digital platform that combines a liquid scintillation TDCR system or a proportional counter in the β-channel with a classical γ-channel using the live time technique. The first results obtained with the liquid scintillation part of the digital system are particularly encouraging; in short, the counting are processed as in the MAC3 module with the addition of a variable resolution time and time-to-amplitude measurements. - In order to improve the knowledge of light production in liquid scintillation counters, a stochastic modelisation based on the GEANT4 Monte Carlo code is underway. The first step of this project is to simulate Cerenkov photons produced by gamma diffusion in photomultiplier windows in a TDCR counter.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Laboratoire National Henri Becquerel CEA/Saclay – F-91191 Gif-sur-Yvette Cedex Tel: 33 1 36 08 29 64
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LABORATORY	LNE- Laboratoire National Henri Becquerel
NAMES	Carine Hamon, Laurent Ferreux, Marie-Christine Lépy
ACTIVITY	Gamma-ray spectrometry
APPARATUS	Coaxial and planar HPGe Detectors
RESULTS	Efficiency calibration of HPGe detectors within 0.5 % for point sources. Efficiency calibration for volume sources New software (ACORES) for fitting efficiency curves versus the energy taking account of correlations between input data
PUBLICATIONS	J. Plagnard, C. Hamon, M. C. Lépy, “ <i>Study of scattering effects in low-energy gamma-ray spectrometry</i> ”, Applied Radiation and Isotopes 66 (2008) 769-773 M. C. Lépy , J. Plagnard, L. Ferreux, “ <i>Measurement of ^{241}Am L X-Ray emission probabilities</i> ” Applied Radiation and Isotopes 66 (2008) 715-721
IN PROGRESS	Measurement of photon emission probabilities of ^{126}Sn and ^{126}Sb
ADDRESS	CEA-LNE/LNHB CEA-Saclay F-91191 Gif-sur-Yvette cedex, FRANCE Tel : +33.1.69.08.24.48 Fax : +33.1.69.08.26.19 E-mail : marie-christine.lepy@cea.fr
CONTACT	Marie-Christine Lépy

LABORATORY	LNE- Laboratoire National Henri Becquerel
NAMES	M. Loidl, M. Rodrigues, E. Leblanc, A. Qasimi
ACTIVITY	Development of cryogenic detectors (magnetic calorimeters) for X-ray and beta spectrometry and for activity measurement
KEYWORDS	Activity measurement, beta spectrometry, cryogenic detector, data measurement, X-ray spectrometry, ^{55}Fe , ^{63}Ni
RESULTS	First measurement of the beta spectrum of ^{63}Ni with a cryogenic detector
PUBLICATIONS	
IN PROGRESS	Development of magnetic calorimeters for low and medium energy X-ray spectrometry; improved uncertainty on activity measurement
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	<p>M. Rodrigues, M. Loidl, E. Leblanc, A. Fleischmann and C. Enss: <i>Development of metallic magnetic calorimeters for X-ray metrology applications</i>, X-Ray Spectrometry (2008) 255</p> <p>M. Loidl, E. Leblanc, M. Rodrigues, J. Bouchard, B. Censier, T. Branger and D. Lacour: <i>Metallic magnetic calorimeters for absolute activity measurement</i>, Journal of Low Temperature Physics 151 (2008) 1055</p> <p>M. Rodrigues, E. Leblanc, M. Loidl, J. Bouchard, B. Censier, A. Fleischmann, A. Burck, H. Rotzinger and C. Enss: <i>A metallic magnetic calorimeter for hard X-ray and gamma ray spectrometry</i>, Journal of Low Temperature Physics 151 (2008) 1080</p> <p>Hannes Rotzinger, Markus Linck, Andreas Burck, Matias Rodrigues, Martin Loidl, Elvire Leblanc, Loredana Gastaldo, Andreas Fleischmann and Christian Enss: <i>Beta spectrometry with magnetic calorimeters</i>, Journal of Low Temperature Physics 151 (2008) 1087</p> <p>M. Loidl, E. Leblanc, M. Rodrigues, T. Branger, D. Lacour, J. Bouchard and B. Censier: <i>Validation study of a new technique for absolute activity measurement with 4π solid angle metallic magnetic calorimeters</i>, Applied Radiation and Isotopes 66 (2008) 872</p>
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LABORATORY	LNE- Laboratoire National Henri Becquerel
NAMES	Marie-Christine Lépy, Yves Menesguen
ACTIVITY	X-ray Spectrometry
APPARATUS	Si(Li) and HPGe Detectors Tunable monochromatic X-ray source (1-20 keV) (SOLEX) Synchrotron beam line (SOLEIL)
RESULTS	Characterization of a HPGe detector by scanning the absorption edges of the detector components Measurement of linear attenuation coefficients and transmissions of different materials
PUBLICATIONS	Use of tunable monochromatic X-ray sources for metrological studies in the low-energy range at the Laboratoire National Henri Becquerel, <i>Johann Plagnard et Marie-Christine Lépy</i> , Proceedings of the International Conference on Nuclear Data for Science and Technology 2007, 433-436. Accurate efficiency calibration of a low-energy HPGe detector using a monochromatic x-ray source <i>Johann Plagnard, Christophe Bobin et Marie-Christine Lépy</i> X-Ray Spectrometry, 36 (2007) 191-198.
IN PROGRESS	Characterization of a reference detector for semiconductor detectors efficiency calibration using a tuneable monochromatic X-Ray source Characterization of the metrology beam line at the SOLEIL synchrotron facility
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CONTACT	Marie-Christine Lépy

LABORATORY	DRT/LIST/DETECS/LNE-LNHB
NAMES	BRANGER T. ; LE GARRERES I. ; MORELLI S. ; LACOUR D.
ACTIVITY	Metrology in the field of radioactivity
KEYWORDS	Radiochemistry, source preparation
RESULTS	<p>A comparative study between two drying techniques for the preparation of solid sources has been undertaken in LNE-LNHB: freeze-drying and evaporation using hot dry nitrogen. The radionuclide used for this comparison was ^{51}Cr. In order to characterize the influence of self-absorption as function of the deposited mass, coincidence and photon spectrometry measurements were performed.</p> <p>In the case of the photon spectrometry measurements, no significant difference between the two drying techniques was observed; it should be noted that additional measurements of sources dried under atmospheric pressure gave significantly lower values. Moreover, the fact that no correlation arises depending on the deposited masses is particularly interesting. Because freeze-drying is time-consuming, the system using hot dry nitrogen seems to be better-suited for the preparation of dry sources for photon spectrometry measurements.</p> <p>By coincidence measurements, a large variability was observed. As expected, when a proportional counter is used, the results confirmed that detection efficiencies for electrons are very sensitive to self-absorption and radioactive homogeneity defects. When comparing the two drying techniques, higher detection efficiencies have been obtained with freeze-dried sources (for masses above 12 mg). Nevertheless, we cannot draw definitive conclusions because unexpected homogeneity defects were encountered on the sources dried with hot-nitrogen jets.</p> <p>In this comparative study, encouraging results were obtained. However, they have to be confirmed or even improved with additional experiments.</p>
PUBLICATIONS	<p>T. Branger, C. Bobin, M.-G. Iroulart, M.-C. Lépy, I. Le Garrères, S. Morelli, D. Lacour, J. Plagnard, 2008, Comparative study of two drying techniques used in radioactive source preparation : Freeze-drying and evaporation using hot dry nitrogen jets, Appl. Radiat. Isot. 66, 685-690</p> <p>M. Loidl, E. Leblanc, M. Rodrigues, T. Branger, D. Lacour, J. Bouchard, B. Censier, 2008, Valisation study of a new technique for absolute activity measurement with 4π solid angle metallic magnetic calorimeters, Appl. Radiat. Isot. 66, 872-876</p>
IN PROGRESS	-
INFORMATION	-
SOURCE IN PREPARATION	-
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LABORATORY	LNE- Laboratoire National Henri Becquerel
NAMES	G. Moutard, L. Ferreux
ACTIVITY	Organisation of national and international interlaboratory comparisons in the field of activity measurements. Low-level activity measurement
APPARATUS	Calibrated HPGe, NaI(Tl), Liquid scintillation counters, Well-type ionisation chamber with standard electronics. HPGe detector with anti-cosmic system
RESULTS	Characterization of technically enhanced naturally occurring radionuclides (TENORM) in phosphogypsum (IAEA intercomparison), <i>L. Ferreux, G. Moutard, T. Branger</i> , To be published in the proceedings of ICRM-LL08 meeting
IN PROGRESS	An opened intercomparison program is proposed every year by LNE-LNHB. The intercomparison program for 2009 is: <ul style="list-style-type: none"> - Mass activity measurement of mixtures of gamma emitting radionuclides and ^3H with low activity (about 1 Bq.g^{-1}, and 0.1 Bq.g^{-1}, respectively) - Mass activity measurement of mixtures of gamma emitting radionuclides and ^3H with high activity (about 20 kBq.g^{-1}, and 10 kBq.g^{-1}, respectively) - Activity measurement of aerosol filters (^{90}Sr, ^{90}Y and ^{239}Pu) with about 10 Bq per radionuclides.
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LABORATORY	Laboratoire National Henri Becquerel
NAMES	P. Cassette, F. Jaubert, I. Tartès
ACTIVITY	Liquid Scintillation Counting
KEYWORDS	Liquid scintillation
APPARATUS	Triple coincidence counters with Compton spectrometers Commercial LS counters
RESULTS	Development of TDCR and tracer LS methods
PUBLICATIONS	<p>P. Cassette and Phuc Do. The Compton Source Efficiency Tracing method in Liquid Scintillation Counting, a new standardization method using a TDCR counter with a Compton spectrometer. <i>Applied radiation and Isotopes</i>, Vol. 66, Issues 6-7, June-July 2008, p 1026-1032.</p> <p>C. Ivan, P. Cassette, Maria Sahagia. A new TDCR-LS Counter using Channel Photomultiplier tubes. <i>Applied radiation and Isotopes</i>, Vol. 66, Issues 6-7, June-July 2008, p 1006-1011.</p>
IN PROGRESS	Development of a new TDCR counter with Compton spectrometer using CPM and data acquisition based on FPGA.
ADDRESS	DRT/DETECS/LNHB CEA-Saclay F-91191 Gif-sur-Yvette cedex, France Tel : 33 1 69 08 48 68 Fax : 33 1 69 08 26 19 E-mail : Philippe.cassette@cea.fr
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LABORATORY	Laboratoire National Henri Becquerel
NAMES	P. Cassette, F. Jaubert
ACTIVITY	Radon standardization
KEYWORDS	Radon
APPARATUS	Cryogenic defined solid angle alpha spectrometer
RESULTS	Standardization of ^{222}Rn
PUBLICATIONS	P. Cassette, M. Sahagia, L. Grigorescu, M.C. Lépy and J.L. Picolo. Standardization of ^{222}Rn by LSC and comparison with α - and γ -spectrometry. <i>Applied Radiation and Isotopes</i> . Vol. 64, 10-11. p 1465-1470.
IN PROGRESS	Measurement of ^{220}Rn
ADDRESS	DRT/DETECS/LNHB CEA-Saclay F-91191 Gif-sur-Yvette cedex, France Tel : 33 1 69 08 48 68 Fax : 33 1 69 08 26 19 E-mail : Philippe.cassette@cea.fr
CONTACT	Philippe Cassette

