



LABORATOIRE NATIONAL  
HENRI BECQUEREL

LNE-LNHB



## Workshop of the ICRM Gamma and Beta spectrometry working group - LNE, Paris, February 23-34, 2009

Thanks to the 20 participants

Thanks to LNE and LIST

Mainly focused on the coincidence summing action, but  
also some « basic » problems

- > Quality of metrological work
- > Practical solutions for users : recommendation  
in the ICRM WG web page

# Interest enquiry : started in 2005

- The whole results of this interest enquiry are summarized hereafter:

Interest	Monte Carlo for efficiency	Web site forum	Coincidence summing	Uncertainties	X-Ray Spectrometry	Beta particle	Signal processing	New detector
<b>High</b>	12	9	12	9	4	2	3	2
<b>Medium</b>	1	6	3	4	8	8	7	7
<b>Low</b>	2	2	1	3	3	5	4	6

- Actions for the first three items are in progress.
- Any member of the GSWG must feel free to propose and coordinate new projects !
- Further enquiry planned at ICRM 2009

# ICRM web page :

[http://www.nucleide.org/ICRM\\_GSWG.htm](http://www.nucleide.org/ICRM_GSWG.htm)

Accueil LNHB Remonter Sommaire LNHB Dosimétrie Radioactivité

Laboratoire National Henri Becquerel  
Gamma-Ray Spectrometry W.G.

**International Committee for Radionuclide Metrology (I.C.R.M.)  
Gamma-Ray Spectrometry Working Group**

The Working Group is devoted to the development of the metrological aspects of gamma-ray spectrometry and its applications. This includes, but is not restricted to: measurement techniques and equipment, determination of photon emission intensities, detector efficiency calibrations (including Monte Carlo methods), coincidence-summing corrections, uncertainties, correlations, new instrumentation, X-ray spectrometry.

**Gamma-Ray Spectrometry Working Group Meetings**

The next workshop will be held on February 23-24, 2009, in the building of Laboratoire National d'Essais which is located in Paris (Southern side). The meeting will concentrate on the coincidence summing action, however, a number of other items, such as uncertainties in gamma-ray spectrometry, definition of detection limits and minimum detectable activity, relations with software suppliers, will be discussed. The preliminary [agenda](#) of the workshop and further [information](#) are included here.

The last meeting of the Gamma-Ray Spectrometry Working Group was held in Cape Town on September 4<sup>th</sup>, 2007, during the ICRM conference. The relevant report is included here: [ICRM\\_GSWG\\_Report\\_2007.doc](#).



### Basic bibliography

#### **Practical Gamma-Ray Spectrometry, 2<sup>nd</sup> Edition**

Authors : Gordon Gilmore  
April 2008  
Publisher : Wiley

#### **Radiation Detection and Measurements, 3<sup>rd</sup> edition**

Author: Glenn F. Knoll  
January 2000  
Publisher : John Wiley & Sons, Inc.

#### **Gamma-Ray and X-Ray Spectrometry with Semiconductor Detectors**

Authors: Klaus Debertin and Richard G. Helmer  
January 1989  
Publisher : North Holland, 1988

#### **Nuclear decay database**

According to the 3NDWG meeting of 7 september 2005, the atomic and nuclear decay data contained within [Monographie](#)

# Practical information

## **Gamma ray spectra**

A library of gamma ray spectra is published by Idaho National Laboratory - Gamma Spectrometry Center.

(<http://www.inl.gov/gammaray/catalogs/catalogs.shtml>)

## **Software**

### ***Coincidence summing corrections***

GESPECOR

ETNA

### ***Tool for spectrum transfer***

"SPECOR" <http://polywww.in2p3.fr/activites/autres/boudry/Specon.html>

### ***Peak fitting***

COLEGRAM

### **Attenuation coefficients**

XCOM : Photon Cross Sections Database <http://physics.nist.gov/PhysRefData/Xcom/Text/XCOM.html>

## **Bibliography by topics**

The attached files include a non-exhaustive list of published articles in relation with the main topics.

### ***Coincidence summing***

The attached file ([Coincidence summing Biblio.doc](#)) gathers around 50 references sorted in the publication dates. They presents either theoretical or practical methods, or experimental validations.

This is only a list without any judgment about the quality of the quoted articles.

### ***Monte Carlo methods applied to efficiency computation***

The attached file ([Monte Carlo Efficiency Biblio.doc](#)) gathers around 20 references sorted in the publication dates. This is only a raw list without any judgment about the quality of the quoted articles.

