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GammaSpec 2017 Proceedings

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Abstract

The GammaSpec seminar was held at Risø, Denmark, during 19-20 September 2017. Three invited lectures covered ultra-low background equipment and measurement techniques, new technologies for gamma spectrometry, and a new technique to create nuclide libraries for gamma spectrometry. Other seminar participants presented applications of gamma spectrometry in their labs. Intercomparison exercises organised for the seminar covered laboratory analyses of distributed samples (water and sediment) and desk top exercises involving gamma spectra and data for quantitative and qualitative analyses. Results of the intercomparison exercises were presented and discussed. The seminar was attended by 41 individuals from 25 organisations.

Key words

Gamma, spectrometry, calibration, intercomparison, quality

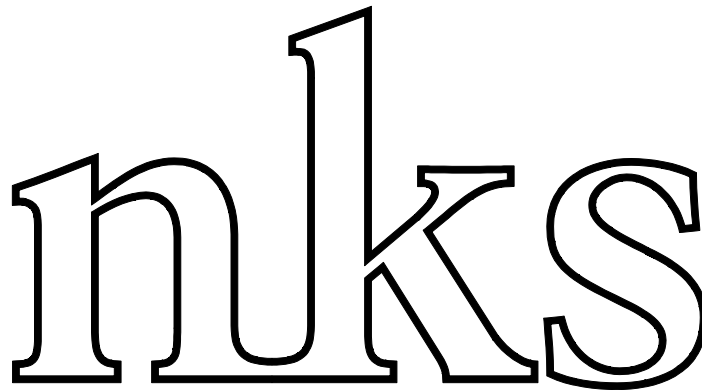
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GammaSpec 2017 Proceedings

Seminar for users of gamma-ray spectrometry

Risø, Denmark,
19-20 September 2017



Sven P. Nielsen, Anna Rand, Trygve Bjerk, Henrik Ramebäck, Roy Pöllänen and Gísli Jónsson



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Introduction

After many years of limited interaction between Nordic users of gamma ray spectrometry, an NKS activity on gamma spectrometry was started in 2009. Three follow-up seminars were held in 2010, 2011 and 2012. The latest seminars were held by FOI, Sweden, STUK, Finland and IFE, Norway in 2013, 2014 and 2016 respectively.

Feedback from participants has been positive through all these years, and a considerable interest for future seminars has been expressed amongst the participants.

GammaSpec 2017

At the 2017 GammaSpec meeting 41 individuals from 25 organisations were present (Appendix 1). The participants were a good mixture of scientists from universities as well as users from industry and authorities. Invited lectures were

- Mikael Hult, European Commission, JRC, Directorate G, Unit G.2, Geel, Belgium, gave a presentation entitled (*Ultra-*) *Low Background Gamma-ray Spectrometry*, where he presented recent advances in analytical equipment and applications particularly in the underground facility HADES located at Mol in Belgium.
- Harri Toivonen, CEO at HT Nuclear, Finland. In his talk *Novel Technologies for In-Field Gamma Spectrometry*, he described the European Reference Network for Critical Infrastructure Protection (ERNICIP) for which he is coordinator and described aspects of relevance to gamma spectrometry.
- Leen Verheyen, SCK-CEN, Labo LRM, Belgium, gave a presentation entitled *Genie2k Library Creator* describing a system that builds a radionuclide library based on most recent nuclear data (from www.nuclide.org) for use with Genie2000 software.

There were the following additional presentations from participants:

- Anna Rand and Trygve Bjerk, IFE, Norway: *Practical gamma measurements at IFE – natural activity*
- Roy Pöllänen, STUK, Finland: *Experimental efficiency calibration of a HPGe gamma-ray detector*
- Joonas Tikkanen, STUK, Finland: *Calibration of a small anode Germanium well detector*
- Tim Vidmar, SCK.CEN, Belgium: *Notes on Exercise 2a*
- Asser Nyander Poulsen, Sundhedsstyrelsen, Strålebeskyttelse, Denmark: *Quality assurance of a characterised Ge-detector used for various geometries (mathematical efficiency calibration)*
- Daniela Pittauer, MARUM, Germany: *Detector contamination from a broken sealed test source*
- Mats Eriksson, SSM, Sweden: *On the measurements of alpha-particle and X-ray/gamma-ray in coincidence*
- Nikola Markovic, DTU, Denmark: *GenTran – user interface software for Genie2000TM/EFFTRAN based gamma analysis*

