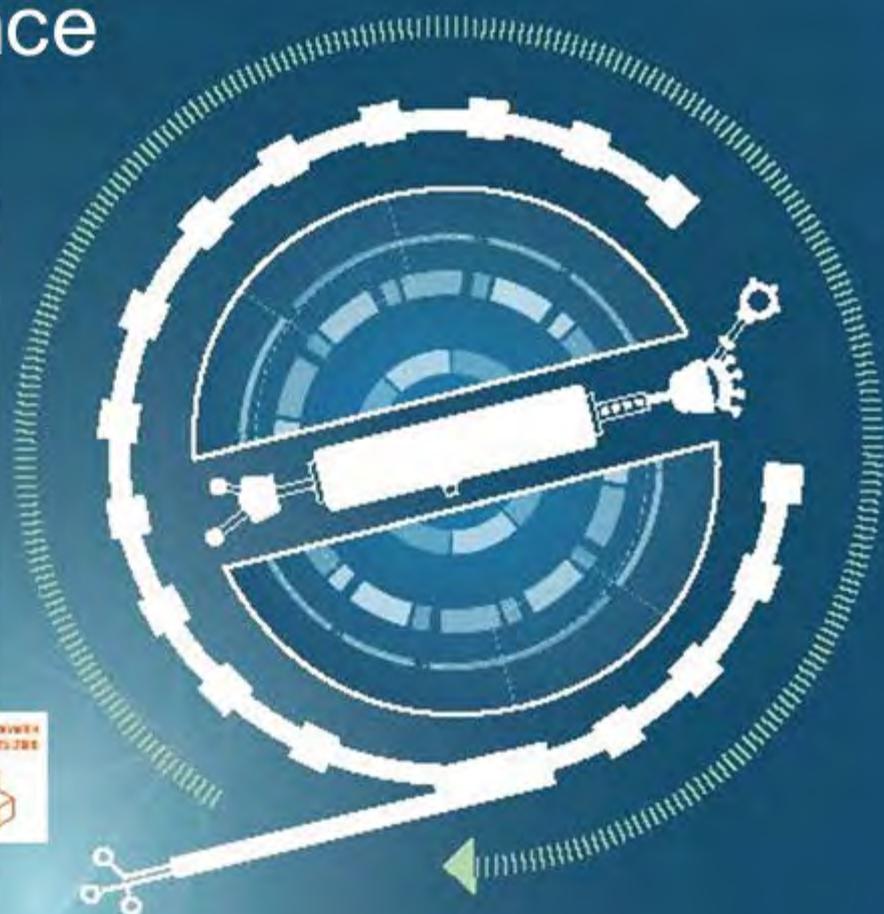


INTERNATIONAL CONFERENCE ON

ACCELERATORS FOR RESEARCH AND SUSTAINABLE DEVELOPMENT

From good practices towards socioeconomic impact

Conference
Material
Volume 1
Master
File



23–27 May 2022

IAEA Headquarters, Vienna, Austria



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International Conference on Accelerators for Research and Sustainable Development

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Accelerating a better world¹

Tens of thousands of accelerators around the world help create radiopharmaceuticals, treat cancer, preserve food, monitor the environment, strengthen materials, understand fundamental physics, study the past, and even disclose crimes.

A first of its kind international conference, Accelerators for Research and Sustainable Development: From Good Practices Towards Socioeconomic Impact was organised by the International Atomic Energy Agency (IAEA) at its headquarters in Vienna from 23 to 27 May. It was held as a hybrid event attended by around 500 scientists from 72 IAEA member states. While focusing mainly on applications of accelerator science and technology, the conference was geared towards accelerator technologists, operators, users, entrepreneurs, and other stakeholders involved in applications of accelerator technologies as well as policy makers and regulators.



“The far-reaching capabilities of accelerator technology help countries progress towards sustainable development,” said IAEA director general Rafael Mariano Grossi in his opening address. “IAEA’s work with accelerators helps to fulfil a core part of its ‘Atoms for Peace and Development’ mandate.” He also highlighted how accelerator technology plays a critical role in two IAEA initiatives launched over the past year: Rays of Hope, aimed at improving access to radiotherapy and cancer care in low- and middle-income countries, and NUTEC plastics, supporting countries in addressing plastic waste issues in the ocean and on land. Finally, he described IAEA plans to establish an accelerator of its own: a state-of-the-art ion-beam facility in Seibersdorf, Austria that will support research and help educate and train scientists.

