
GammaSkill 2023 Proceedings: Training and seminar for
users of gamma-ray spectrometry

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Abstract

A three-day training event and seminar for users of gamma ray spectrometry was arranged in STUK, Finland, at 26th–28th September 2023. Around 100 participants from 11 countries took part, which probably made this the most popular technical NKS event to date. In addition to the training day lectures the total number of seminar presentations was 22. Five internationally recognized experts were invited to give lectures in the training day and in the two-day seminar. Very positive feedback was received from the digital participant questionnaire form.

Key words

Gamma ray spectrometry, seminar, training

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GammaSkill 2023 Proceedings

Training and seminar for users of gamma-ray
spectrometry

Vantaa, Finland,
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1. Introduction

The GammaSkill 2023 activity addresses users of gamma ray spectrometry in the Nordic countries and includes training and seminar on gamma ray spectrometry. The scope of the activity was broad, allowing a range of topics to be considered. High-level internationally recognized experts were invited to give talks on selected topics and challenges in gamma-ray spectrometry.

The series of NKS-funded gamma ray seminars started 2009. The content of past seminars has been varied and has often included intercomparison exercises. Instead of intercomparison a 1-day training event was included in the GammaSkill 2023 activity.

2. GammaSkill 2023

Around 100 participants from 11 countries participated – either on site or remotely by MS-Teams – in GammaSkill 2023, which means that the activity was probably the most popular NKS seminar to date. The participants were from universities, research institutions, industry and authorities. The number of seminar presentations was 22, see Appendix 1. The presentations will be available later at the GammaWiki web site.

No remote participation on the training day was possible. This was because on-site participation was considered to be necessary to obtain maximal benefit. In addition to lectures the training day also included practical exercises and their results were followed during the training. The number of lectures/exercises in the training day was 8.

3. Participant feedback

A participant anonymous feedback questionnaire was prepared in order to improve possible future seminars. Participants' comments together with the questions are presented in Appendix 2. The overall feedback was, as in the case of previous seminars, very positive.

In general, the participants suggested continuation of gamma spectrometry seminars.

Appendix 1 – Programme of the training day and the seminar.

Tuesday, September 26, 2023

Training Event

8:30 – 9:00	Registration
9:00 – 9:15	Opening and practical information Roy Pöllänen, STUK
9:15 – 10:00	Gamma-ray spectrometry basics #1: What are gamma-rays and how can we measure them? Invited lecturer Alexander Muring, IFE
10:00 – 10:30	Coffee break Served in conference lobby
10:30 – 11:15	Gamma-ray spectrometry basics #2: Gamma spectrum analysis and activity calculations Invited lecturer Alexander Muring, IFE
11:15 – 11:30	Break
11:30 – 11:45	Summary of the measurement process and introduction to the exercises Invited lecturer Alexander Muring, IFE
11:45 – 12:15	Practice exercises on basics of gamma-ray spectrometry Invited lecturer Alexander Muring, IFE
12:15 – 13:30	Lunch break Self-paid lunch at Restaurant Hella
13:30 – 13:40	Exercise solutions and results Invited lecturer Alexander Muring, IFE
13:40 – 14:30	Detector efficiency calibration basics Invited lecturer Guillaume Lutter, DTU
14:30 – 15:00	Coffee break Served in conference lobby
15:00 – 15:45	Uncertainty calculations and reporting of measurement results Invited lecturer Henrik Ramebäck, FOI
15:45 – 16:00	Break
16:00 – 16:30	Using gamma-ray spectrometry in the nuclear power plants Invited lecturer Laura Togneri, STUK
16:30 – 16:45	Summary, feedback and closing