LABORATORY	Laboratoire Nationl Henri Becquerel
NAMES	P. Cassette, M. H. Ha-Thi
ACTIVITY	Development and characterization of liquid scintillators
KEYWORDS	Liquid scintillator, nanoparticles
APPARATUS	Monochromatic X-ray source with detector and liquid sample holder Compton spectrometer coupled with a TDCR LS counter
RESULTS	Development of liquid scintillators based on fluorescent nanoparticles Measurement of the response of scintillators in the 1-10 keV energy range
PUBLICATIONS	
IN PROGRESS	Test of different fluorescent nanoparticles for the development of new liquid scintillators: CdTe quantum dots, oxide nanoparticles Characterisation of commercial and locally developed LS cocktails
ADDRESS	DRT/DETECS/LNHB CEA-Saclay F-91191 Gif-sur-Yvette cedex, France Tel : 33 1 69 08 48 68 Fax : 33 1 69 08 26 19 E-mail : Philippe.cassette@cea.fr
CONTACT	Philippe Cassette

LABORATORY	Laboratoire National Henri Becquerel
NAMES	J.Plagnard, M.Rosenzweig
APPARATUS ACTIVITY	Absolute activity measurement of radioactive gas
PUBLICATIONS	---
IN PROGRESS	<ul style="list-style-type: none">- Modernization of the measurement system composed by tree differential proportional counters.- Development of a specific Labview application to control the measurement process.
ADDRESS	Laboratoire National Henri Becquerel CEA/Saclay F-91191 Gif-sur-Yvette Cedex, France Tel.: 33 1 69 08 41 78
CONTACT	Johann Plagnard e-mail: johann.plagnard@cea.fr

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Karsten Kossert
ACTIVITY	Improvement of methods to calculate the counting efficiency in liquid scintillation counting (CIEMAT/NIST and TDCR), in particular for electron-capture nuclides; Activity standardizations (e.g. Ga-68, Cu-64, H-3) and half-life measurements of long-lived isotopes (Be-10, Ca-41, Sm-147, Lu-176)
KEYWORDS	CIEMAT/NIST, TDCR, electron-capture nuclides, LS spectrometry, half-lives
RESULTS	
PUBLICATIONS	Grau Carles, A., Kossert, K.: Monte Carlo simulation of Auger electron spectra. ARI 67 (2009) 192-196. Kossert, K., Jörg, G., Lierse v. Gostomski Ch.: Activity standardization of ⁴¹ Ca by means of liquid scintillation counting. Radiochimica Acta 97 (2009) 1-8.
IN PROGRESS	Measurement of the half-lives of Lu-176; Activity standardization of emerging nuclides for nuclear medicine
INFORMATION	
SOURCE IN PREPARATION	Kossert, K., Jörg, G., Nähle, O., Lierse v. Gostomski, Ch.: High precision measurement of the half-life of ¹⁴⁷ Sm. In preparation. Chmeleff, J., v. Blanckenburg, F., Kossert, K., Jakob, D.: Determination of the ¹⁰ Be half-life by multicollector ICP-MS and liquid scintillation counting. To be submitted.
OTHER RELATED PUBLICATIONS	Vidmar, T., Kossert, K., Nähle, O.J., Ott. O.: Application of the sum peak method to activity standardizations of extended ⁶⁰ Co sources. ARI 67 (2009) 160-163
ADDRESS	Physikalisch-Technische-Bundesanstalt Department 6.1 Bundesallee 100 D-38116 Braunschweig Germany Tel. ++49-531-592-6110 Fax. ++49-531-592-6305 E-mail: Karsten.Kossert@ptb.de
CONTACT	Karsten Kossert

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Ole Naehle
ACTIVITY	4 π β - γ -coincidence counting Liquid Scintillation Counting TDCR Calibration of large area reference sources (α -, β - and γ -emitters)
KEYWORDS	(anti) coincidence method, data measurement, gas proportional counter, liquid scintillation, NaI well-type counter, SIR, TDCR, large area sources, Cu-64
RESULTS	Activity standardization of Ce-139, Y-88, Cu-64
PUBLICATIONS	<i>Nähle, Ole; Kossert, K.; Klein, R.:</i> Activity Standardization of ²²Na. Applied Radiation and Isotopes 66 (2008) 865-871. <i>Vidmar, T.; Kossert, K.; Nähle, O.; Ott, O.:</i> Application of the sum-peak method to activity standardizations of extended ⁶⁰Co sources. Applied Radiation and Isotopes 67 (2009) 160-163. <i>Nähle, Ole; Kossert, K.; Brunzendorf, J.:</i> Study of Light Emission Processes for the Design of Liquid Scintillation Counters. Accepted for publication in Radiocarbon. <i>Kossert, K.; Ott, O.; Nähle, Ole:</i> Improved techniques for the activity standardization of ¹⁰⁹Cd by means of liquid scintillation spectrometry. Accepted for publication in Radiocarbon.
IN PROGRESS	Design of a TDCR automated source sampler Setup of a detector system to characterize large area reference sources Activity standardization of radioisotopes for medical applications
INFORMATION	
SOURCE IN PREPARATION	Application of the new TDCR system at PTB for the activity standardization of H-3 Source preparation and activity standardization of Sb-124
OTHER RELATED PUBLICATIONS	
ADDRESS	Physikalisch-Technische-Bundesanstalt Department 6.1 Bundesallee 100 D-38116 Braunschweig Germany Tel. ++49-531-592-6322 Fax. ++49-531-592-6305 E-mail: Ole.J.Naehle@ptb.de
CONTACT	Ole Naehle

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Oliver Ott
ACTIVITY	Determination of the gamma emission probabilities of ^{124}Sb (Euromet project 907) and of the alpha emission probabilities of ^{240}Pu (Euromet project 749); determination of emission probabilities of short-lived nuclides like ^{64}Cu
KEYWORDS	decay data measurements, Euromet, gamma-ray spectrometry, Sb-124, Cu-64, alpha spectrometry, Pu-240
RESULTS	gamma emission probabilities for ^{124}Sb
PUBLICATIONS	
IN PROGRESS	measurements on ^{64}Cu and other radionuclides, in particular for nuclear medicine
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Physikalisch-Technische-Bundesanstalt Department 6.1 Bundesallee 100 D-38116 Braunschweig Germany Tel. ++49-531-592-6312 Fax. ++49-531-592-6305 E-mail: Oliver.Ott@ptb.de
CONTACT	O. Ott

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Dr. Annette Röttger, Anja Honig
ACTIVITY	Radon measuring technique: Radon-220 (Thoron) progeny reference chamber and mixed atmosphere reference chamber (Radon-222, Radon-220 and their progenies) of the PTB. Production and measurement of reference atmospheres. Online α -spectrometry and offline simultaneous $\alpha\gamma$ -spectrometry.
KEYWORDS	Rn-220, Rn-222, Alpha and Gamma spectrometry, radioactive gas
RESULTS	Reference atmospheres for Rn-220, Rn-222 and their progenies. Calibration service.
PUBLICATIONS	Annette Röttger, Anja Honig and Dirk Arnold : The German thoron progeny chamber - concept and application. In print. ARI 2009.
IN PROGRESS	Reference atmospheres for Rn-220 (primary standard). Reference atmospheres for Rn-220 and Rn-220/Rn-222 mixtures with reduced uncertainties.
INFORMATION	BMU-Project: Generation and characterisation of reference atmospheres of thoron decay products for the calibration of measuring devices for thoron decay products (St.Sch.-Nr. 4453 by BMU/BfS) http://www.ptb.de/de/org/6/61/613/index.htm
SOURCE IN PREPARATION	Low level Rn-222 reference atmospheres.
OTHER RELATED PUBLICATIONS	http://www.ptb.de/de/org/6/61/613/index.htm
ADDRESS	Physikalisch-Technische-Bundesanstalt Department 6.1 Bundesallee 100 D-38116 Braunschweig Germany Tel. ++49-531-592-6104 Fax. ++49-531-592-8525 E-mail: Annette.Roettger@ptb.de
CONTACT	Annette Röttger

LABORATORY	Bhabha Atomic Research Centre, India
NAMES	Leena Joseph, Anuradha Ravindra, D.B. Kulkarni
ACTIVITY	<ol style="list-style-type: none"> 1. Participation in international intercomparisons 2. Absolute activity measurements 3. Audit program of activity measurements in nuclear medicine centres
APPARATUS	<ol style="list-style-type: none"> 1. 4π β(PC)- γ(NaI) coincidence system. 2. Calibrated 4π Gamma ion chamber. 3. HPGe detector assembly for gamma ray spectrometer. 4. Dose Calibrator, CRC –15 Beta (Capintec Make)
KEYWORDS	APMP, I-131, Tc-99m , Co-57, audit, dose calibrator
RESULTS	<ol style="list-style-type: none"> 1. Conducted national audit for I-131 activity measurements with dose calibrators among 65 nuclear medicine centres (NMC) in the country 2. Conducted audit for Tc-99m activity measurements among seven NMCs in the country 3. Standardized Co-57 solution under IAEA's CRP 4. Calibrated radioactive sources for users
PUBLICATIONS	<ol style="list-style-type: none"> 1. Quality audit programme for ^{99m}Tc and ^{131}I radioactivity measurements with radionuclide calibrators; Leena Joseph, R. Anuradha, D.B. Kulkarni; Applied Radiation and Isotopes 66 (2008) 994 -997 2. Standardization of Silver-110m at BARC, India; Leena Joseph, R. Anuradha, D.B. Kulkarni and V.V. Shaha; MAPAN – Journal of Metrology Society of India, Vol. 22, No. 4, 2007; pp. 225-229 3. International intercomparison of ^{131}I activity measurements, Anuradha R., Leena Joseph, D.B. Kulkarni, Suresh Rao and D.N. Sharma, Journal of Medical Physics, vol. 32/suppl/2007, pg S22 4. Standardization of ^{134}Cs , Leena Joseph, Anuradha R., Kulkarni D.B., presented at National Symposium on Radiation Physics (NSRP-17) at Kolkata during November 14-16, 2007
IN PROGRESS	<ol style="list-style-type: none"> 1. Standardization of ^{131}I under APMP programme 2. Analysis of I-131 audit results 3. Calibration of sources for users.
INFORMATION	
ADDRESS	<p>Head , Radiation Standards Section, Radiation Safety Systems Division, BARC, Mumbai - 400 085, India Telephone : 25595075 Telefax : 0091(22) 5505151,5519613 E-mail : leena@barc.gov.in</p>
CONTACT	Leena Joseph

