International Workshop on Isotopic Analysis of Uranium and Plutonium by Nondestructive Assay Techniques for Nuclear Safeguards

16-19 February 2021
All Times Vienna, Austria

16-Feb – 12:00 - Opening Remarks and Kick-off

16-Feb Session #1 U/Pu Isotopics Software (Chairs: Ram Venkataraman, Pierre Funk)

Time	*Log*	*Authors*	*Title*
12:30	34	T. Sampson	A Historical Overview of the Development of Gamma-Ray Isotopic Analysis of Plutonium and Uranium
12:50	25	D. Vo	FRAM v.6.1's improvements
13:10	11	I. Meleshenkovskii, F. Carrel, A.-C. Simon, I. Espagnon	Isotopic composition determination codes: current state-of-the-art, recent developments and future perspectives
13:30	7	E. Kovalsky, V. Danilenko, I. Kuvykin, V. Mayorov, A. Berlizov	Isotopic Analysis of Nuclear Materials Using the SpectraLine Code
13:50	28	R. Venkataraman, P.K. Pujari, R. Tripathi, A. Favalli, M. Iliev, L. Limback	An Indigenous Isotopic Analysis Code Developed at Bhabha Atomic Research Centre (India) - Inter-Comparison with FRAM, MGA and MGAU
14:10	17	K. Koehler, D. Becker, M. Croce, J. Ullom, M. Yoho	SAPPY: A Spectral Analysis Program in Python for Microcalorimeter and High-Purity Germanium Data

16-Feb Session #2 Uncertainty and Performance (Chairs: Anne-Laure Weber, Brent McGinnis)

Time	*Log*	*Authors*	*Title*
15:00	1	T. Burr, T. Sampson, D. Vo	Measurement Error Variance Estimation in Gamma-Spectroscopy Data using FRAM
15:20	33	J. Zsigrai, A. Berlizov, J. Bagi, A. Muehleisen	Isotopic Analysis of Shielded Nuclear Material with FRAM and Electrically Cooled Coaxial High-Purity Germanium Detectors
15:40	32	J. Zsigrai, C.T. Nguyen, A. Berlizov, T. Ruther	Influence of Bismuth on Uranium Isotopic Composition Measurements by HRGS
16:00	30	C. Deyglun, J.-L. Dufour, N. Pepin, A.-L. Weber	Uncertainty Estimation of UF_6 Enrichment Measurement by High Resolution Gamma Spectrometry
16:20	37	S. Friedrich, G.-B. Kim, R. Hummatov, R. Henderson, J. Ad Hall, R. Cantor, S.P.T. Boyd	Ultra-high Resolution Magnetic Microcalorimeter Gamma-Ray Detectors for Nondestructive Assay of Nuclear Materials
16:40	*XX*	*Reserved*	*None*

17-Feb Session #3 Isotopic Analysis at Uncommon Energy Resolutions (Chairs: Andriy Berlizov, Jozsef Zsigrai)

Time	*Log*	*Authors*	*Title*
12:30	4	X. Wang, L. He, J. Shao	Medium Resolution Gamma-Ray Spectra Analyzing Methods for $LaBr_3$(Ce) detectors: A Review in China
12:50	8	A. Berlizov, M. Koskelo, B. McGinnis, J. Carbonaro	The Inter-Comparison Exercise on Uranium and Plutonium Isotopic Analysis with Medium Resolution Gamma-Ray Spectrometers
13:10	6	R. Gunnink, A. Berlizov	PAT, a Program for Determining the Category of Plutonium Samples
13:30	3	A. Borella, M. Bruggeman, R. Rossa, P. Schillebeeckx, T. Vidmar	Peak Shape Characterization of a 500 mm^3 Cadmium Zinc Telluride Detector and Analysis of Spectroscopic Measurement Data for Uranium Samples
13:50	26	R. Venkataraman, M. Dion, S. Smith, J. Dreyer, V. Mozin, M. Enghauser, G. Thoreson, D. Vo, M. Zalavadia	Isotopic Analysis of Uranium Gamma Ray Spectra Acquired using a Higher Resolution Cadmium Zinc Telluride Detector - Initial Results
14:10	10	M. Croce, D. Becker, D. Bennett et al (18 authors in total)	Improving the Precision of Nondestructive Uranium and Plutonium Isotopic Analysis with Practical Microcalorimeter Gamma Spectrometers

17-Feb Session #4 Performance and Modelling (Chairs: Ludovic Bourva, Andrey Bosko)