Wednesday, September 27, 2023

First day of the Seminar

8:30 – 9:00	Registration
9:00 – 9:15	Opening and practical information Roy Pöllänen, STUK
9:15 – 9:45	Challenges in NORM analysis by gamma spectrometry: PT-2022 Sample 7, spectrum exercise of a spiked soil as a case study (MS-Teams) Invited lecturer Barbara Nadalut, IAEA
9:45 – 10:05	Gamma spectra after nuclear weapon detonation NKS TEMEDET: Technical challenges in metrological response to a nuclear detonation Mark Dowdall, DSA
10:05 – 10:40	Coffee break Served in the seminar lobby
10:40 – 11:00	Measuring mass attenuation coefficients for materials with unknown composition by performing transmission measurements with a HPGe detector for X-rays and low-energy gamma rays Leen Verheyen, SCK·CEN
11:00 – 11:20	Nuclide identification in gamma-ray spectroscopy using mixture of experts approach (MS-Teams) Abdelkader Helwan, LiU
11:20 – 11:40	Break
11:40 – 12:00	Experiences with accreditation of variable-geometry gamma- spectrometry Asser Nyander Poulsen, SIS
12:00 – 12:10	Separation of the gamma-rays 241 keV and 238 keV Hans Vigeland Lerum, Oncoinvent
12:10 – 12:20	A new gamma-ray spectrometry laboratory at IFE Kjeller to support nuclear decommissioning Invited lecturer Alexander Mairing, IFE
12:20 – 13:40	Lunch break Self-paid lunch at Restaurant Hella
13:40 – 14:00	Novel in-field technologies for source localization Harri Toivonen, HT Nuclear
14:00 – 14:20	Hidex Sample Exchanger SEC for HpGe systems Sari Viljanen, Hidex Oy

14:20 – 14:30	Radioanalytical Laboratory (RAL) Obaidur Rahman, SSM
14:30 – 14:50	STUK's new gamma-ray laboratory Roy Pöllänen, STUK
14:50 – 15:20	Coffee break Served in the seminar lobby
15:20 – 16:40	Visit to STUK's laboratories: 1) Remote expert support 2) Gamma-ray laboratory 3) Whole body counting 4) Field laboratory SONNI
18:00 – 22:00	Dinner at Finnish Science Centre Heureka

Thursday, September 28, 2023
Second day of the Seminar

9:00 – 9:30	Full energy peak efficiency using Monte Carlo simulations: principles Invited lecturer Guillaume Lutter, DTU
9:30 – 9:50	Improvement of gamma efficiency curves by maximizing the number of data-points András Kocsonya, EK-CER
9:50 – 10:20	Coffee break Served in the seminar lobby
10:20 – 11:00	Uncertainty calculation (GUMUF and MC) and calculation of critical limits Invited lecturer Henrik Ramebäck, FOI
11:00 – 11:20	Improving the accuracy of uncertainty calculations with Genie 4.0 Eric Tischenbach, Mirion Technologies
11:20 – 11:40	Break
11:40 – 12:00	Peak area determination in γ -ray spectrometry – influence caused by subjective elements Roy Pöllänen, STUK
12:00 – 12:10	Development of measurement systems at STUK's gamma laboratory Jani Turunen, STUK
12:10 – 12:20	Detector development at the Detector Laboratory of HIP Timo Hildén, HIP
12:20 – 12:30	Principal component analysis (PCA) for anomaly detection in time-series of gamma spectra Ellinoora Vikman, STUK
12:30 – 13:40	Lunch break Self-paid lunch at Restaurant Hella
13:40 – 14:00	Gamma-ray signals in neutron activation analysis Sakari Ihantola, NeutronGate
14:00 – 14:20	Non-destructive assay of spent nuclear fuel with Passive Gamma Emission Tomography (PGET) Riina Virta, STUK
14:20 – 14:40	Gamma spectrometry at ESS Nicola Markovic, ESS
14:40 – 15:00	Summary, feedback and closing

Appendix 2 – Participant Feedback

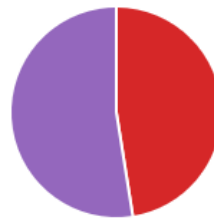
40

Number of answers

1. Content of the seminar program (on a scale 1-5, 1=poor and 5=excellent)

[Lisätietoja](#)

● 1	0
● 2	0
● 3	0
● 4	19
● 5	21



2. Presentations should be more practical/theoretical (on a scale 1-5, 1=practical and 5=theoretical)

[Lisätietoja](#)

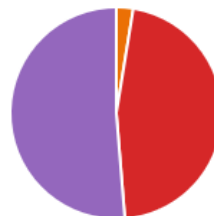
● 1	4
● 2	11
● 3	22
● 4	2
● 5	1



3. Was the training event and seminar useful (on a scale 1-5, 1=not at all and 5=very useful)

[Lisätietoja](#)

● 1	0
● 2	1
● 3	0
● 4	18
● 5	20



4. Free text (for example: comments of the present seminar, suggestion of the future seminar topics/themes, etc.)

Free text (for example: comments of the present seminar, suggestion of the future seminar topics/themes, etc.)