The conference included sessions dedicated to case studies demonstrating socioeconomic impact as well as best practices in effective management, safe operation, and the sustainability of present and future accelerator facilities. It showcased the rich diversity in types of accelerators – from

¹ Meeting report published in [CERN Courier](#), on 25 August 2022, by Sotirios Charisopoulos, Danas Ridikas, Celina Horak and Valeriia Starovoitova, IAEA

large-scale synchrotrons and spallation neutron sources, or medical cyclotrons and e-beam irradiators used for industrial applications, to small-scale electrostatic accelerators and compact-accelerator based neutron sources – and included updates in emerging accelerator technologies, such as laser-driven neutron and X-ray sources and their future applications. Six plenary sessions featuring 16 keynote talks captured the state of the art in various application domains, accompanied by 16 parallel and two poster sessions by young researchers.

During the summary and highlights session, important developments and future trends were presented:

- Large-scale accelerator facilities under development across the world – notably FAIR in Germany, SPIRAL-2 in France, FRIB in the US, RIBF in Japan, HIAF in China, RAON in Korea, DERICA in Russia and MYRRHA in Belgium – boost the development of advanced accelerator technologies, which are expected to deliver high-impact socioeconomical applications. Substantial interdisciplinary research programmes are foreseen from their beginning, and the IAEA could play an important role by strengthening the links and cooperation between all parties.
- Recent technology developments in Compact-Accelerator Neutron Sources (CANS) or High-Power CANS (HiCANS) are very promising. Among many projects, ERANS at RIKEN in Japan aims to realise a low-cost CANS capable of providing 10^{12} n/s for applications in materials research and ERANS-III a transportable CANS for testing the structure of bridges. On the HiCANS front, the French SONATE project aims to reach neutron flux levels comparable to the ageing fleet of low and medium power research reactors at least for some applications.
- CANS technology is promising for tools to fight cancer, for example via the Boron Neutron Capture Therapy (BNCT) method. Japan leads the way by operating or constructing 10 such in-hospital based facilities, with only a few other countries, e.g., Finland, considering similar technologies. Recent developments suggest that accelerator based BNCT treatments become soon more acceptable. IAEA could play an important coordinating role and as a technology bridge to developing countries to enable more widespread adoption.
- The role of accelerators in preserving cultural heritage objects and in detecting forgeries is becoming more vital, especially in countries that do not have the required capabilities. Ion-beam analysis and accelerator mass spectrometry techniques are of particular relevance, and, again, the IAEA can assist by coordinating actions to disseminate knowledge, educating the relevant communities, and possibly centralising the demands for expertise.
- The IAEA could simplify the supply of accelerator technologies between the different member states, enabling the installation and operation of facilities in low- and middle-income countries, for example by structuring the scientific and technical accelerators communities, and educating young researchers and technicians via dedicated training schools.
- One of IAEA's projects is to establish a state-of-the-art ion beam facility in Austria. This will enable applied research and provision of analytical services, as well as help educate and train scientists on the diverse applications of ion beams (including the production of secondary particles such as neutrons) and will enhance collaborations with both developed and developing countries.

- Ion-beam analysis (IBA) together with accelerator-mass spectroscopy (AMS) techniques are unique, reliable and cost-effective for Environmental Monitoring and Climate Change Related Studies, for example in characterising environmental samples and investigating isotope ratio studies for chronology and environmental remediation AMS facilities with smaller footprints have increased their distribution worldwide, resulting in accessible and affordable measurements for interdisciplinary research, while other IBA techniques offer efficient analytical methods to characterise the chemical composition of particles from air pollution.
- Materials science and accelerators are now moving ahead hand in hand, from characterisation to modification of technologically important materials including semiconductors, nano-materials, materials for emerging quantum technologies and materials relevant to energy production. Testing materials with accelerator-based light and heavy-ion beams remains a unique possibility in the case of fusion materials and offers much faster radiation-damage studies than irradiation facilities at research reactors. Equally important is the accelerator-assisted creation of gaseous products such as hydrogen and helium that allows testing the radiation resilience in unmoderated neutron systems such as fast fission and fusion reactors.
- New developments in electron-beam accelerators for industrial applications were also mentioned, in particular their application to pollution control. E-beam system technologies are also widely employed in food safety. Reducing spoilage by extending the shelf-life of foods and reducing the potential for pathogens in and on foods will become major drivers for the adoption of these technologies, for which a deeper understanding of the related effects and resistance against radiation is mandatory.

Accelerator technologies evolve very fast, presenting a challenge for regulatory bodies to authorise and inspect accelerator facilities and activities. This conference demonstrated that thanks to recent technological breakthroughs in accelerator technology and associated instrumentation, accelerators are becoming an equally attractive alternative to other sources of ionising radiation such as gamma irradiators or research reactors, among other conventional techniques. Based on the success of this conference, it is expected that the IAEA will start a new series of accelerator community gatherings periodically from now on every two to three years.