Time	*Log*	*Authors*	*Title*
15:00	15	D. Nakazawa, C.K. Kim, K. Raptis, G. Duhamel	Studies on the application of plutonium isotopics codes in the IAEA On-Site Laboratory
15:20	38	V. Nizhnik	Fissile mass quantification using gamma-spectroscopy with deep learning assay. Numerical validation of the methodology
15:40	2	B. Goddard, M. Shah, C. Lloyd	Gamma Spectrum Predictor: An Open Source Gamma Spectrum Generation Tool
16:00	5	A. Rozite	Influence of HPGe Detector Energy Resolution on the Analysis Capabilities of MGA, MGAU and FRAM Spectrum Analysis Codes
16:20	19	L. Bourva	Evaluation of a simple iterative ISOCS based analysis for the determination of the uranium concentration in 200-l drums
16:40	*XX*	*Reserved*	*None*

18-Feb Session #5 Related Techniques (Chairs: Stephen Croft, Mikhail Mayorov)

Time	*Log*	*Authors*	*Title*
12:30	16	D.C. Rodriguez, M. Koizumi, H.J. Lee, F. Rossi, S. Suzuki, T. Takahashi	Delayed Gamma-ray Spectroscopy (DGS) Topics
12:50	12	A. Levunin, S. Romadova, Y. Tadevosyan, S. Bogdanov, D. Volnistov	New software for HKED densitometer of RT-1 plant
13:10	20	G. Hull, E. McNaghten, C. Sharrad, P. Martin	A combined system for elemental and isotopic analysis of nuclear materials using laser-induced breakdown spectroscopy and laser absorption spectroscopy
13:30	13	B. Ryazanov, S. Bogdanov, G. Bezhunov, N. Rykov, A. Masterov, S. Nikolaev, V. Chernov	Justification of the possibility of the neutron method applying for monitoring the fissile material accumulations in filters and air ducts of the SNF reprocessing plant
13:50	18	A. Thornthwaite, N. Clarke, J. Sharpe, J. Rackham, M. Wilson	Applying the Plutonium Fluoride Correction Technique using Passive Neutron Counting and High-Resolution Gamma Spectrometry
14:10	39	V. Nizhnik	Dynamic Calorimetry with Infrared Sensing and Recurrent Neural Network Assay for MOX and Plutonium Items

18-Feb Session #6 Enrichment Meter Principle (Chairs: Markku Koskelo, Ray Gunnink)

Time	*Log*	*Authors*	*Title*
15:00	21	A. Rabinovich, A. Bonino, F. Dias, G. Diaz, H. Gonzales, M.C. Moreira, M.S. Grund, M. Facchinetti	Application of the NaIGEM Code for Uranium Enrichment Measurements by Gamma-Ray Spectrometry with Lanthanum Bromide Detectors
15:20	23	A. Berlizov	GEM: a Next-Generation Gamma Enrichment Measurements Code
15:40	14	B. McDonald, M. Zalavadia, K. Bensema, N. Deshmukh, L.E. Smith	Gamma-ray Enrichment Analysis of Field Trial Data from an Unattended Cylinder Verification Station
16:00	36	G. Mammitzsch, A. Berlizov, J. Mintcheva, G. Schneider, K. Aymanns	MCA Touch 2.1: A Versatile Software for Nuclear Safeguards Inspectors
16:20	22	A. Berlizov, U. Repinc, S. Baumann, M. Sturm, K. Henderson	Validation of the Concentration Meter Principle for Non-Destructive Assay of Uranium in Low-Concentrated Materials
16:40	40	Y. Dodane, A. Lebrun	Status of performance evaluation of advanced Cadmium-Zinc-Telluride gamma spectrometry probes

19-Feb Session #7 Round Table Discussion 1 (Organizers: Ram Venkataraman, Markku Koskelo)

Start	*End*	*Title*
12:00	14:00	Application of Medium Resolution Gamma Spectrometers for Isotopic Analysis of Uranium and Plutonium - Present and Future

19-Feb Session #8 Round Table Discussion 2 (Organizers: Anne-Laure Weber, Jozsef Zsigrai, Markku Koskelo)

Start	*End*	*Title*
14:15	16:15	International Target Values ITV-2020 for Measurement Uncertainties in Safeguarding Nuclear Material by Nondestructive Assay Techniques 1. ITV-2020 Project Overview: IAEA Objectives and Time Table (C. Norman) 2. Briefings by panelists: • Chair of ITV-2020 Sub-Group 1 – COMPUCEA (M. Toma) • Chair of ITV-2020 Sub-Group 2 – U/Th Content by NDA (N. St-Amant) • Chair of ITV-2020 Sub-Group 3 – U-235 Enrichment by NDA (M. Koskelo) • Chair of ITV-2020 Sub-Group 4 – Pu Isotopics by NDA (D. Vo) • Chair of ITV-2020 Sub-Group 5 – U/Pu Mass by Gamma (R. Venkataraman) • Chair of ITV-2020 Sub-Group 6 – U/Pu Mass by Neutron (M. Swinhoe) 3. Discussions / Comments / Proposals / Q&A 4. Summary and conclusions

19-Feb – 16:30 – 17:00 Closing Session (Chaired by: Arden Dougan and Brent McGinnis)