# ICRM Forum : http://laraweb.free.fr/GRS\_forum



**ICRM Gamma-Ray Spectrometry Working Group**  
The forum of gamma-ray spectrometry users

  
Recherche avancée

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[Index du forum](#) vA^

[Panneau de l'utilisateur \(0 nouveau message\)](#) • [Voir mes messages](#)      [FAQ](#) [Membres](#) [Déconnexion](#) [ Marie-Christine Lépy ]

Mous sommes le **Sam Fév 21, 2009 12:50 pm** Dernière visite le **Mar Fév 17, 2009 7:48 pm**  
[ Panneau de modération ]

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BEGINNER'S GUIDE TO ICRM GRS WG FORUM NAVIGATION	SJETS	MESSAGES	DERNIER MESSAGE
 <b>Forum general information</b> How does it work ? What can be done ? etc. All you wanted to know about forum but were afraid to ask.	5	17	de <b>Marie-Christine Lépy</b>  le <b>Jeu Jan 08, 2009 11:33 pm</b>
<b>MONTE CARLO SIMULATION APPLIED TO GAMMA-RAY SPECTROMETRY</b>			
 <b>Your experience in Monte Carlo simulation</b> If you have any experience, recommendation to new users of Monte Carlo simulation	5	3	de <b>Thany VN</b>  le <b>Ven Juin 20, 2008 3:15 pm</b>
 <b>Monte Carlo simulation applied to efficiency computation</b>	0	0	Pas de message
<b>EFFICIENCY CALIBRATION</b>			
 <b>Curve fitting</b>	4	5	de <b>Eugeny Torontchenko</b> 

## STATISTIQUES

53 message(s) • 26 sujet(s) • 61 membre(s) •

## Workshop schedule : Monday February, 23<sup>rd</sup>

09:30	Welcome and presentation of the workshop schedule	<i>M.-C. Lépy</i>
09:45	Introduction : Accuracy of results of emission probabilities	<i>M.-M. Bé</i>
10:00	<b>Questions about efficiency calibration</b>	
	1. Efficiency calibration using experimental approach	
	Example of PTB (Fitting using Spline functions)	<i>R. Dersch</i>
	Example of LNHB (Fitting using logarithm polynomial)	<i>M.-C. Lépy</i>
10:30	Efficiency calibration using Monte Carlo calculation	
	Example of CMI	<i>P. Dryak</i>
10:45	<i>Coffee break</i>	
11:15	2. Efficiency calibration using Monte Carlo calculation	
	Example of Sevilla University	<i>S. Hurtado</i>
	Efficiency calibration of an extended-range detector by MC simulation at CIEMAT	<i>V. Peyres Medina</i>
	Other presentations about problems of efficiency calibrations	
11:45	3. Discussion about efficiency calibration	
	What minimum uncertainty can be obtained?	
	What about correlations between input data?	
	Calibration in the low-energy range	
12:30	<b>Lunch</b>	



## Workshop schedule : Tuesday February, 24th

- 09:00 Continuation of the discussion about **coincidence summing**  
Following of the action  
ICRM abstract  
Content of the ICRM paper  
Extension to volume sources ?
- 10:00 **Detection limit – Decision threshold** : Application of ISO 11929  
P. De Felice  
A. Luca  
L.-E. De Geer
- 10:30 *Coffee break*
- 11:00 Further discussion about detection limits  
Include some practical recommendation to the ICRM WG web page  
Information about commercial software : ORTEC, Canberra ?
- 12:00 **Lunch**

# Workshop schedule : Tuesday February, 24th

- 13:30 Information or questions from participants (10' each)  
L. Pibida ( $^{82}\text{Sr}$  half-life, digital-analog electronics)  
J. Saegusa  
T. Vidmar (AIEA Environment action – Monte Carlo action)  
L.-E. De Geer (VGSL)  
P. Cassette (Beta spectrometry)  
Other ?
- 14:30 **Final uncertainties:**  
Establish a list of the terms to be taken onto account  
Minimum achievable uncertainties  
Computing absolute emission intensities  
Computing relative uncertainties (for the evaluators' practical use)  
Include some practical recommendation to the ICRM WG  
web page ?
- 15:00 *Coffee break*
- 15:30 Further discussions
- 16:30 Possible demonstration of software
- 17:00 Conclusion