Useful links

Conference website: (main) <https://www.iaea.org/events/acconf22>
(indico) <https://conferences.iaea.org/event/264/>

Conference Material Vol. 2 ([Book of Abstracts](#))

Conference Material Vol. 3 ([Full Papers](#))

Conference App pages: <https://iaea.event.do/#/e/5542/f/35897>

Photos of the conference (all days): <https://photos.app.goo.gl/azkGRUnvmB6QtpgK7>

Applications of Accelerators and
Other Sources of Ionizing Radiation: <https://www.iaea.org/bulletin/63-2>
IAEA Bulletin (Vol. 63/2, May 2022)

Note on how to use this document

- During the conference, all sessions with oral presentations including plenaries were video recorded daily and streamed live. Links to these videos are given in pages 14–16 of this document marked with “[am](#)” or “[pm](#)”. These correspond, respectively, to videos containing all morning or all afternoon sessions, which were held in the same meeting hall (marked in the programme with “[M Plenary](#)” or “[Board Room A](#)”). Hence, in the case of, e.g., Tuesday, May 24, the reader will find in page 14, four different streaming links. For “[M Plenary](#)” there are two links, one “[am](#)” and one “[pm](#)”. The same applies for “[Board Room A](#)”. In the case of “[M Plenary](#)”, the “[am](#)”-linked video contains all morning sessions, i.e., the plenary sessions no. 5, and the two parallel sessions 6.A and 6.B. Similarly, the “[pm](#)”-linked video contains the Side Event 1 and the parallel sessions 7.A and 7.B. Note that, on Monday, May 23, no morning sessions were held in Board Room A, whereas on Friday, May 27, sessions took place only in M Plenary and only in the morning.
- Depending on the material provided by the speakers, the reader will find links in pages 17–30 leading to the corresponding a) abstract, b) speaker’s profile, c) slides of his/her presentation and d) recording of the presentation provided prior to the conference start and e) the full paper submitted after the conference. To access these, simply click, respectively, on a) the number of the abstract, b) name of speaker, c) the link marked with “[Slides](#)”, d) “[Recorded Presentation](#)” and e) “[Full Paper](#)”. If no material was provided by the speaker, then the corresponding link is not given.
- In the case of poster contributions (pages 31-37), links are given for the abstract, the profile of the scientist who submitted or presented the abstract and the recorded presentation of the poster. To access these, simply click, respectively, on the number of the abstract, name of speaker, “[Recorded Presentation](#)” and “[Full Paper](#)”. Similarly, if no material was provided by the poster presenter, then the corresponding link is not given.

Conference Profile

Programme Committee:

- [Nicolas Alamanos](#), CEA, France
 - [Giuliana Aquilanti](#), Elettra Sincrotrone Trieste, Italy
 - [Ceri Brenner](#), ANSTO, Australia
 - [Thomas Gutberlet](#), Forschungszentrum Julich, Germany
 - [Cornelia Hoehr](#), TRIUMF & University of Victoria, Canada
 - [Andrew Hutton](#), JLab, USA
 - [Milko Jaksic](#), Ruder Boskovic Institute (RBI), Croatia
 - [Joseph Mittendorfer](#), High Tech Consulting, Austria
-

IAEA Secretariat:

Scientific Secretaries, NAPC:

[Sotirios Charisopoulos](#)

[Valeriia Starovoitova](#)

[Danas Ridikas](#)

[Celina Horak](#)

Event Organizer, MTCD:

Julie Zellinger

Administrative Support, NAPC:

Ekaterina Nazarova

Tatiana Kornelyuk

Olha Bilous

Location of the Event:

International Atomic Energy Agency, Vienna International Centre (VIC)

Building M, Board Rooms A, B/M1

Wagramer Strasse 5, A-1400 Vienna, Austria. Tel.: (+43 1) 2600 21330

Working Language: English

Conference website: <https://www.iaea.org/events/acconf22> (main)

<https://conferences.iaea.org/event/264/> (indico)

A. Background

The International Atomic Energy Agency (IAEA) organized the First International Conference on Accelerators for Research and Development: from good practices towards socioeconomics impact. Such a Conference was long awaited by the Member States to address important needs in our high-tech oriented society, where particle accelerators have become indispensable.