LABORATORY	ENEA - Istituto Nazionale di Metrologia delle Radiazioni Ionizzanti – Italy (INMRI)
NAMES	M. Capogni, L. Cozzella, P. De Felice, A. Fazio
ACTIVITY	Participation of the ENEA in the SIR for ^{18}F
KEYWORDS	SIR (International Reference System)
RESULTS	Liquid Scintillation counting system and well-type Ionisation chamber. ^{18}F activity measurements to link the ENEA to the SIR
PUBLICATIONS	M. Capogni, P. De Felice, A. Fazio, F. Simonelli, V. D’Ursi, A. Pecorale, C. Giliberti and K. Abbas “Development of a Primary Standard for Calibration of [^{18}F]FDG Activity Measurement Systems” - Institute of Physics Publishing Journal of Physics: Conference Series 41 (2006) 506-513 doi:10.1088/1742-6596/41/1/057
IN PROGRESS	Preliminary contacts with the BIPM has been established to identify the technical details of the operation
ADDRESS	ENEA Istituto Nazionale di Metrologia delle Radiazioni Ionizzanti Centro Ricerche Casaccia P.O.Box 2400 - Roma (Italy) Phone: +39 06 3048 6628 Fax: +39 06 3048 4650 marco.capogni@casaccia.enea.it
CONTACT	M. Capogni

LABORATORY	ENEA - Istituto Nazionale di Metrologia delle Radiazioni Ionizzanti – Italy (INMRI).
NAMES	M. Capogni, L. Cozzella, P. De Felice, A. Fazio
ACTIVITY	¹⁷⁷ Lu activity comparison
KEYWORDS	CCRI(II) Key-Comparison
RESULTS	Liquid Scintillation counting system, 4πβ-γ coincidence system, HPGe γ-ray spectrometer and well-type Ionisation chamber. CIEMAT/NIST and 4πβ -γ coincidence counting methods; γ-ray spectrometric analysis techniques. ¹⁷⁷ Lu activity measurements in the frame of an international comparison organised by NIST under the auspices of BIPM.
PUBLICATIONS	Sahagia M., Ivan C., Grigorescu E. L., Capogni M., De Felice P., Fazio A., “Standardisation of ⁶⁵ Zn by 4πβ(PC)-γ coincidence counting method with efficiency extrapolation” – Applied Radiation and Isotopes V. 60- Issue 2-4 February April 2004 – pp 423 427. Capogni M., De Felice P. Fazio A., Latini F., Abbas K., “Development of a primary standard for calibration of ⁶⁴ Cu activity measurement systems” – Applied Radiation and Isotopes V. 66- Issue 6-7 June 2008 – pp 948 953.
IN PROGRESS	Contact with the NIST to receive the ¹⁷⁷ Lu ampoule.
ADDRESS	ENEA Istituto Nazionale di Metrologia delle Radiazioni Ionizzanti Centro Ricerche Casaccia P.O.Box 2400 - Roma (Italy) Phone: +39 06 3048 6628 Fax: +39 06 3048 4650 marco.capogni@casaccia.enea.it
CONTACT	M. Capogni

LABORATORY	National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology (NMIJ/AIST)
NAMES	Yoshio HINO, Akira YUNOKI, Yasushi SATO and Yasuhiro UNNO
ACTIVITY	Calibrations of activity by using the following apparatus; $4\pi\beta(\text{pc})-\gamma(\text{NaI})$ and $4\pi\beta(\text{ppc})-\gamma(\text{Ge})$ coincidence systems, Calibrated $4\pi\gamma$ ionisation chamber, HP-Ge and Si(Li) detectors, Liquid scintillation system, NaI(Tl) well-type counter, PIPS for α counting and 2π multi wire chamber.
KEYWORDS	remote calibration, coincidence method, data measurement, define solid angle measurement, gamma-ray spectrometry, gas proportional counter, ionisation chamber, liquid scintillation, NaI(Tl) well-type counter, radioactive gas, simulation code, SIR, source preparation, traceability
RESULTS	(1) A remote calibration service of activity measurement instruments was authorized by the government. (2) The NMIJ participated in the following international comparisons of activity measurements; Bilateral base comparison with BARC of P-32, APMP.RI(II)-K2.Ba-133 and CCRI(II)-K2.Kr-85.
PUBLICATIONS	(1) Y. Sato, T. Yamada, H. Hata, K. Moriyama, A. Yunoki and Y. Hino, "The detection efficiency variation method for $4\pi\beta-\gamma$ coincidence counting using an ink-jet printer", Applied Rad. and Isotopes 66 (2008) 691-693. (2) A. Yunoki, T. Yamada, Y. Sato, Y. Kawada and Y. Hino, "Calibration of ^{55}Fe activity with a lithium drifted silicon detector", Applied Rad. and Isotopes 66 (2008) 756-759.
IN PROGRESS	(1) Test of a remote calibration system using IC tags (RFID) to keep a high quality of calibration at a user's facility. (2) Surface contamination monitor for large-area floor by using IP (imaging plate) and sources of various surface emission rates. (3) Air kerma strength standards for brachytherapy sources.
INFORMATION	--
SOURCE IN PREPARATION	Area sources printed on aluminium plates by an ink jet printer with wide-range surface emission rate.
OTHER RELATED PUBLICATIONS	--
ADDRESS	Radioactivity and Neutron Section, Quantum Radiation Division, National Metrology Institute of Japan. Central2,1-1-1 Umezono Tsukuba, Ibaraki 305-8568, JAPAN.
CONTACT	Akira Yunoki (e-mail: a.yunoki@aist.go.jp)

LABORATORY	Laboratory of Radioactivity Standards, Radioisotope Centre POLATOM, Institute of Atomic Energy
NAMES	Ryszard BRODA
ACTIVITY	Technical expert during 7 accreditation audits of calibration laboratories in Poland. Participation in 11 th Conference of the Polish Society of Nuclear Medicine and in the BIPM Workshop 2 on CCRI(II) Activity Uncertainties and Comparisons.
KEYWORDS	coincidence method, liquid scintillation, SIR, H-3
RESULTS	H-3 solution measurement by the TDCR method: the Polya model, estimated uncertainty $\pm 0.5\%$, frosted vials (better fit of the set of counting points, but the obtained activity was nearly the same as with normal vials)
PUBLICATIONS	R. Broda. Some remarks on photon statistics in the LS-counter. Appl. Radiat. Isot., 66, (2008) 1062-1066
IN PROGRESS	Participation in the H-3 and Lu-177 intercomparison. Improvement of the quality management system in the laboratory.
INFORMATION	Laboratory of Radioactivity Standards, RC POLATOM, IAE, was accredited in 2008 by the Polish Centre for Accreditation
SOURCE IN PREPARATION	R. Broda, T. Dziel, A. Muklanowicz, A. Listkowska, Ł. Pieńkowski, A. Patocka, E. Kołakowska. Intercomparison of ^{99m} Tc and ¹³¹ I in Polish hospitals, 2007. (paper for the ICRM2009).
ADDRESS	Radioisotope Centre POLATOM, Institute of Atomic Energy, 05-400 Otwock-Świerk, Poland, e-mail: r.broda@polatom.pl tel.: (48 22) 718 07 21 fax: (+48 22) 718 03 50
CONTACT	Ryszard Broda

LABORATORY	Institutul National de C&D pentru Fizica si Inginerie Nucleara « Horia Hulubei » (IFIN-HH) Radionuclide Metrology Laboratory (LMR)
NAMES	Aurelian Luca
ACTIVITY	Evaluation of nuclear decay data.
KEYWORDS	Data evaluation, ^{236}U , ^{234}Th , ^{228}Ra , ^{64}Cu , ^{211}Bi , ^{211}Po
RESULTS	-Evaluation of the nuclear decay data for ^{236}U (published in Monographie BIPM-5), in the frame of the IAEA CRP "Updated decay data library for actinides" -Organization and participation (one paper presented) at the 2 nd Workshop for Radioactive Decay Data Evaluators: Training sessions of the Decay Data Evaluation Project (DDEP-2008), 12-14 May 2008, Bucharest, Romania. -Participation at the 3 rd Research Coordination Meeting of the IAEA CRP "Updated decay data library for actinides", 8-10 October 2008, IAEA, Vienna, Austria. -Participation at the IAEA Technical Meeting on "Reference data libraries for advanced nuclear applications", 10-11 November 2008, IAEA, Vienna, Austria.
PUBLICATIONS	M.-M. Bé, V. Chisté, C. Duliéu, E. Browne, V. Chechev, N. Kuzmenko, F. Kondev, A. Luca, M. Galan, A. Pearce and X. Huang – Monographie BIPM-5. Table of Radionuclides (Vol. 4 – A = 133 to 252), Bureau International des Poids et Mesures, Sèvres, France, pages 177-182, 2008.
IN PROGRESS	-Evaluation of the nuclear decay data for ^{234}Th and ^{228}Ra , in the frame of the IAEA CRP "Updated decay data library for actinides". -Organization and participation at the Workshop for Nuclear Structure and Decay Data Evaluators (ENSDF-2009), 30 March – 3 April 2009, IFIN-HH, Bucharest-Magurele, Romania. -Participation at the EURAMET TC-IR Project (proposed), ref. 1085: Standardization, decay data measurements and evaluation of ^{64}Cu .
INFORMATION	http://www.nipne.ro/ddep2008/ (information about the DDEP-2008 Workshop); http://tandem.nipne.ro/~workshop_ensdf/ (ENSDF-2009 Workshop).
SOURCE IN PREPARATION	Evaluation of the nuclear decay data for ^{211}Bi and ^{211}Po , in the frame of the IAEA CRP "Updated decay data library for actinides".
OTHER RELATED PUBLICATIONS	
ADDRESS	IFIN-HH / LMR, 407 Atomistilor St., Magurele, Ilfov County, PO Box MG-6, Postcode 077125, Romania; phone: +40 21 4046163; Fax: +40 21 4574440; e-mail: aluca@ifin.nipne.ro
CONTACT	Dr. Aurelian Luca