- Nicolò Borghi, DTU, Denmark: *Developing a Target Imaging System for the ESS*
- Petri Jovi, Olkiluoto NPP, Finland: *Measuring iodine from stack filters*
- Tiina Torvela, STUK, Finland: *Renewed whole body measurement chamber at STUK*
- Benóný Þór Björnsson, IRSA, Iceland: *Radioactivity in the environment and food in Iceland – regular monitoring*
- Roy Pöllänen, STUK, Finland: *Intercomparison samples & gamma-ray analyses at STUK*
- Sinikka Virtanen, STUK, Finland: *Gamma intercomparison exercise - sample preparation and preliminary results*
- Anna Rand and Trygve Bjerk, IFE, Norway: *Intercomparison exercise 2a*
- Sven Nielsen, DTU, Denmark: *Evaluation of results for exercise 2a*
- Henrik Ramebäck, FOI, Sweden: *Intercomparison exercise 2b*

The last presentations dealt with intercomparison exercises that had been made available to the participants before the seminar: 1) laboratory analyses of two samples, water and sediment (also part of the NKS-B CAMNAR activity, organised and distributed to participants by STUK), 2a) a desktop exercise on analyses of gamma spectra with associated information representing two unknown samples (organised by IFE) and 2b) an exercise on identifying radionuclides in a gamma spectrum and identity of sample (organised by FOI).

Towards the end of the seminar, Canberra gave a presentation of new developments/equipment available:

- Michel Ceuppens, Canberra: *iPA, the intelligent pre-amplifier. What does it bring you as user?*

The seminar programme is listed in Appendix 2 and the presentations have been made available at the GammaWiki web site

(http://gr.is/wiki/GammaWiki/index.php/GammaSpec_2017).

The overall feedback from participants was positive, see Appendix 3.

All participants are looking forward to future events.

Appendix 1 – List of participants

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Appendix 2 – Seminar Programme

Programme NKS-B GammaSpec 2017 Seminar, Niels Bohr Auditorium, Risø, 19-20 September 2017



Tuesday, 19 September			
Start	End	Speaker	Title
09:00	09:15	Sven Nielsen, DTU Nutech, DK	Opening and practical information
09:15	09:30	Kasper Andersson, DTU Nutech, DK	Call for proposals for NKS-B 2018
09:30	10:15	Mikael Hult, EC, JRC, Unit G.2, BE	Low-level techniques and recent developments in gamma spectrometry
10:15	10:45	Coffee break, Auditorium hall	
10:45	11:30	Harri Toivonen, HT Nuclear, FI	Novel Technologies for In-field Gamma Spectrometry
11:30	13:00	Lunch, Risø Canteen	
13:00	13:45	Leen Verheiden, SCK.CEN, BE	Creating gamma-ray nuclide libraries in Genie using the recommended data from nucleide.org
13:45	14:05	Anna Rand and Trygve Bjerck, IFE, NO	Practical gamma measurements at IFE - natural activity
14:05	14:45	Roy Pöllänen, STUK	Experimental efficiency calibration of a HPGe gamma-ray detector
14:45	15:15	Coffee break, Auditorium hall	
15:15	15:30	Joonas Tikkanen, STUK, FI	Calibration of a small anode Germanium well detector
15:30	15:45	Tim Vidmar, SCK.CEN, BE	Some tests of EFFTRAN TCS correction factors calculations
15:45	16:00	Asser Nyander Poulsen, SIS, DK	Quality assurance of a characterised Ge-detector used for various geometries (mathematical efficiency calibration)
16:00	16:15	Daniela Pittauer, MARUM, DE	Detector contamination from a broken sealed test source
19:00		Seminar dinner at Snekken in Roskilde	