Nowadays, more than 20,000 particle accelerators operating world-wide are used for commercial applications, either in the medical (radiotherapy treatments) or industrial sectors (materials modification). Although only a few hundred accelerators are used for scientific research, the knowledge and technological spin-offs gained from these facilities drive the development of commercial applications and support the research and development needs of a diverse range of fields, including fundamental and applied science. The current trend is to utilize accelerators in a dedicated way to support specific high technology application areas. The main demand from researchers is for high quality X ray, neutron, and ion beams to engage in cutting-edge research in energy, food and agriculture, environment, biology, medicine, forensics, cultural heritage, materials science, and many other areas. Accelerators also play a key role in capacity building, provide education and training both in academia and industry, contributing to the solution of problems of modern society and to increased competitiveness of local economies.

Numerous innovations and accomplishments in the field of accelerator-based research and development as well as diverse applications have been already acknowledged, however it is now time to take a comprehensive look at their socioeconomic impact, assess their sustainability and ability to meet future challenges. The IAEA has been implementing programmatic activities that provide interested Member States with platforms to exchange information on new trends and applications in accelerator-based nuclear science and technology. Indeed, the IAEA successfully implements a few programmes with direct relevance to use of particle accelerators such as Nuclear Science, Radioisotope Production and Radiation Technology, Human Health, and Environment. In addition, direct support, and assistance to the Member States in the area of accelerator-based research and applications is also provided through the IAEA Technical Cooperation Programme.

B. Purpose and Objectives

The Conference aimed primarily to present an international stage for discussing accelerator applications in research and industry, foster exchange of information on best practices in accelerator facility utilization and management, and to provide a showcase how achievements and experience attained with accelerator technologies contribute to a sustainable development. All types of accelerators will be considered: from low-energy ion-beam electrostatic accelerators to cyclotrons, from compact accelerator-based neutron sources to large-scale spallation facilities, from electron-based irradiation facilities to synchrotron light sources, and many others.

Special emphasis was also be given in accelerator applications of large societal impact such as human health, environmental monitoring, cultural heritage, food quality, energy sector, forensics, nuclear security, and others promoting economic development. The Conference provided a unique opportunity to achieve the following specific objectives:

➤ **To disseminate:**

- New knowledge and technologies developed through accelerator-based research and applications in a wide spectrum of scientific areas.
- Best practices in establishing new accelerator facilities, and ensuring their effective management and sustainability

➤ **To review:**

- Key developments in particle accelerator technologies, established and emerging ones, and their role in enhancing innovations
- National, regional, and global initiatives for implementing proven accelerator applications that lead to socio-economic benefits and strengthen capacity building in Member States; and

➤ **To serve:**

- As a composite platform through which academia and industry can foster new initiatives for ensuring the success of accelerator applications in addressing the emerging challenges in multiple disciplines.
- As a bridge to enhance existing and establish new collaborations among scientists and institutions from Member States aiming at benefiting from accelerator technologies to face challenges in a series of problems of modern society.

C. Themes and Topics

The IAEA welcomed high-quality, well structured, abstracts and papers in all fields of accelerator-based research and applications which were grouped under three main themes/tracks:

1. Cutting-edge scientific results and innovation in applications
2. Success stories and case studies demonstrating socioeconomic impact
3. Best practices in effective management, safe operation, and sustainability of accelerator facilities, including establishment of new facilities

The scope of the conference was meant to cover, but not limited to, the following topical areas:

- Biology and biophysics
- Cultural heritage
- Engineering applications (including energy sector)
- Environmental applications (including geosciences and climate change)
- Food and agriculture
- Forensics and security applications
- Information and quantum technologies
- Materials research (including materials damage studies)
- Nuclear data and modelling benchmarks
- Radioactive beam applications

- Medical applications (including radioisotope production and Boron Neutron Capture Therapy)
- R&D on new accelerator and alternative technologies (including Compact Accelerator based Neutron Sources)
- Best practices in and lessons learned from:
 - Education and training with accelerators
 - Establishment of new facilities
 - Facility management and user programmes
 - Facility operations and maintenance
 - Outreach, knowledge preservation and management
 - User access programmes and regional/interregional networking
 - Strategic considerations for sustainability and self-reliance

D. Structure

The topical areas were discussed under the three main themes outlined in section C. A series of plenary sessions addressed the most interesting and crucial topics and the meeting programme included invited keynote speakers from academia and industry, giving oral presentations and participating in panel discussions and round table sessions. Poster sessions were organized to allow ample time for discussion and interaction. In addition, the participants had the opportunity to interact with conference exhibitors and participate in technical tour(s). Finally, a closing panel session reviewed the main conclusions drawn in the plenary sessions and summarized recommendations for the future development of radiation sciences and technologies using particle accelerators.

E. Outcomes

The conference achieved strengthening contacts and fostering cooperation among accelerator-based science and application researchers, accelerator manufacturers, facility operators and the coordinators of academic programmes in the accelerator sciences, leading to a comprehensive review of the status of accelerator-based research and applications. The conference also contributed to generate ideas that will form the basis of future IAEA programmes in the area of research and applications using accelerator technologies.