LABORATORY	Institutul National de C&D pentru Fizica si Inginerie Nucleara "Horia Hulubei" ("Horia Hulubei" National Institute of R&D for Physics and Nuclear Engineering) IFIN-HH Radionuclide Metrology Laboratory
NAMES	M.Sahagia, A.C.Razdolescu, C.Ivan
ACTIVITY	^{57}Co , ^{137}Cs (BIPM,RI(II)- K1 Comparison) ^{57}Co (IAEA, CCRI(II)-S6 Comparison). Final audit of Radionuclide Metrology Laboratory for obtaining Accreditation
KEYWORDS	Coincidence method , SIR, Supplementary Key comparison Radionuclide by name (Co-57, Cs-137)
RESULTS	Under evaluation at BIPM and IAEA
PUBLICATIONS	M.Sahagia, A.C.Razdolescu, A.Luca, C.Ivan "Assurance of the traceability chain for I-131 measurement" Appl. Radiat. Isot. 6,4(2008)539-544 M. Sahagia, C. Ivan, E.L.Grigorescu, Anamaria Cristina Razdolescu "Standardization of ^{125}I by the Coincidence Method and Practical Applications" Appl. Radiat. Isot., 66,6-7(2008)895-899
IN PROGRESS	-Implementation of software for collection and processing of data in the new coincidence system -Participation at the 17 th International Conference on Radionuclide Metrology and its Applications (ICRM 2009), 7-11 September 2009, Bratislava, Slovak Republic.
INFORMATION	
SOURCE IN PREPARATION	Participation at the 17 th International Conference on Radionuclide Metrology and its Applications (ICRM 2009), 7-11 September 2009, Bratislava, Slovak Republic.
OTHER RELATED PUBLICATIONS	M. Woods, M.Sahagia "The international framework for maintaining equivalence and traceability in radionuclide metrology", AIP Conf.Proc 1036, 2008, pp.5-11 M.Sahagia, M.Woods "The national dissemination of international measurements" AIP Conf Proc 1036, 2008. pp.12-25 Maria Sahagia » Main research area and international activities of the Radionuclide Metrology Laboratory from IFIN-HH » 2 nd Workshop for Radioactive Decay Data Evaluators: Training sessions of the Decay Data Evaluation Project (DDEP-2008), 12-14 May 2008, Bucharest, Romania
ADDRESS	Atomistilor Str.407, Magurele, Ilfov County, POB. MG 6, Code 077125, Romania Tel +40214046163, Fax +40214574432, +40214574440, E-mail<msahagia@nipne.ro>
CONTACT	Dr. Maria Sahagia

LABORATORY	Institutul National de C&D pentru Fizica si Inginerie Nucleara “Horia Hulubei” (“Horia Hulubei” National Institute of R&D for Physics and Nuclear Engineering) IFIN-HH Radionuclide Metrology Laboratory
NAMES	A.C.Wätjen, C.Ivan, P. Cassette, M. Sahagia
ACTIVITY	²²² Rn standardization by LSC Construction of a new LSC-TDCR system, with 6 Channel Photomultipliers (CPM) Final audit of Radionuclide Metrology Laboratory for obtaining Accreditation
KEYWORDS	LSC-TDCR, CPM, CCRI(II)-K2.H3 Radionuclide by name (Rn-222, H-3)
RESULTS	Rn-222, adsorbed in liquid scintillator, was standardized and dead time corrections applied. CPM based LSC-TDCR was set and first tests were done. A new optical chamber was constructed
PUBLICATIONS	C. Ivan, P. Cassette, M. Sahagia “A new TDCR-LS Counter using Channel Photomultiplier tubes “ Appl. Radiat. Isot. 66, 6-7 (2008)1006-1011 A.C.Razdolescu, P.Cassette, M.Sahagia “Measurement of Fe-55 solution activity by LSC-TDCR method” Appl. Radiat. Isot. 66, 6-7 (2008)750-755
IN PROGRESS	Standardization of H-3 by LSC-TDCR and participation at the CCRI(II)-K2.H3 key comparison Complete characterization of the CPM- LSC-TDCR system
INFORMATION	
SOURCE IN PREPARATION	Participation at the 17 th International Conference on Radionuclide Metrology and its Applications (ICRM 2009), 7-11 September 2009, Bratislava, Slovak Republic.
OTHER RELATED PUBLICATIONS	
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CONTACT	Anamaria Cristina Wätjen

LABORATORY	Institutul National de C&D pentru Fizica si Inginerie Nucleara « Horia Hulubei » (IFIN-HH) Radionuclide Metrology Laboratory (LMR)
NAMES	Aurelian Luca, Constantin Ivan, Andrei Antohe
ACTIVITY	Gamma-ray spectrometry
KEYWORDS	Data measurement, environmental control, Euromet, gamma-ray spectrometry, low-level, simulation code, ^{124}Sb , ^{222}Rn , ^{64}Cu .
RESULTS	<ul style="list-style-type: none"> -Participation at the EUROMET Project 907: “^{124}Sb- Determination of photon emission intensities”. -Installation and testing of a composed shield (lead, tin, copper) for the new HP Ge detector included in the gamma-ray spectrometry system. -Energy and efficiency calibrations of the new gamma-ray spectrometry system. -Participation (two papers presented) at the 5th International Conference on Radionuclide Metrology Low-level Radioactivity Measurements Techniques (ICRM-LLRMT’08), 22-26 September 2008, Braunschweig, Germany. -Participation at the NPL Environmental Radioactivity Proficiency Test Exercise 2008 (activity measurements for concrete and aqueous samples).
PUBLICATIONS	A. Luca, Experimental determination of the uranium enrichment, Romanian Journal of Physics, vol. 53, nos. 1-2, pages 35-39, Bucharest, 2008.
IN PROGRESS	<ul style="list-style-type: none"> -Standardization of ^{222}Rn (glass vials with gas and liquid scintillator) by using gamma-ray spectrometry. -Implementation and testing of the GESPECOR ver.4.0 software (Monte Carlo simulation code for true coincidence summing corrections and efficiency transfer in gamma-ray spectrometry). -Participation at the EURAMET TC-IR Project (proposed), ref. 1085: Standardization, decay data measurements and evaluation of ^{64}Cu.
INFORMATION	
SOURCE IN PREPARATION	<ul style="list-style-type: none"> -Participation at the Workshop of the ICRM Gamma-ray spectrometry Working Group, 23-24 February 2009, Laboratoire National d’Essais (LNE), Paris, France. -Participation at the 17th International Conference on Radionuclide Metrology and its Applications (ICRM 2009), 7-11 September 2009, Bratislava, Slovak Republic.
OTHER RELATED PUBLICATIONS	
ADDRESS	IFIN-HH / LMR, 407 Atomistilor St., Magurele, Ilfov County, PO Box MG-6, Postcode 077125, Romania; phone: +40 21 4046163; Fax: +40 21 4574440; e-mail: aluca@ifin.nipne.ro
CONTACT	Dr. Aurelian Luca

LABORATORY	D.I. Mendeleev Institute for Metrology (VNIIM)
NAMES	I.A. Kharitonov, N.I. Karmalitsyn A.V. Zanevsky, S.V. Sepman, E.E. Terechtchenko, I.A. Sokolova, V.N. Motornaya, T.I. Shilnikova
ACTIVITY	Standardization of radionuclide solutions, point, surface and volume reference sources. $4\pi\beta(\text{PC})-\gamma(\text{NaI}(\text{Tl}))$ and $\text{KX}(0.1\text{mm NaI}(\text{Tl}))-\gamma(\text{NaI}(\text{Tl}))$ -coincidence counting systems, $4\pi\beta(\text{PC})$ - and $4\pi\alpha(\text{PC})$ -counting system, $4\pi\gamma(\text{NaI}(\text{Tl}))$ -counting system, Defined solid angle α -counting system, calibrated gamma- and X-ray spectrometers.
KEYWORDS	coincidence method, define solid angle (ASD) measurement, gamma-ray spectrometry, gas proportional counter
RESULTS	Calibration of radionuclides in solution: Na-24, Sr-90, T-3, Co-57, Cs-137, Ba-133, pilot lab of COOMET key comparison Cs-137, development of 4π -gamma method for Eu-152
PUBLICATIONS	I.A.Kharitonov, A.V.Zanevsky, V.Milevski, A.Ivaniukovich, P.Oropesa Verdecia, Y.Moreno León and A.Svec "Measurement of activity concentration of radionuclide Cs-137 in a solution (COOMET Project no 386/RU/06)" Metrologia, 2008, 45, Tech. Suppl., 06005
IN PROGRESS	Carrying out the COOMET.RI(II)-K2.Eu-152 key comparison of activity concentration measurements of ^{152}Eu
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	VNIIM, 19 Moskovsky pr., St. Petersburg 198005, Russia Phone: (812) 323-96-12 Fax: (812) 113-01-14 E-mail: info2101@vniim.ru http://www.vniim.ru/
CONTACT	I.A. Kharitonov