Wednesday, 20 September			
Start	End	Speaker	Title
09:00	09:15	Mats Eriksson	On the measurements of alpha-particle and X-ray/gamma-ray in coincidence
09:15	09:30	Nikola Markovic, DTU, DK	GenTran – user interface software for Genie2000™/EFFTRAN based gamma analysis
09:30	09:45	Nicolò Borghi	Developing a Target Imaging System for the ESS
09:45	10:00	Petri Jovi, Olkiluoto NPP, FI	Measuring iodine from stack filters
10:00	10:30	Coffee break, Auditorium hall	
10:30	10:45	Tiina Torvela, STUK, FI	Renewed whole body measurement chamber at STUK
10:45	11:00	Benóný Þór Björnsson	Radioactivity in the environment and food in Iceland – regular monitoring
11:00	11:15	Roy Pöllänen, STUK	Intercomparison samples & gamma-ray analyses at STUK
11:15	11:30	Sinikka Virtanen, STUK, FI	Gamma intercomparison exercise - sample preparation and preliminary results
11:30	13:00	Lunch, Risø Canteen	
13:00	13:40	Trygve Bjerck and Anna Rand, IFE, NO + Henrik Ramebäck, FOI, SE	Intercomparison exercises 2 and 3
13:40	14:00	Michel Ceuppens, Canberra/Mirion, BE	iPA, the intelligent pre-amplifier. What does it bring you as user?
14:00	14:30	Coffee break, Auditorium hall	
14:30	15:00	Participant feedback survey	
15:00	15:30	Seminar round up, future gamma spectrometry meetings	
16:00		End of Seminar	

Appendix 3 – Participant feedback

<ul style="list-style-type: none"> • Successful meeting • Good forum for exchange of experience within the field and meeting colleagues • Forum also good for new people who start working with gamma spectrometry • The unformal atmosphere is appreciated • Optimal number of participants • Good with participants from outside the Nordic countries • Intercomparison exercises and desktop exercises are fine, although we did not report much due to other work • Annual seminars are fine • Information on new trends and applications in the field are valuable
<ul style="list-style-type: none"> • More on practical issues, perhaps more detailed • Less on organization presentations/overviews • Themes suggested: low energy 5-50 keV X-ray/gamma spectrometry (many problems), gamma/X-ray lab setup, analysis of residual isotopes in radiopharmaceuticals, decommissioning • Possibly a gamma seminar would benefit from being mixed with a more radiometric seminar (not every year but at least once) to enable comparison of techniques usable for isotopes/matrices, e.g. gamma/LSC/alpha for Pb-210/Bi-210/Po-210 or X-ray vs. alpha for Am-241.
<ul style="list-style-type: none"> • GammaSpec (GammaUser, Gamma Workshop) is a great opportunity to regularly meet colleagues working in the field. Regularity is a great plus of this event. It is fine that it is short (2 days) so it is a short business trip. • The intercomparisons are also a very good feature although it would be better if more detailed evaluation was discussed. The desktop exercise 2a was interesting but we did not participate because it appeared very time consuming. • The topic selection was as always very relevant and of high interest for many. Also it is highly appreciated that members of the community make their software solutions freely available and GammaSpec is a great opportunity to advertise and promote them. • In my opinion we should continue meeting in 1-y intervals. Also the nice dinners during these events contribute greatly to networking and community building. • Keep on and thank you for a great meeting • Suggestions for future topics: hands-on exercise (workshop) on list-mode acquisition
<ul style="list-style-type: none"> • About the exercises I encountered difficulties when trying to open the spectrum files. When I managed to get a computer with Genie installed there was not really time for me to perform the tasks. • About the intercomparison measurements, the nuclides in the sample are not what we usually measure. Our system is not optimized for this kind of measurements. • Other – Could have been nice with information about starting time etc. via email • A good seminar and nice dinner
<ul style="list-style-type: none"> • The website was not accessible, blocked from our IT-department. Therefore it was difficult to get information about the seminar. Emailing the schedule to the participants would be good. It also made it difficult to download the spectrum files. This had to be done at home on private computers and then transferring them to another computer. Still, we had problems with opening and converting the files and did not participate in the intercomparison exercises. • Nice to meet others doing the same work • Seminar once a year is good

