



European  
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## Joint Research Centre

The European Commission's in-house scientific service

### Scientific organization

Mikael Hult  
European Commission - Joint Research Centre  
Institute for Reference Materials and Measurements  
Retieseweg 111  
B-2440 Geel, Belgium  
E-mail: [mikael.hult@ec.europa.eu](mailto:mikael.hult@ec.europa.eu)

### Workshop secretariat

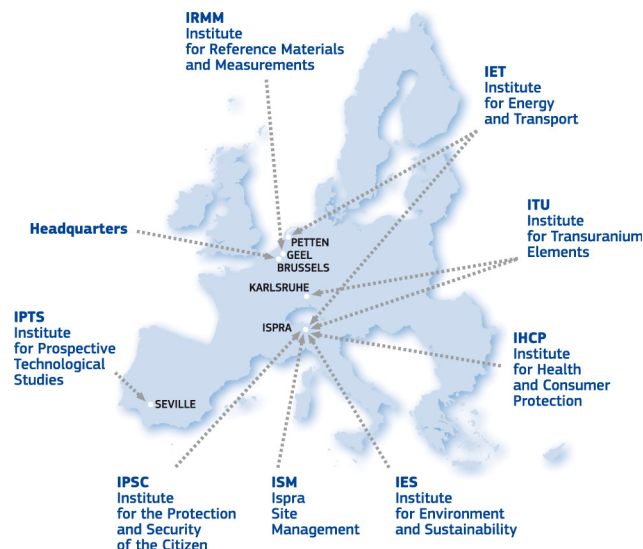
Mira van de Lucht  
European Commission - Joint Research Centre  
Institute for Reference Materials and Measurements  
Retieseweg 111  
B-2440 Geel, Belgium  
Tel.: +32 (0) 14 571 288  
Fax: +32 (0) 14 584 273  
Web: <http://irmm.jrc.ec.europa.eu/gamma-spec>  
E-mail: [mira.van-de-lucht@ec.europa.eu](mailto:mira.van-de-lucht@ec.europa.eu)

### Trainers

Mikael Hult, Uwe Wätjen (EC-JRC-IRMM)  
Tim Vidmar (SCK-CEN, Mol, Belgium)

Serving society  
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## JRC Sites

### OUR MISSION

As the Commission's in-house science service, the Joint Research Centre's mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle. Working in close cooperation with policy Directorates-General, the JRC addresses key societal challenges by stimulating innovation through developing new methods, tools and standards, and sharing its knowledge with the Member States, the scientific community and international partners. Key policy areas include environment and climate change; energy and transport; culture and food security; health and consumer protection; information society and digital agenda; safety and security, including nuclear; all supported through a cross-cutting and multidisciplinary approach.

## AGENDA

### Gamma-ray spectrometry

*Training Workshop on  
Applications of gamma-ray spectrometry  
to environmental samples*

Belgrade, Serbia

13 – 15 November 2012



Organized by:  
European Commission - Joint Research Centre  
Institute for Reference Materials and Measurements  
(EC-JRC-IRMM)

in collaboration with:  
Vinča Institute of Nuclear Sciences, Belgrade, Serbia

Joint  
Research  
Centre

# Gamma-ray spectrometry

Belgrade, Serbia, 13-15 November 2012

## Training Workshop on applications of gamma-ray spectrometry to environmental samples

### Tuesday, 13 November 2012

- 10:00 Welcome & gathering (*Host*)
- 10:15 Introduction (*M. Hult*<sup>1</sup>)
- 10:30 IRMM and JRC Enlargement & Integration Action (*U. Wätjen*<sup>1</sup>)
- 10:45 Basic concepts I (*M. Hult*<sup>1</sup>)
- 11:05 *Break*
- 11:25 The basic equation for gamma-ray spectrometry (*M. Hult*<sup>1</sup>)
- 12:05 Uncertainty budget (*U. Wätjen*<sup>1</sup>)
- 12:35 Uncertainty exercise (*U. Wätjen*<sup>1</sup>)
- 13:05 *Lunch*
- 14:00 Introductory test (*T. Vidmar*<sup>2</sup>)
- 14:25 Basic concepts II (*M. Hult*<sup>1</sup>)
- 14:45 Instrumentation (*M. Hult*<sup>1</sup>)
- 15:25 *Break*
- 15:45 Efficiency transfer (*T. Vidmar*<sup>2</sup>)
- 16:05 EFFTRAN (*T. Vidmar*<sup>2</sup>)
- 16:20 Efficiency computer exercise (*T. Vidmar*<sup>2</sup>, *M. Hult*<sup>1</sup>)
- 17:20 Test 2: instrumentation and the basic equation (*M. Hult*<sup>1</sup>)
- 17:40 Results and answers to Test 1 (*M. Hult*<sup>1</sup>)
- 18:00 End of day 1

### Wednesday, 14 November 2012

- 10:00 Answers to Test 2: instrumentation and the basic equation (*M. Hult*)
- 10:20 Decay data (*T. Vidmar*)
- 10:50 Natural decay chains and equilibrium (*M. Hult*)
- 11:20 *Break*
- 11:40 Coincidence summing (*T. Vidmar*)
- 12:10 Computer Exercise on coincidence summing (*T. Vidmar*, *M. Hult*)
- 13:10 *Lunch*
- 14:10 Test 3: decay data and decay chains (*M. Hult*)
- 14:30 Coincidence techniques and electronics (Compton suppression, muon shields) by *M. Hult*
- 14:50 Monte Carlo simulations (*T. Vidmar*)
- 15:20 *Break*
- 15:40 Introduction to EGSnrc and Monte Carlo exercise (*M. Hult*)
- 16:00 Computer exercise on Compton suppression (*M. Hult*, *T. Vidmar*)
- 17:40 Answers to Test 3: decay data (*T. Vidmar*)
- 18:00 End of day 2

### Thursday, 15 November 2012

- 10:00 Feedback to Test 3 (*T. Vidmar*)
- 10:10 Software for efficiency transfer and coincidence summing calculations (*T. Vidmar*)
- 10:40 QA, Intercomparisons, Proficiency testing (*M. Hult*)
- 10:55 The sum-peak method (*T. Vidmar*)
- 11:05 *Break*
- 11:25 Low energy problems (*M. Hult*)
- 11:55 Computer and calculation exercise (*M. Hult*, *T. Vidmar*)
- 13:00 *Lunch*
- 14:00 Computer and calculation exercise continued (*M. Hult*, *T. Vidmar*)
- 15:15 Angular correlations (*T. Vidmar*)
- 15:25 *Break*
- 15:45 Final Test (*T. Vidmar*)
- 16:10 Low background and cosmic rays (*M. Hult*)
- 16:35 Detection limits and decision thresholds (*M. Hult*)
- 17:00 Answers to Final Test (*T. Vidmar*, *M. Hult*)
- 17:30 Feedback and discussion
- 18:00 End of course

<sup>1</sup> EC-JRC-IRMM, Geel, Belgium

<sup>2</sup> SCK-CEN, Mol, Belgium

### Workshop opening on Monday, 12 November:

18:00 Registration desk open at Hotel Palace

19:40 Walk from Hotel Palace to opening dinner

20:00 Dinner at Restaurant "Little Bay"