LABORATORY	Slovak Institute of Metrology
NAMES	Jozef Dobrovodský, Robert Hinca, Ivana Praženicová, Anton Švec
ACTIVITY	Calibrations of ionization chambers, large area sources and contamination monitors, gamma-ray spectrometry, illicit traffic radiation monitors, releases of contaminated materials and effluents into environment
KEYWORDS	Large area alpha and beta source measurements, environmental control, EURAMET, gamma-ray spectrometry, ionisation chamber, life sciences, liquid scintillation, SIR
RESULTS	Efficiency curves of ionization chambers, HPGe detectors, large area alpha and beta radiation detectors, testing of radiation monitors
PUBLICATIONS	Švec A.: Analytical efficiency curve for coaxial germanium detectors. Applied Rad.Isot. 66 (2008) 786-791 Švec A.: Interpretation of ionization chamber efficiency curves. Metrologia 46 (2009) 43-46
IN PROGRESS	Liquid scintillation counter purchase and the method introduction
INFORMATION	Next ICRM Conference and General Meeting will be held in September 7-11, 2009 at SMU in Bratislava, Slovak Republic
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	Švec A.: Testing and performance evaluation of illicit trafficking radioactivity detectors. Proceedings of the NATO Advanced Training Course, Mugla, Turkey, May 26-30, 2008 Kharitonov I.A., Zanevsky A.V., Milevski V., Ivaniukovich A., Oropesa Verdecia P., Moreno León Y., Švec A.: Measurement of activity concentration of radionuclide Cs-137 in a solution (COOMET Project no 386/RU/06). Metrologia 45 Technical Supplement (Technical Supplement 2008) 06005
ADDRESS	Slovak Institute of Metrology, Center for Ionizing Radiations, Karloveská 63, 842 55 Bratislava Tel.: +421 2 60294 671, Fax.: +421 2 60294 670 e-mail: dobrovodsky@smu.gov.sk , svec@smu.gov.sk
CONTACT	Jozef Dobrovodský, Director of the Center

LABORATORY	National Metrology Institute of South Africa (NMISA) (SA1/SA2)
NAMES	Bruce Simpson, Freda van Wyngaardt, Joline Lubbe, Martin van Staden
ACTIVITY	<p style="text-align: center;">Activities undertaken in 2008</p> <ul style="list-style-type: none"> • Undertook a 5-week visit to IRMM, Geel, Belgium in February and participated in liquid scintillation related projects (FvW). • Updated all quality management system procedures pertaining to the Radioactivity Standards laboratory. • Attended the ICRM Executive Board meeting held at the Slovak Institute of Metrology (SMU) in Bratislava in May. • Presented a paper in poster form at the Liquid Scintillation Spectrometry Conference (LSC 2008) held at Davos, Switzerland in May. • Reviewed a manuscript (FvW) submitted to an international scientific journal for publication. • In July the RS laboratory was inspected for compliance by the Directorate Radiation Control of the Department of Health. • Participated in the ICRM international comparison of the analysis of ⁹⁹Tc TDCR data. • Participated in the CCRI(II) Activity Uncertainties and Comparisons Workshop held at the BIPM in September, as well as the CCRI(II) Key Comparisons Working Group and Uncertainties WG meetings. • Started training a new staff member (JL) from October onwards. • The RS laboratory successfully underwent an 18 month assessment for accreditation purposes in December. Submitted revised and additional radioactivity BMCs to the South African National Accreditation System (SANAS) to extend the scope of the laboratory. • A number of ¹³¹I capsules, which are administered orally to patients, were measured for clients for verification and calibration purposes. The activity of a ¹³⁷Cs source was checked for a nuclear medicine facility. Checked a number of ionization chambers maintained at a particle accelerator facility. <p style="text-align: center;">Programme for 2009</p> <ul style="list-style-type: none"> • Ongoing training of new staff members. • Submit an abstract to the ICRM 2009 conference Scientific Secretariat for consideration by the scientific committee and write a paper if selected. • Review all abstracts submitted for inclusion in the ICRM 2009 conference programme. Attend the ICRM Scientific Committee/EB meetings in March, being held in Bratislava, Slovakia. • Participate in the CCRI key comparisons of ³H activity measurements and ¹⁷⁷Lu activity measurements. • Attend the CCRI(II) and CCRI meetings being held at the BIPM in June. • Continue with the installation and commissioning of an HPGe detector and Digital Spectrum Analyzer. • Submit additional radioactivity CMCs for intra- and inter-regional review. • Referee papers accepted for the ICRM 2009 conference. Attend the ICRM 2009 conference being held at the SMU, Bratislava in September. • Undertake an absolute standardization of ¹⁸F by liquid scintillation coincidence counting and establish calibration factors for the NMISA ionization chamber. • Continue with a project to develop the necessary infrastructure for the provision of stable liquid scintillation counting standards of ³H and ¹⁴C to the South African user community. • Provide radioactivity measurement services to the user community.

KEYWORDS	coincidence method, activity measurement, ionisation chamber, life sciences, liquid scintillation, source preparation, gamma-ray spectrometry, 131I, 137Cs, 99Tc, 3H, 177Lu, 18F, 14C, 133Ba, 35S
PUBLICATIONS	<p>W.M. van Wyngaardt, B.R.S. Simpson and G.E. Jackson, <i>Further investigations of a simple counting technique for measuring mixtures of two pure β-emitting radionuclides</i>. Appl. Radiat. Isot. 66 (2008) 1012-1020.</p> <p>B.R.S. Simpson and W.M. van Wyngaardt, <i>Absolute activity of ^{133}Ba by liquid scintillation coincidence counting using the $4\pi(e,X)\text{-}\gamma$ extrapolation technique</i>. Appl. Radiat. Isot. 66 (2008) 929-933.</p> <p>W.M. van Wyngaardt and B.R.S. Simpson, <i>Standardization of S-35 by the TDCR efficiency calculation technique</i>. Liquid Scintillation Spectrometry Conference (LSC 2008) proceedings (to be published).</p>
INFORMATION	Freda van Wyngaardt was awarded the degree of PhD in June 2008 at the University of Cape Town midyear graduation ceremony. The title of her thesis is: <i>A new liquid scintillation counting technique to resolve mixtures of two pure beta-emitting radionuclides</i> . Electronic copies are available for anyone interested.
OTHER RELATED PUBLICATIONS	Yoshio Hino, Bruce Simpson, Mike Woods and Pierino De Felice, <i>Preface</i> by the Guest Editors for the ICRM 2007 Conference Proceedings. Appl. Radiat. Isot. 66 (2008) 677-679.
ADDRESS	<p>Radioactivity Standards Laboratory, NMISA 15 Lower Hope Road, Rosebank 7700 Cape Town, SOUTH AFRICA</p>
CONTACT	<p>B.R.S. Simpson Tel./fax (office) +27 21 686 2759, Tel. (lab) +27 21 685 4325 E-mail : bsimpson@nmisa.org</p>

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes, CIEMAT
NAMES	M. GALÁN, J.M. LOS ARCOS
ACTIVITY	Decay data evaluations, maintenance and update of the Spanish National Database for Ionizing Radiation (BANDRRI)
KEYWORDS	Data evaluation
RESULTS	$^{135}\text{Xe}^m$ evaluation (http://www.nucleide.org7DDEP_WG/DDEPdata.htm) Participation in DDEP workshop in Bucharest.
PUBLICATIONS	Evaluation of ^{133}Xe and $^{133}\text{Xe}^m$ decay data, Applied Radiation and Isotopes 67 (2009), pp. 170-173
IN PROGRESS	^{22}Na , ^{59}Ni , ^{94}Nb evaluations
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	CIEMAT, Ed. 12. Av. Complutense 22, 28040 Madrid (Spain) Tel.: + 34 91 346 6222 FAX: + 34 91 346 6442
CONTACT	monica.galan@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes, CIEMAT
NAMES	Eduardo García-Toraño, Virginia Peyrés Medina
ACTIVITY	Standardization of radionuclides by $4\pi\gamma$ counting
KEYWORDS	Nal well-type counters
RESULTS	
PUBLICATIONS	
IN PROGRESS	Implementation of a single channel digital acquisition system at the preamplifier level and development of analysis software, including dead time corrections.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	CIEMAT, Ed. 12 Avenida Complutense s/n, 28040 Madrid, Spain. Tel: +34 91 346 6225, FAX: +34 91 346 6442
CONTACT	Eduardo García-Toraño, e.garciatorano@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes, CIEMAT
NAMES	Eduardo García-Toraño
ACTIVITY	Measurement of the half-life of ^{233}U
KEYWORDS	Defined solid angle counting
RESULTS	Standardization of sources of ^{233}U as a part of an international cooperation project coordinated by IRMM (partners PTB, LNHB, NPL and CIEMAT)
PUBLICATIONS	
IN PROGRESS	Final data analysis to provide new values for $T_{1/2}$ of ^{233}U (S. Pommé, IRMM, coordinator). Draft paper already written
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	CIEMAT, Ed. 12 Avenida Complutense s/n, 28040 Madrid, Spain Tel: +34 91 346 6225, FAX: +34 91 346 6442
CONTACT	Eduardo García-Toraño, e.garciatorano@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes (CIEMAT)
NAMES	Virginia Peyrés Medina, Eduardo García-Toraño
ACTIVITY	Monte Carlo simulation for efficiency calibration of Ge detectors.
KEYWORDS	Gamma-ray spectrometry, Monte Carlo simulation
RESULTS	Optimization of a Monte Carlo model by numerical methods
PUBLICATIONS	V. Peyres, E. García-Toraño, "Optimization of a Gamma Spectrometry System by Numerical Methods". Accepted for publication in ARI.
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	CIEMAT, Ed. 12 Avenida Complutense s/n, 28040 Madrid, Spain Tel: +34 91 346 6226, FAX: +34 91 346 6442
CONTACT	Virginia Peyres virginia.peyres@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes, CIEMAT
NAMES	Teresa Durán Ramiro
ACTIVITY	Design of a LSC counter based on an Hybrid Photomultiplier
KEYWORDS	Liquid scintillation
RESULTS	Prototype of LSC system with improved energy resolution for sources of alpha emitters in standard LSC vials
PUBLICATIONS	M.T. Durán, (2008) PhD Thesis, "Diseño y construcción de un contador de centelleo líquido basado en fotomultiplicadores híbridos". Facultad de Ciencias Físicas, Universidad Complutense de Madrid, Spain.
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	M.T. Durán, E. García-Toraño, "A Liquid Scintillation Counter with Enhanced Energy Resolution Based on an Hybrid Photomultiplier "
OTHER RELATED PUBLICATIONS	
ADDRESS	CIEMAT, Ed. 12 Avenida Complutense s/n, 28040 Madrid, Spain Tel: +34 91 346 6225, FAX: +34 91 346 6442
CONTACT	Teresa Durán Ramiro, tduran@tecnatom.es Eduardo García-Toraño, e.garciatorano@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes, CIEMAT
NAMES	Miguel Roteta Ibarra
ACTIVITY	$4\pi\beta\text{-}\gamma$ Coincidence Measurements with pressurised proportional counters
KEYWORDS	coincidence method
RESULTS	
PUBLICATIONS	
IN PROGRESS	Studies of the new digital acquisition system with two channels, and development of software to analyze data, including correlations. Standardization of ^{99m}Tc , ^{134}Eu , ^{152}Eu , ^{67}Ga
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Miguel Roteta Ibarra, Miguel.Roteta@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes, CIEMAT
NAMES	Eduardo García-Toraño, Miguel Roteta Ibarra, Virginia Peyrés Medina
ACTIVITY	Standardization of radionuclides for Nuclear Medicine use.
KEYWORDS	Life sciences
RESULTS	Standardization of ^{99m}Tc , ^{131}I , ^{18}F by several techniques and dissemination to users.
PUBLICATIONS	
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	CIEMAT, Ed. 12 Avenida Complutense s/n, 28040 Madrid, Spain Tel: +34 91 346 6244, FAX: +34 91 346 6442
CONTACT	Eduardo García-Toraño, e.garciatorano@ciemat.es