I am quite new in the field of activity measurement and participated in this seminar for first time. I got some very useful information about gamma measurement from this seminar which will be useful in my daily work in the laboratory.

This training event shed light on many aspects of gamma ray spectroscopy which, as an MSc student in nuclear chemistry on his second year, I had never considered in detail yet.

A big thanks to all panelists for sharing their knowledge and experience!

The auditorium is not suitable for such a big group. The facilities are not good. Excellent presentations as a whole, the schedule allowed for enough discussions and well-arranged seminar dinner.

Very nice to give us the opportunity to participate via teams. Nice presentations.

It would have been nice to participate via teams during the presentations on Tuesday.

Thank you.

Thank you for arranging this! Really good that there were enough breaks and the audience could concentrate well :)

I'm very grateful as a non-Scandinavian that I may participate at the seminar, which is one of the few regular events specifically dedicated to gamma-ray spectrometry. I think it's current concept does not require much change and I hope you manage to continue running it in the future.

Thank you for the great organization!

Interesting topics were covered by great people, I sincerely regret that I could not participate offline, but the Teams meeting was carried out perfectly and event was pretty great from the online perspective as well. I especially appreciated you keeping to the schedule (in fact, I cannot think of another event where the timeline was followed this impeccably, you're just amazing!).

From the theme point of view, I enjoyed presentations from Abedelkader Helwan and Henrik Ramebäck the most.

For the next time it would be great to hear more on practical aspects of the math used in analyzing the spectra, peak separation, decay correction, etc. What add-ons we can use to get the best of our data? Are there any additional software ideas? More cool AI approaches? etc :)

Things evolve quickly these days, you can as well consider annual basis for the future. Although, I understand if you don't. It is a lot of work to organize meeting like this and you should know that your work is highly appreciated.

Thanks again!

Best regards,
Alesya Maruk

Thank you for excellent seminar!

Excellent combination of presentation and logical and very good progression (from quite basic to much more complex).

I would've liked more exercises, but that is a tradeoff with less presentations. And I found all the presentations to be interesting and inspiring. And it would be up to the presenters to produce and implement in the time they have been given, which might not suit everyone.

I found the breaks to be a bit long, especially lunch break. But that might be that I'm used to less breaktime. I did appreciate the 20min breaks, because it gave time to chat and discuss with the others about what had been presented.

Overall a very useful, helpful and interesting seminar. Appreciate the strictness of keeping on time, although it leaves a somewhat tight timegap for questions and discussion afterwards.

Having dinner and socialising at Heureka was absolutely brilliant!

This is the kind of seminars most needed by lab fellows, it was excellent and fruitful experience. Thank you very much!

Both days morning sessions before lunch were interesting.

Training event was very good and the exercises were better still. The seminars were varied and interesting. Very well-organized event.

Very good seminar with lots of interesting talks. I would perhaps be a bit more interested in also talking about the NaI crystals as these are often used more in an emergency management setting.

Great dinner location!

I like that the seminar is on a quite practical level. Specialist lectures on some certain topics could be fun (like determination of natural radionuclides with gamma spectrometry or best practises for self-absorption / coincidence summing corrections).

Excellent organization, great venue. Nice to have broad attendance (many countries). Could it also be held outside the Nordic countries?

Pausene var kanskje litt lange....

Good with time to discuss between the presentations, but maybe the coffee breaks, and the lunch could be a little bit shorter. Better with many short breaks. And the days could be shorter.

Very well organized. One of the best conferences/workshops I've attended. You put some effort in the lab tour, and we really got opportunity to see a lot. Thank you for that. Conference room (all technicalities around presentations, microphones, zoom etc.), distance to hotel and dinner - all was very good.

I know this seminar was labelled as gammaskills which is very important to develop measurement skills of the Nordic countries. I remember from the past some seminar presentations which had more weight on research aspect.

All in all a very nice event and especially the evening event was very nice! :)

Excellent arrangement, logical and didactic professional program and lectures. Very useful seminar.

Would be interesting with a little more variety in the content of the presentations

very nice dinner

Find it to be a good variation of topics. Always interesting with the discussions regarding how to thing with regards to detection limits and similar.

No comments, all was good!

I think the level of the presentation was very good for me. A wide range of topics regarding gamma measurements were covered. Though the local was quite warm it was a good area to mingle and talk to each other during breaks and also enough time for discussions. To see your lab and locals were also very interesting.

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