<ul style="list-style-type: none"> • Organisation has been excellent • I appreciate the meeting as an annual event • I have not participated in the interlab comparison exercises but will do so as soon as we have the lab setup (2018/2019). I think they are an excellent way to bring the community together. • I did not receive any communication between meetings so please add me to the email group
<ul style="list-style-type: none"> • Very good organization and good with many new faces • Important that this continues due to the limited number of Nordic users of gamma spectrometry who need to exchange experience. Perhaps test spectra (exercises) should have been sent to all participants before the seminar
<ul style="list-style-type: none"> • Very good seminar, thank you • Every second year would be enough, then more motivated to do exercises, now time problem • Good to have user presentations, good presentations
<ul style="list-style-type: none"> • Thank you for the seminar • Very interesting seminar even if you are not a specialist • Seminar once every 2 years
<ul style="list-style-type: none"> • We got the information about GammaSpec quite late, mid-June I believe. • The webpage was not updated and also it was blocked from the company computers. This is a minor problem. However, installing programs for reading spectra is rather hard for us thanks to company policies and firewalls
<ul style="list-style-type: none"> • We really like comparison samples, unfortunately we did not have time to do anything this year • I really like the presentations, I do not know if anything from the nuclear power plant industry would be interesting to hear about? Maybe something more about decommissioning? • I think it can be a yearly event, but perhaps think about when (time of year). • It is best suited, perhaps winter is better than autumn, or spring perhaps? • Maybe we should do a presentation on who is who and what they do? • Keep up the good work • Thanks a lot for this year
<ul style="list-style-type: none"> • (-) The webpage was not easy to access, we had difficulties of entering the webpage • (-) We did not get the announcement early, that is why we did not participate in the intercomparison and exercise • (+) The contents of the whole meeting was interesting • (+) Keep having these meetings annually since it is good with gathering people around to discuss spectrometry and share and gather information
<ul style="list-style-type: none"> • Thank you many times for the NKS gamma seminar 19 – 20 September at Risø • The presentations from participants including the one from the commercial company MIRION were all very interesting and covered a variety of topics within gamma spectrometry. It was first time attending the NKS gamma seminar and I'm looking forward to future NKS seminars.

<p>Intercomparisons</p> <ul style="list-style-type: none"> • Soil – if you don't know the homogenization and moisture content, I don't know if you can use it • Water – interesting – let also a reference institute measure the sample • Exercise 2a: very nice and interesting • Exercise 2b: overlooked it at the website, would otherwise have participated <p>First time on this seminar</p> <ul style="list-style-type: none"> • Very interesting • Very useful in the future • Nice people • Good tips for lab improvement, calibration topics, organization, different programs, ... • Length of conference – good • Organisation very kind <p>Topics for the future</p> <ul style="list-style-type: none"> • Unknown sample material, different ways of calculating low energies • More errors in the different labs • More exercises like 2a and 2b
<p>Thanks for a very instructive and interesting seminar. I hope that annual seminars will continue. The exercises were very good. They were very instructive although I did not have time to participate in all of them. I hope that similar exercises will be organized next year</p>
<ul style="list-style-type: none"> • Seminar was well organized in my opinion • Topics were interesting, it would be nice to have something more for NPP persons. • Yearly is good in my opinion, I usually have good info to take home with.
<ul style="list-style-type: none"> • Very well organized • Very nice location and lecture hall • Scandinavian collaboration important • Meeting every 18 months • Next time: special session on closed activities that had to be restarted • Special session on errors made
<ul style="list-style-type: none"> • I find this seminar very useful. I have not attended to the gamma seminar before but would like to do it again. As a gamma-beginner, the level and diversity of topics were great. • Unfortunately, I misunderstood and did not find exercise 3 and therefore did not reply to it. • The spectra exercise 2 was very useful for us (me). • If the seminar could be every year or every 2nd year, I would definitely like to attend again.
<ul style="list-style-type: none"> • Nicely organized meeting • Good presentations regarding different aspects of gamma spectrometry • Strongly recommend to continue gamma spec meetings • Many participants in the intercomparison which was a very good thing, continuation suggested. • Good way for exchanging information.
<ul style="list-style-type: none"> • Valuable meetings combining different organisations • Did only participate in CAMNAR measurements due to lack of time • Annual is a good frequency to keep the contact with other participants
<ul style="list-style-type: none"> • My first time here. I have learned a lot and have some really interesting questions to take home. • I think I could gain a lot of knowledge from annual participation in this forum. Therefore, I think that this should be an annual occurring event. • We feel that the exercises were very useful. Unfortunately we failed to find the last spectrum (peak ID) and therefore did not participate.

<p>Good seminar, friendly and relaxed</p> <p>Suggestions</p> <ul style="list-style-type: none">• Maybe focus on fewer subjects• Practical demo/lab on useful software• Exercise on nuclide vectors in decommissioning, i.e. concrete/steel sample
<ul style="list-style-type: none">• One of the best NKS gamma seminars so far – many thanks!• The presentations are getting more interesting in each edition so there is no need really for any basic change and if possible these meetings should definitely be held annually• See you next time
<ul style="list-style-type: none">• Really enjoyable• Would be nice to have more talks on practical applications
<ul style="list-style-type: none">• Good size, not too tight schedule• To be organized every 2nd year is enough• +++++, 5 stars

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