LABORATORY	IRA
NAMES	Claude Bailat, Yvan Caffari, Youcef Nedjadi,
ACTIVITY	Source preparation, coincidence method, gas proportional counter, NaI well counter, liquid scintillation, alpha spectrometry, gamma-ray spectrometry, ionisation chamber, Monte Carlo simulation, Radon measurements.
KEYWORDS	Alpha spectrometry, beta spectrometry, (anti) coincidence method, cryogenic detector, data evaluation, data measurement, define solid angle (ASD) measurement, environmental control, Euramet, gamma-ray spectrometry, gas proportional counter, ionisation chamber, life sciences, liquid and plastic scintillation, low-level, NaI well-type counter, neutron measurement, radioactive gas, radiochemistry, simulation code, SIR, source preparation, traceability, X-ray spectrometry
RESULTS	
PUBLICATIONS	<p>Youcef Nedjadi, Philippe Spring, Claude Bailat, P. Froidevaux, C. Wastiel, and François Bochud, Purification and activity standardisation of a ho-166m solution, Applied Radiation and Isotopes 66 (2008) 900-904.</p> <p>Pachoud M., Bailat C., Buchillier T., Bochud F., Moeckli R. TH-D-352-07: Absolute Dose Determination of Helical Tomotherapy: Comparison Between Several Methods, Medical Physics, 35(6), p 2995, 2008</p>
IN PROGRESS	Validating the TDCR method; Validating the 4pβ-4p? coincidence method; Measuring the period of Ho-166m and replacing the reference sources for the Swiss reference ionisation chamber; Characterising a HPGe well-detector for Monte Carlo simulation.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	<p>Institut Universitaire de Radiophysique Appliquée Grand-Pré 1 CH-1007 Lausanne Switzerland Tel : +41 21 6233434 Fax : +41 21 6233435 http://www.chuv.ch/public/instituts/ira</p>
CONTACT	Claude Bailat

LABORATORY	National Radiation Standard Laboratory, Institute of Nuclear Energy Research (NRSL/INER)
NAMES	Ming-Chen Yuan, Chien-Yung Yeh, Ing-Jane Chen
ACTIVITY	<ol style="list-style-type: none"> 1. Standardization of I-123 for the radio pharmacist of INER. 2. Calibration and evaluation on the drum counting system of INER for radioactive waste decommissioning. 3. Setting up a new $2\pi\alpha/\beta$ counting system. 4. Performing a proficiency testing feasibility study for measurement of gamma-emitted clearance sample.
KEYWORDS	coincidence method, environmental control, gas proportional counter, ionisation chamber, I-123
RESULTS	<ol style="list-style-type: none"> 1. I-123 by coincidence method with relative standard uncertainty 0.87%. 2. The proficiency testing for measurement of gamma-emitted clearance sample showed that the En values were below 1 for 80% of the measurement results.
PUBLICATIONS	<ol style="list-style-type: none"> 1. Ming-Chen Yuan, Ing-Jane Chen, Chu-Fang Wang. Primary standardization of ^{67}Ga radiopharmaceuticals, Applied Radiation and Isotopes 66, pp. 976–980, 2008. 2. Ming-Chen Yuan, Chin-Hsien Yeh, Jeng-Jong Wang, Ing-Jane Chen and Chu-Fang Wang. The calibration and evaluation of a radioactive waste drum counting system. 5th International Conference on Radionuclide Metrology Low-Level Radioactivity Measurement Techniques, September 22-26, 2008, Braunschweig, Germany. 3. Tsuey-Lin Tsai, Jeng-Jong Wang, Ing-Jane Chen, Jyi-Lan Wu and Tzu-Wen Wang. Clearance measurements of metal scraps for nuclear facility at INER in Taiwan. 5th International Conference on Radionuclide Metrology Low-Level Radioactivity Measurement Techniques, September 22-26, 2008, Braunschweig, Germany. 4. Jeng-Jong Wang, Jyi-Lan Wu and Ing-Jane Chen. Low level radioactivity proficiency testing program in Taiwan. 5th International Conference on Radionuclide Metrology Low-Level Radioactivity Measurement Techniques, September 22-26, 2008, Braunschweig, Germany.
IN PROGRESS	<ol style="list-style-type: none"> 1. Standardization of Sr-89 for the radiopharmacist of INER. 2. Setting up the well type NaI(Tl) integral counting system for the standard of low radioactivity. 3. Organizing the environmental level and the low-intermediate level radioactivity proficiency testing programs.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Health Physics Division, Institute of Nuclear Energy Research, No.1000, Wenhua Rd., Jiaan Village, Longtan Township, Taoyuan County, 32546, Taiwan (R.O.C.)
CONTACT	Ming-Chen Yuan (mcyuan@iner.gov.tw)

LABORATORY	NPL
NAMES	Lena Johansson, John Keightley, Andy Stroak, Andy Pearce and John Sephton,
APPARATUS ACTIVITY	$4\pi\beta\text{-}\gamma$ coincidence counting
RESULTS	<p>Submissions of Mn-56 and Cs-134 to the SIR.</p> <p>Production of detailed data from measuring ^{60}Co sources for the purpose of a BIPM comparison of uncertainties originating from the extrapolation to unit efficiency in coincidence counting.</p> <p>Upgrade of the coincidence counting software, now called BADGERS, which uses extending dead time.</p> <p>Development of DCC software for investigation of statistics of pulse interval distributions, dual-channel correlation counting and selective sampling.</p>
PUBLICATIONS	PhD thesis
IN PROGRESS	<p>Standardisation of Cu-64 and Co-60 including submission to SIR.</p> <p>Installation of automatic source changer for VYNS foils.</p>
INFORMATION	
SOURCE IN PREPARATION	Standardisation of ^{177}Lu
OTHER RELATED PUBLICATIONS	
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CONTACT	Lena Johansson

LABORATORY	National Physical Laboratory
NAMES	Andy Pearce, Arzu Arinc
APPARATUS ACTIVITY	Nuclear decay data evaluation
RESULTS	Evaluations of ^{232}U and ^{232}Th
PUBLICATIONS	None
IN PROGRESS	Evaluations of ^{228}Ac , $^{106}\text{Ru}/^{106}\text{Rh}$
INFORMATION	-
IN PREPARATION	Evaluations of ^{231}Pa and ^{223}Ra planned.
OTHER RELATED PUBLICATIONS	-
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CONTACT	Andy Pearce

Laboratory	National Physical Laboratory
Name	Julian Dean, Arvic Harms, Simon Jerome, Chris Gilligan
Activity	UK Measurement Infrastructure for Nuclear Decommissioning: <ul style="list-style-type: none"> • Development of reference materials • Organisation of comparison exercises • Contributions to guidance on radionuclide metrology in site decommissioning
Keywords	Gamma-ray spectrometry; ionisation chamber; low-level; radiochemistry.
Results	Comparison of gamma-spectrometry systems at UK nuclear sites
Publications	Dean, J. C. J., 'A UK Comparison for Measurements of Low Levels of Gamma-emitters in Waste Drums' (submitted for publication in proceedings of ICRM LLRMT conference 2008, Braunschweig)
In progress	Second comparison scheduled for 2009
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Contact	Julian Dean (julian.dean@npl.co.uk)

LABORATORY	National Physical Laboratory
NAMES	Chris Gilligan, Simon Jerome, Arzu Arinc, Lena Johansson and Arvic Harms
ACTIVITY	*Organisation of laboratory proficiency testing programmes *Provision of low-level standards of radioactivity
KEYWORDS	Alpha spectrometry, (anti) coincidence method, gamma-ray spectrometry, ionisation chamber, liquid scintillation, low-level, radiochemistry, source preparation, traceability, ^3H , ^{14}C , ^{22}Na , ^{36}Cl , ^{40}K , ^{55}Fe , ^{60}Co , ^{63}Ni , ^{90}Sr , ^{95}Zr , ^{95}Nb , ^{99}Tc , ^{133}Ba , ^{134}Cs , ^{137}Cs , ^{152}Eu , ^{154}Eu , ^{209}Po , ^{226}Ra , ^{228}Ra , ^{234}U , ^{235}U , ^{238}U , ^{237}Np , ^{238}Pu , ^{239}Pu , ^{241}Am and ^{244}Cm
RESULTS	*Organisation of the NPL Environmental Radioactivity Proficiency Test Exercise 2008 (80 participants; seven sample types (aqueous and solid); nuclides included ^3H , ^{14}C , ^{22}Na , ^{36}Cl , ^{40}K , ^{55}Fe , ^{60}Co , ^{63}Ni , ^{90}Sr , ^{95}Zr , ^{95}Nb , ^{99}Tc , ^{133}Ba , ^{134}Cs , ^{137}Cs , ^{152}Eu , ^{154}Eu , ^{226}Ra , ^{228}Ra , ^{234}U , ^{235}U , ^{238}U , ^{237}Np , ^{238}Pu , ^{239}Pu , ^{241}Am and ^{244}Cm) *Provision of ^{209}Po standards
PUBLICATIONS	Harms, A.V., Johansson, L., MacMahon, D., 2009. Decay correction of ^{95}Nb . Applied Radiation and Isotopes, in press.
IN PROGRESS	*Organisation of the NPL Environmental Radioactivity Proficiency Test Exercise 2009 *UKAS accreditation (ISO Guide 43, part 1; Proficiency Test Exercise Providers) *Provision of low-level standards of ^{241}Pu *Development of environmental radioactivity reference materials *Publications on (i) Data treatment for the NPL Environmental Radioactivity Proficiency Test Exercise, (ii) Visualisation of proficiency test exercise results in Kiri plots, (iii) Combined results of NPL Environmental Radioactivity Proficiency Test Exercises (1989-2008) and (iv) Development of an irradiated concrete reference material
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CONTACT	Arvic Harms