F. Target Audience

This conference focused on applications of accelerator science and technology, which is a multidisciplinary area covering many different branches from accelerator and nuclear physics, materials science, biology, environment, medicine, cultural heritage to engineering and industrial applications. Accordingly, the target audience for this conference comprised, but not limited to:

- research scientists engaged in accelerator-based research and applications
- accelerator operators and users
- entrepreneurs or stakeholders involved in applications of accelerator technologies
- policy makers and regulators.

TIMETABLE – Sessions Overview

Monday, 23 May 2022

Streaming: [M Plenary \[am – pm\]](#)

[Board Room A \[pm\]](#)

Time	Session No.	Session Title / Break	Venue
10:00 – 10:30		Opening Session	M Plenary
10:30 – 11:15	Session 1 Plenary Session	Accelerators for the Environment	M Plenary
11:15 – 12:45	Session 2 Plenary Session	Accelerators for Medical Radioisotopes, Energy Production and Nuclear Research	M Plenary
12:45 – 14:00		Lunch Break	
14:00 – 15:30	Session 3.A Parallel Session	Advances in Accelerator Technologies	Board Room A
14:00 – 15:30	Session 3.B Parallel Session	Accelerators for Medical Applications - 1	M Plenary
15:30 – 16:00		Coffee / Tea Break	
16:00 – 17:30	Session 4.A Parallel Session	Accelerators for Environmental Monitoring	Board Room A
16:00 – 17:30	Session 4.B Parallel Session	Accelerators for Medical Applications - 2	M Plenary
18:00 – 20:00		Welcome Reception	M-Building

Tuesday, 24 May 2022

Streaming: [M Plenary \[am – pm\]](#)

[Board Room A \[am – pm\]](#)

Time	Session No.	Session Title / Break	Venue
09:00 – 10:30	Session 5 Plenary Session	Accelerators for Neutron Therapy, Cultural Heritage, Innovation and Education	M Plenary
10:30 – 11:00		Coffee / Tea Break	
11:00 – 12:30	Session 6.A Parallel Session	Accelerators for BNCT and Cultural Heritage	Board Room A
11:00 – 12:30	Session 6.B Parallel Session	Best Practices in Using Accelerators for R&D, Education, Environmental and Industrial Applications	M Plenary
12:30 – 14:00		Lunch Break	
14:00 – 15:30	Side Event 1	Accelerator-Based Sources of Radiation: Recent Developments	Board Room A
14:00 – 15:30	Poster Session 1	All posters (see separate page)	M-Building 2nd Floor
15:30 – 16:00		Coffee / Tea Break	
16:00 – 17:30	Session 7.A Parallel Session	IBA Facilities and their R&D Program	Board Room A
16:00 – 17:30	Session 7.B Parallel Session	Regulatory Aspects of Accelerator Facilities	M Plenary

Wednesday, 25 May 2022Streaming: [M Plenary \[am – pm\]](#) [Board Room A \[am – pm\]](#)

Time	Session No.	Session Title / Break	Venue
09:00 – 10:30	Session 8 Plenary Session	Accelerators for Nuclear Data and Materials Research	M Plenary
10:30 – 11:00		Coffee / Tea Break	
11:00 – 12:30	Session 9.A Parallel Session	Accelerators for Nuclear Data	Board Room A
11:00 – 12:30	Session 9.B Parallel Session	Radiation Technologies and their Applications	M Plenary
12:30 – 14:00		Lunch Break	
14:00 – 15:30	Side Event 2	Collaborating Centres of IAEA	Board Room A
14:00 – 15:30	Side Event 3	Women in Accelerator-based Science	M-Building 2nd Floor
15:30 – 16:00		Coffee / Tea Break	
16:00 – 17:30	Session 10.A Parallel Session	Applications of Heavy Ion Beams	Board Room A
16:00 – 17:30	Session 10.B Parallel Session	Societal Applications of Accelerators and Sustainable Development	M Plenary

Thursday, 26 May 2022Streaming: [M Plenary \[am – pm\]](#) [Board Room A \[am – pm\]](#)