LABORATORY	NPL
NAMES	Sean Collins, Andy Pearce, Amanda Law
ACTIVITY	Gamma Spectrometry
KEYWORDS	gamma-ray spectrometry, low-level
RESULTS	-
PUBLICATIONS	None
IN PROGRESS	<p>Procurement of detector optimised for measurement of low energy gamma emissions in environmental level samples.</p> <p>Investigation of the benefits of neutron-stopping materials in shielding for environmental level germanium spectrometers.</p> <p>Measurement of challenging radionuclide mixtures in particulate samples.</p> <p>Comprehensive recalibration of high-precision spectrometers.</p>
INFORMATION	-
IN PREPARATION	Preparation of a good practice guide for gamma spectrometry.
OTHER RELATED PUBLICATIONS	-
ADDRESS	<p>National Physical Laboratory</p> <p>Hampton Road</p> <p>Teddington</p> <p>Middlesex</p> <p>TW11 0LW</p> <p>Tel: +44 208 943 8508</p>
CONTACT	Sean Collins sean.collins@npl.co.uk

LABORATORY	NPL
NAMES	Hilary Phillips, Julian Dean, Maria Marouli, Lena Johansson and John Sephton,
APPARATUS ACTIVITY	Internal Gas Counting
RESULTS	Monte Carlo modelling of the response of the NPL gas counting system (proportional counters) to radioactivity in gas. Standardisation of ^{11}C by internal gas counting. Submission of ^{85}Kr activity determined for BIPM key-comparison. Calibration of gamma spectrometers and ion chamber systems for ^{85}Kr .
PUBLICATIONS	Ph.D. in preparation
IN PROGRESS	Participation in the BIPM tritiated water comparison exercise. Calibration of a secondary standard detector for PET nuclides (e.g. ^{11}C). Development of a quality control counter for the ^3H counting system. Use of correlation counting for examination of after pulsing.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Hilary Phillips

LABORATORY	NPL
NAMES	John Keightley, Andy Stroak, Michaela Baker, John Sephton
ACTIVITY	Ionisation Chambers
KEYWORDS	Ion chamber, dose calibrator
RESULTS	Radionuclide Calibrator Users Forum (RCUF) meeting held (minutes on web page) : www.npl.co.uk/rcuf New electrometer system installed : to be operated in parallel with old system for foreseeable future.
PUBLICATIONS	An SI traceable electrometer system for radionuclide metrology S P Giblin, E. Bakshandier, N E Fletcher, K J Lines, J P Sephton (in press, NIMA)
IN PROGRESS	New calibration factors NPL Secondary Standard (FIDELIS) for I-125 brachytherapy seeds and strands, Ir-192 wires, I-131 capsules. Validation of new electrometer system.
INFORMATION	-
IN PREPARATION	Intercomparison exercise for Y-90 in UK hospitals.
OTHER RELATED PUBLICATIONS	-
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CONTACT	John Keightley

LABORATORY	NPL
NAMES	Arzu Arinc, Lena Johansson, John Sephton, Andy Pearce
APPARATUS ACTIVITY	Liquid Scintillation Counting
RESULTS	<p>Radionuclide solutions of ^{55}Fe, ^{63}Ni, ^{89}Sr and ^{129}I standardised by CIEMAT/NIST.</p> <p>Radionuclide solutions of ^{209}Po, ^{236}Pu, ^{238}Pu and ^{239}Pu standardised by 100% efficiency alpha liquid scintillation counting.</p> <p>Validation and characterisation of Beckman 2700 TR counter.</p>
PUBLICATIONS	
IN PROGRESS	Standardisation of ^{64}Cu and ^{134}Cs
INFORMATION	
SOURCE IN PREPARATION	Standardisation of ^{177}Lu
OTHER RELATED PUBLICATIONS	
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CONTACT	Arzu Arinc

LABORATORY	National Institute of Standards and Technology (NIST)
NAMES	R. Fitzgerald
ACTIVITY	anticoincidence counting (LS-NaI and HPPC-NaI)
KEYWORDS	(anti) coincidence method, ^{229}Th , ^{57}Co
RESULTS	Expanded application of anticoincidence method. Standardization of $^{68}\text{Ga}/^{68}\text{Ge}$, ^{229}Th and ^{57}Co .
PUBLICATIONS	B. E. Zimmerman, J. T. Cessna, and R. Fitzgerald, J. Res. Natl. Inst. Stand. Tech. 113 , 265 (2008). ($^{68}\text{Ge}/^{68}\text{Ga}$ standardization).
IN PROGRESS	Standardization of $^{99\text{m}}\text{Tc}$ solution. Study LS efficiency for alpha emitters (wall-effect).
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	ryan.fitzgerald@nist.gov 301-975-5597

LABORATORY	National Institute of Standards and Technology (NIST)
NAMES	R. Fitzgerald
ACTIVITY	Development and calibration of an ionization chamber with commercial electrometer and robotic sample loading.
KEYWORDS	ionisation chamber
RESULTS	Characterized precision, repeatability and stability of system over a wide range of experimental conditions.
PUBLICATIONS	L. Pibida, R. Fitzgerald, M. Unterweger, M.M. Hammond, D. Golas, Appl. Radiat. Isotopes (2009 in press) (^{82}Sr half life).
IN PROGRESS	Study reproducibility of calibration factors during the next few years.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	NIST, MS8462, 100 Bureau Dr., Gaithersburg, MD, 20899 USA
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LABORATORY	NIST
NAMES	B. E. Zimmerman, R. Fitzgerald, J. T. Cessna
ACTIVITY	Primary standardization of ^{68}Ge
KEYWORDS	Anticoincidence counting, liquid scintillation counting, TDCR, CIEMAT-NIST, life sciences, Ge-68, ionisation chamber
RESULTS	Standardized solutions, calibration service available
PUBLICATIONS	B. E. Zimmerman, J. T. Cessna, and R. Fitzgerald, "Standardization of $^{68}\text{Ge}/^{68}\text{Ga}$ using three liquid scintillation counting based methods", J. Res. Nat. Inst. Stand. Technol., 113 , 265-280 (2008).
IN PROGRESS	Submission to SIR
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	100 Bureau Dr., Stop 8462, Gaithersburg, MD 20899-8462
CONTACT	B. E. Zimmerman: bez@nist.gov

LABORATORY	NIST
NAMES	B. E. Zimmerman, J. T. Cessna, L. E. King
ACTIVITY	Primary standardization of ^{223}Ra
KEYWORDS	Liquid scintillation counting, 4π - α proportional counter, CIEMAT-NIST, life sciences, Ra-223
RESULTS	Standardized solutions, calibration service available
PUBLICATIONS	
IN PROGRESS	B. E. Zimmerman, J. T. Cessna, and L. E. King, "Standardization of the α -emitting radionuclide ^{223}Ra ", to be submitted to ARI.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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LABORATORY	NIST
NAMES	D. E. Bergeron, B. E. Zimmerman
ACTIVITY	Secondary standards for ²²³ Ra
KEYWORDS	Ra-223, ionisation chambers, life sciences
RESULTS	
PUBLICATIONS	
IN PROGRESS	Developing new calibration factors for Ra-223 in syringe and vial geometries for commercial re-entrant activity calibrators; study of geometrical effects in measurement in ionization chambers
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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LABORATORY	NIST
NAMES	B. E. Zimmerman, J. T. Cessna, M. M. Hammond
ACTIVITY	Secondary standards for ^{68}Ge
KEYWORDS	Ge-68, life sciences, gamma-ray spectrometry, ionization chambers
RESULTS	Development and calibration of solid sources of Ge-68 in “mock syringe” geometry for calibration of activity calibrators, as well as phantom inserts for quantitative medical imaging
PUBLICATIONS	In progress
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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LABORATORY	NIST
NAMES	Kenneth G.W. Inn, Svetlana Nour, Jerome LaRosa, Balazs Bene
ACTIVITY	Low Level Radiochemistry Project
KEYWORDS	Alpha spectrometry, beta spectrometry, data evaluation, data measurement, environmental control, life sciences, liquid scintillation, low-level, radiochemistry, simulation code, source preparation, traceability
RESULTS	
PUBLICATIONS	
IN PROGRESS	<p>NIST Radiochemical Intercomparison Program – air filter, soil, water, synthetic urine, synthetic feces, emergency preparedness</p> <p>USDOE Radiological Traceability Program – air filter, soil, water, vegetation, synthetic urine, synthetic feces</p> <p>Nuclear Forensics Reference Materials – ^{229}Th SRM, Pu in Peruvian Soil, RDD Reference Solutions, $^{137}\text{Cs}/^{137}\text{Ba}$ Chronometer, Spiked Peruvian Soil</p> <p>Natural Matrix Radionuclide Standard Reference Materials – Shellfish, Peruvian Soil</p> <p>Whole-Body Phantom Measurements, Monte Carlo Simulations – BOMABs</p> <p>Radionuclide Speciation in Soil/Sediment – Sequential Extraction Protocol</p>
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Kenneth G.W. Inn

LABORATORY	NIST
NAMES	R.Collé, L. Laureano-Perez
ACTIVITY	NIST-NPL(PTB) agreement on ^{210}Pb standards
KEYWORDS	Alpha spectrometry, beta spectrometry, anticoincidence counting, gamma-ray spectrometry, HPGe, liquid scintillation, low-level, NaI sandwich detector, Pb-210, Po-210 ingrowth, Si surface barrier, Si(Li) detector
RESULTS	<p>NIST primary standardization of ^{210}Pb by LS CNET (with confirmation by three other methods: anticoincidence counting, gamma spectrometry; ^{210}Po ingrowth) has large uncertainty of 2.4 % at $k = 2$, which is comparable to that for NPL ^{210}Pb standard.</p> <p>NPL ^{210}Pb standard (based on dilution of one obtained from PTB with confirmatory measurements by NPL) was purchased and compared to new NIST ^{210}Pb standard (SRM 4337) by five methods: $4\pi\alpha\beta$ LS; 4π NaI sandwich detector, HPGe spectrometry, ^{210}Po ingrowth, and Si(Li) spectrometry.</p> <p>Two standards agreed to within 0.3 %, which is well within the 1.5 % propagated standard uncertainty assigned to both standards. Findings suggest that originally assigned uncertainty on ^{210}Pb standard may be overestimated.</p>
PUBLICATIONS	R. Collé and L. Laureano-Perez, On the standardization of ^{209}Po and ^{210}Pb , <i>LSC 2008</i> , Radiocarbon, in print.
IN PROGRESS	A new NIST-NPL informal comparison is underway with measurements being performed on exchanged solutions sent by each respective laboratory.
INFORMATION	
SOURCE IN PREPARATION	SRM 4337 available
OTHER RELATED PUBLICATIONS	R. Collé, L. Laureano-Perez & I. Outola, A note on the half-life of ^{209}Po , <i>Appl. Radiat. Isot.</i> 65 , 728-730 (2007); L. Laureano-Perez, R. Collé, R. Fitzgerald, I. Outola, L. Pibida, A liquid scintillation-based primary standardization of ^{210}Pb , <i>Appl. Radiat. Isot.</i> 65 , 1368-1380 (2007).
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LABORATORY	NIST
NAMES	R. Fitzgerald, R. Collé, L. Laureano-Perez, B. Zimmerman, L. King, M. Hammond, S. Nour
ACTIVITY	Standardization of ^{229}Th : Method comparisons
KEYWORDS	Alpha spectrometry, beta spectrometry, anticoincidence counting, CNET, gamma-ray spectrometry, liquid scintillation, proportional counter, TDCR, Th-229
RESULTS	<p>A new standard (SRM 4328C) of ^{229}Th was developed.</p> <p>Its certification is based on standardization by $4\pi\alpha\beta(\text{LS})\text{-NaI}(\text{TI})$ live-timed anticoincidence counting (LTAC) with confirmatory measurements by five other methods: (i) $4\pi\alpha\beta$ liquid scintillation (LS CNET) spectrometry (with ^3H standard efficiency tracing for β efficiencies); (ii) an LS-based $4\pi\alpha\beta$ triple-to-double coincidence ratio (TDCR) method; (iii) $2\pi\alpha$ proportional counting (PC); (iv) $2\pi\alpha$ spectrometry using Si surface barrier detector (α-SPECT), following chemical separation, with a ^{230}Th standard tracer; and (v) HPGe γ-ray spectrometry (γ-SPECT) confirmatory measurements.</p> <p>The expanded ($k = 2$) uncertainties for the five confirmatory methods were: (i) 1.2 %; (ii) 1.0 %; (iii) 2 %; (iv) 2 %; and (v) 3 %, respectively. All of the confirmatory measurements agreed with the certified value within their respective measurement uncertainties, except that for the TDCR result (-1.7 % difference). This discrepancy in methods has also been observed in ^{241}Pu which suggests that there is a need for further study on this matter. The results for methods (i) and (iv) agreed with the certified anti-coincidence value to better than 0.1 %.</p>
PUBLICATIONS	in preparation
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	SRM 4328C available
OTHER RELATED PUBLICATIONS	
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LABORATORY	NIST
NAMES	R. Collé, L. Laureano-Perez, R. Fitzgerald, D. Golas, E. Crawford, J. LaRosa, I. Outola, L. Pibida, H. Hammond
ACTIVITY	Rigorous evaluation of primary ^{241}Am standardizations
KEYWORDS	Alpha spectrometry, Am-241, anticoincidence counting; beta counting; CIEMAT/NIST method, efficiency tracing; gamma spectrometry, HPGe, liquid scintillation (LS); NaI sandwich detector,
RESULTS	<p>Performed a rigorous test of our capability to perform primary ^{241}Am standardizations, which was achieved by comparing the results of four independent primary standardizations on three gravimetrically linked solution standards that were prepared for different NIST programs.</p> <p>Three of the standardizations were based on $4\pi\alpha$ LS spectrometry and the fourth used a more powerful $4\pi\alpha(\text{LS})-\gamma(\text{NaI})$ live-timed anticoincidence counting (LTAC) method. The ^{241}Am solution standards comprised those produced for SRM 4322C, for a set of ampoules used for proficiency testing by participants in the NEI Nuclear Power Plant Program (PPP), a set of ampoules prepared for the Integrated Consortium of Laboratory Networks (ICLN).</p> <p>In addition, direct comparative measurements were made between the new SRM 4322C and the previous SRM 4322B issue. These were relative measurements based on γ-ray spectrometry with HPGe detectors and even more precise determinations using a $4\pi\gamma(\text{NaI})$ sandwich detector that consists of two large 20-cm scintillation crystals.</p> <p>The certified values for the massic activity of the two SRMs agreed to within 0.13 % for the $4\pi\gamma(\text{NaI})$ measurements. The primary standardization of SRM 4322C by $4\pi\alpha$ LS and by the $4\pi\alpha(\text{LS})-\gamma(\text{NaI})$ LTAC methods agreed to about 0.05 %; whereas the three $4\pi\alpha$ LS standardizations on the three solution standards agreed to about 0.2 % compared to their gravimetric linkages.</p>
PUBLICATIONS	in preparation
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	SRM 4322C available
OTHER RELATED PUBLICATIONS	
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LABORATORY	NIST (USA)
NAMES	R.Collé, L. Laureano-Perez, B.E. Zimmerman & P. Cassette (LNHB)
ACTIVITY	²⁴¹ Pu standardization discrepancy
KEYWORDS	beta spectrometry, CIEMAT-NIST efficiency tracing (CNET), liquid scintillation, TDCR, Pu-241
RESULTS	<p>New ²⁴¹Pu standard (SRM 4340B) is consistent with previous standard (SRM 4340A) issued in 1996</p> <p>Standardization based on CNET with confirmation by ²⁴¹Am ingrowth measurements over a period of 31 years.</p> <p>Two TDCR results (by NIST & LNHB) agree to within about 0.2 %, but differ from CNET certified value by 8 %; reason unknown!</p>
PUBLICATIONS	
IN PROGRESS	New ²⁴¹ Pu comparison amongst few laboratories (NIST, LNHB, PTB & NPL) organized by NPL is planned
INFORMATION	
SOURCE IN PREPARATION	SRM 4340B available
OTHER RELATED PUBLICATIONS	
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LABORATORY	NIST
NAMES	R. Collé, L. Laureano-Perez
ACTIVITY	mass measurements with new comparator
KEYWORDS	balance, mass, weighing
RESULTS	<p>Accurate mass measurements in a range from a few milligrams up to several kilograms are a vital component of our work. It is needed for the preparation of counting sources, for the production of large volumes of standardized solutions, and to ensure that the various sources and solutions are gravimetrically linked.</p> <p>Twenty two different microbalances, analytical balances, and large capacity balances are maintained by the Group for this purpose.</p> <p>A new large capacity balance was needed and acquired: viz., a Mettler-Toledo AX12004 Mass Comparator, which is a high-precision mass comparator up to 12 kg and a 100 µg readability, with a two-position turntable and a large draft shield to accommodate large volumes. The comparator uses internal balance weights and has an "electronic" EMF compensation range of about 100 g.</p> <p>Mass measurements are made by substitution weighing against a calibrated E1 weight set. Extensive tests evaluating the performance of the balance for our purposes have been completed, and new protocols for its use to measure large volume solutions have been developed.</p>
PUBLICATIONS	
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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LABORATORY	NIST
NAMES	D.E. Bergeron, R. Collé, B.E. Zimmerman
ACTIVITY	New low-energy photon spectrometry system
KEYWORDS	gamma-ray spectrometry, Si(Li), X-ray spectrometry,
RESULTS	<p>A new low-energy photonic-emission spectrometry system (consisting of a high-resolution, windowless, liquid nitrogen cooled, Si(Li) detector, an especially-designed and fabricated vacuum chamber equipped with a gate valve for coupling it to the windowless detector, and a suitable calibration range in the chamber to handle a variety of source configurations and geometries) has been assembled.</p> <p>Extensive performance and evaluation tests for energy resolution, detection efficiency, and source positioning effects are currently underway to characterize the system for use with point sources.</p> <p>A comparative measurement of NPL and NIST ^{210}Pb standards is underway.</p>
PUBLICATIONS	
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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LABORATORY	NIST (USA)
NAMES	L. Laureano-Perez, R. Collé, R. Fitzgerald, B. Zimmerman, L. Cumberland
ACTIVITY	Investigation on ^{99}Tc
KEYWORDS	anticoincidence counting; beta counting; CIEMAT/NIST method, efficiency tracing; liquid scintillation (LS); radioactivity; SRM; standards; technetium-99
RESULTS	<p>A new ^{99}Tc standard (SRM 4288B) consistent is with previous standard (SRM 4288A) within 0.06 %</p> <p>Use of Aliquot 336 a complexing agent for the pertechnetate ion had negligible effect in the scintillation cocktail and water is not an efficient quenching agent.</p> <p>The certified (LS) value was in agreement with $4\pi\beta(\text{LS}) - \gamma(\text{NaI})$ live-timed anti-coincidence (LTAC) counting; and an LS-based $4\pi\beta$ triple-to-double coincidence ratio (TDCR) to within -0.22 % and +0.06 %, respectively,</p>
PUBLICATIONS	In preparation
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	SRM 4288B is available
OTHER RELATED PUBLICATIONS	<p>B.M. Coursey, Standardization of Technetium-99 by Liquid Scintillation Counting, <i>Int. J. Applied Radiat. Isot.</i> Vol.35 No.12, pp.1103-1112, 1984.</p> <p>L.Lucas, Calibration of the Massic Activity of a solution of ^{99}Tc, <i>Appl. Radiat. Isot.</i> Vol.49, No. 9-11, pp. 1061-1064, 1998.</p>
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LABORATORY	NIST (USA)
NAMES	R. Collé, R. Fitzgerald
ACTIVITY	Wall effect for alpha particles in LS counting
KEYWORDS	Alpha spectrometry, liquid scintillation, wall effect , Am-241, Po-210
RESULTS	<p>Could not replicate magnitude of 0.2 % wall effect reported by Cassette (LNHB).</p> <p>Experiments performed with solutions of ^{210}Po and ^{241}Am in a series of vials as a function of surface area and surface to volume ratios</p> <p>Finding is equivocal.</p>
PUBLICATIONS	
IN PROGRESS	Additional work planned by looking at non-detection efficiency with NIST $4\pi\alpha(\text{LS})\text{-NaI(Tl)}$ live-timed anticoincidence counting system
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	P. Cassette, Evaluation of the influence of wall effects on the liquid scintillation counting detection efficiency for the standardization of high-energy beta and alpha radionuclides, <i>Advances in Liquid Scintillation Spectrometry LSC 2001</i> , Radiocarbon, Tucson, AZ, 2002, pp. 45-55.
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