Time	Session No.	Session Title / Break	Venue
09:00 – 10:30	Session 11 Plenary Session	Emerging Accelerator Technologies – Accelerator Technologies for Food Safety	M Plenary
10:30 – 11:00		Coffee / Tea Break	
11:00 – 12:30	Session 12.A Parallel Session	Future Accelerator-based Neutron Sources	Board Room A
11:00 – 12:30	Session 12.B Parallel Session	Electron Beams and Applications	M Plenary
12:30 – 14:00		Lunch Break	
14:00 – 15:30	Side Event 4	Promoting Self-Reliance and Sustainability of National Nuclear Institutions Operating Accelerator Facilities	Board Room A
14:00 – 15:30	Poster Session 2	All posters (see separate page)	M-Building 2nd Floor
15:30 – 16:00		Coffee / Tea Break	
16:00 – 17:30	Session 13.A Parallel Session	Selected Applications of Accelerator-based Analytical Techniques	Board Room A
16:00 – 17:30	Session 13.B Parallel Session	Accelerators for Energy and other Applications	M Plenary

Friday, 27 May 2022

Streaming: [M Plenary \[am\]](#)

Time	Session No.	Session Title / Break	Venue
09:00 – 10:30	Session 14 Plenary Session	Accelerators and Multidisciplinary Research and Applications	M Plenary
10:30 – 11:00		Coffee / Tea Break	
11:00 – 11:30	Session 15 Plenary Session	Conference Summary and Highlights	M Plenary
11:30 – 12:00	Session 16 Plenary Session	Conference Closing and Award Ceremony	M Plenary

MONDAY, 23 May 2022

10:00 – 10:30 OPENING SESSION

M Plenary

Time	Name	Affiliation & Designating Member State	
10:00–10:05	M. Denecke	Director NAPC, IAEA	Welcome Address
10:05–10:15	R. M. Grossi	Director General, IAEA	Opening Statement
10:15–10:25	N. Mokhtar M. Chudakov H. Liu	DDG-NA, IAEA DDG-NE, IAEA DDG-TC, IAEA	Opening Remarks



10:30 – 11:15 **PLENARY SESSION 1: Accelerators for the Environment**

M Plenary

Chairpersons: [D. Ridikas](#) (IAEA) and [C. Horak](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
11:15–11:45	224	D. Cohen	ANSTO, Australia	Accelerators for Environmental Monitoring and Climate Change Related Studies Full Paper – Slides
	207	A. Chmielewski	INCT, Poland	Electron Accelerator-Based Systems for Air, Water and Soil Pollution Control Studies Slides



10:00 – 10:30 **PLENARY SESSION 2: Accelerators for Medical Radioisotopes, Energy Production and Nuclear Research**

M Plenary

Chairpersons: [D. Ridikas](#) (IAEA) and [C. Horak](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
11:15–11:45	209	C. S. Cutler	BNL, USA	50 Years of Isotope Production via High Energy Accelerators at Brookhaven National Laboratory Slides
11:45–12:15	223	H. Ait Abderrahim	SCK CEN, Belgium	Realization of a new Research Infrastructure in Belgium: MYRRHA - Present Status and Focus on Latest Developments of MYRRHA ADS Accelerator Slides
12:15–12:45	208	B. Sharkov	JINR, Russian Federation	Large Scale Accelerator Facilities for Nuclear Research and Practical Applications Slides
12:45–14:00		Lunch Break		



14:00 – 15:30 **PARALLEL SESSION 3.A: Advances in Accelerator Technologies** Board Room A
Chairpersons: [N. Alamanos](#) (CEA, France) and [S. Charisopoulos](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
14:00–14:15	204	J. G. Weisend II	ESS, Sweden	The European Spallation Source Accelerator: Overview and Status Slides – Recorded Presentation
14:15–14:30	49	B. Hornberger	Lyncean Technologies USA	Recent Developments in Compact X-ray and Gamma-ray Sources Based on Inverse Compton Scattering Recorded Presentation
14:30–14:45	101	S. Lauber	GSI, Germany	Alternating Phase Focusing Beam Dynamics for Drift Tube Linacs Full Paper – Slides – Recorded Presentation
14:45–15:00	190	M. Fedurin	BNL, USA	Novel Accelerator Concept Utilizing Cyclotron Resonance (eCRA) Slides – Recorded Presentation
15:00–15:15	177	I. Strydom	iThemba LABS, South Africa	An Overview of the South African Isotope Facility (SAIF) Full Paper – Slides – Recorded Presentation
15:15–15:30	Questions and Answers			
12:45–14:00	Coffee / Tea Break			

14:00 – 15:30 **PARALLEL SESSION 3.B: Accelerators for Medical Applications -1** M Plenary
Chairpersons: [C. S. Cutler](#) (BNL, USA) and [V. Starovoitova](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
14:00–14:15	44	N. van der Meulen	PSI, Switzerland	The Use of PSI's High Intensity Proton Accelerator (HIPA) Complex Towards Medical-Radionuclide Development Slides – Recorded Presentation
14:15–14:30	183	A. Gerbershagen	University of Groningen, Netherlands	The New Particle Therapy Research Center (PARTREC) at Univ. Medical Center Groningen Slides – Recorded Presentation
14:30–14:45	73	G. Pupillo	INFN-LNL, Italy	Activities on the Cyclotron-based Production of Innovative Radionuclides: Experience at the Legnaro National Laboratories of INFN Full Paper – Slides – Recorded Presentation
14:45–15:00	124	P. Fernandes Costa Jobim	Federal Univ. Rio Grande do Sul, Brazil	IBA Techniques & Neuroscience: What's Next? Slides – Recorded Presentation
15:00–15:15	136	C. N. Coleman	Int. Cancer Expert Corps, USA	Treatment, not Terror: A Unique Cancer Treatment for Developing Novel Linear Accelerators for Resource-limited Settings Full Paper – Slides – Recorded Presentation
15:15–15:30	Questions and Answers			
12:45–14:00	Coffee / Tea Break			

16:00 – 17:30 **PARALLEL SESSION 4.A: Accelerators for Environmental Monitoring** **Board Room A**
Chairpersons: [S. Merchel](#) (VERA, Austria) and [R. Padilla Alvarez](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
16:00–16:15	186	W. E. Kieser	University of Ottawa, Canada	Accelerator Mass Spectrometry: An Analytical Tool with Applications for Sustainable Society Full Paper – Slides – Recorded Presentation
16:15–16:30	70	M. Santoso	BATAN, Indonesia	Characteristics of Fine Particulates of Two Largest Cities in Indonesia Using IBA Full Paper – Slides – Recorded Presentation
16:30–16:45	147	L. Popa-Simil	LAAS, USA	Ion beam Usage in Environmental Characterization Full Paper – Slides – Recorded Presentation
16:45–17:00	45	M. Roumie	LAEC/CNRS, Lebanon	Elemental Characterization of PM2.5 Aerosol Samples in Four Mideastern Cities and Source Apportionment Investigation Slides – Recorded Presentation
17:00–17:15	86	S. Pollastri	Elettra Sincrotrone, Italy	A Combined XRF and XANES Study on Bottom Ashes from Municipal Solid Waste Incinerator Slides – Recorded Presentation
17:15–17:30	Questions and Answers			

16:00 – 17:30 **PARALLEL SESSION 4.B: Accelerators for Medical Applications -2** **M Plenary**
Chairpersons: [C. Hoehr](#) (TRIUMF, Canada) and [A. Jalilian](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
16:00–16:15	125	E. Punzón-Quijorna	JSI, Slovenia	PIXE Reveals Crucial Information in Hip Endoprostheses Failures. MeV Ion Beams for Improving Medical Diagnostics Slides – Recorded Presentation
16:15–16:30	158	T. Pinheiro	IST/Univ. de Lisboa, Portugal	Metallacarboranes for Proton Therapy Using Research Accelerators Full Paper – Recorded Presentation
16:30–16:45	95	R. Khatun	BAEC, Bangladesh	Dosimetric Verification of Radiotherapy Treatment Planning System Using Thorax Phantom Slides – Recorded Presentation
16:45–17:00	52	D. Kottuparamban	Molecular Cyclotrons, India	Socioeconomic Impact of a Medical Cyclotron in Kerala, India Full Paper – Slides – Recorded Presentation
17:00–17:15	29	S. M. de Carvalho	NCNE, Brazil	Current Status and Perspectives of Cyclotron Facilities in Brazil and the Socioeconomic Impact. Slides – Recorded Presentation
17:15–17:30	Questions and Answers			

18:00–20:00 **WELCOME RECEPTION** **M-building Ground Floor**

TUESDAY, 24 May 2022

9:00 – 10:30 **PLENARY SESSION 5: Accelerators for Neutron Therapy,
Cultural Heritage, Innovation and Education**

M Plenary

Chairpersons: [G. Aquilanti](#) (Elettra, Italy) and [I. Swainson](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
9:00–9:30	210	H. Kumada	University of Tsukuba, Japan	Current Status of Compact Accelerator-based Neutron Sources for Boron Neutron Capture Therapy in the World Slides – Recorded Presentation
9:30–10:00	212	L. Beck	CEA, France	Use of Accelerators to Preserve Cultural Heritage Objects and Detect Forgeries Slides
10:00–10:30	205	A. Strasser	Aerial-CRT, France	Best Practices in Establishing and Running Accelerator Facilities to Support Research, Education, and Commercial Uses Slides
10:30–11:00	Coffee / Tea Break			

11:00 – 12:30 **PARALLEL SESSION 6.A: Accelerators for Boron Neutron-Capture
Therapy (BNCT) and Cultural Heritage**

Board
Room A

Chairpersons: [G. Aquilanti](#) (Elettra, Italy) and [I. Swainson](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
11:00–11:15	131	A. Kreiner	CNEA, Argentina	Review of the Different Accelerator-based BNCT Facilities Worldwide and an Assessment According to the Alara Criterion Full Paper – Slides – Recorded Presentation
11:15–11:30	140	S. Taskaev	Budker Inst., Russian Federation	Accelerator-based Neutron Source for Boron Neutron Capture Therapy & other Applications Full Paper – Slides – Recorded Presentation
11:30–11:45	94	I. Carlomagno	Elettra Sincrotrone, Italy	X-ray Investigations on Ancient Gold Coins: Synchrotron Radiation Contribution to History and Numismatics Slides – Recorded Presentation
11:45–12:00	10	D. M. Atwa Khalil	NILES, Egypt	Synchrotron ... based Investigations of Colored Layers, Binding Materials and Resins of the God Ptah-Sokar-Osiris Wooden Statuette ... Dating Back to 26th Pharaonic Dynasty Slides
12:00–12:15	121	V. Corregidor	Univ. de Lisboa, Portugal	Characterization of Cultural Heritage Using a Micro-beam Slides – Recorded Presentation
12:15–12:30	Questions and Answers			
12:30–14:00	Lunch Break			

11:00 – 12:30 **PARALLEL SESSION 6.B: Best Practices in using Accelerators for R&D, Education, Environmental & Industrial Applications** M Plenary
Chairpersons: [D. Cohen](#) (ANSTO, Australia) and [N. Skukan](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
11:00–11:15	24	O. Riabukhin	Ural Fed. Univ, Russian Federation	The Practice of Electron and Proton Accelerators Utilizing for Industry, Education and Science Full Paper – Slides – Recorded Presentation
11:15–11:30	181	S. H. Park	Korea Univ. Sejong, Rep. of Korea	Use of Accelerators for Research and Training in the University Environment Slides
11:30–11:45	60	P. Foka	GSI, Greece	Heavy Ion Therapy MasterClass School and Capacity Building for Future Ion Research and Therapy Facilities Full Paper – Slides – Recorded Presentation
11:45–12:00	230	M. Pivi	MedAustron, Austria	The MedAustron Particle Therapy Center Slides
12:00–12:15	116	F. Zanini	Elettra Sincrotrone, Italy	Life Cycle Assessment Slides
12:15–12:30	Questions and Answers			
12:30–14:00	Lunch Break			

14:00 – 15:30 **SIDE EVENT 1: Accelerator-based Sources of Radiation: Recent Developments** M Plenary
Chairpersons: [S. Pillai](#) (Texas A&M Univ., USA) & [V. Starovoitova](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
14:00–14:10		S. Norris	DOE/NNSA, USA	Opening Remarks
14:10–14:30	236	J. Schwindling	CEA, France	Compact Accelerator-based Neutron Sources: recent developments Slides
14:30–14:50	237	A.-L. Lamure	RadiaBeam Technologies USA	Electron Beams for research and industrial applications Slides
14:50–15:10	238	A. Pierard	IBA, Belgium	The new generation of sustainable X-ray irradiators Slides
15:10–15:30	Round Table Discussion - Questions and Answers			
15:30–16:00	Coffee / Tea Break			

16:00 – 17:30 **PARALLEL SESSION 7.A: IBA Facilities and their R&D Programmes** [Board Room A](#)
Chairpersons: [E. Da Costa Alves](#) (U. de Lisboa, Portugal) & [N. Skukan](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
16:00–16:15	108	V. Rigato	LNL/INFN, Italy	Multidisciplinary Physics with MeV Ion Beams at the Laboratori Nazionali di Legnaro ... Full Paper – Recorded Presentation
16:15–16:30	229	S. Charisopoulos	IAEA	The IAEA Ion Beam Facility (IBF) project Slides
16:30–16:45	118	I. Bogdanovic Radovic	RBI, Croatia	Development and Applications of the Secondary Ion Mass Spectrometry with MeV Ions (MeV SIMS) Technique at RBI Accelerator Slides – Recorded Presentation
16:45–17:00	151	A. Karydas	NCSR Demokritos, Greece	Applications of Proton-induced X-rays at the Tandem Accelerator Lab. of NCSR “Demokritos” Slides – Recorded Presentation
17:00–17:15	19	R. O. Barrachina	CNEA, Argentina	Six Decades of R&D with Accelerators in the Dept. of Interaction of Radiation with Matter of the Bariloche Atomic Center Full Paper – Slides – Recorded Presentation
17:15–17:30	Questions and Answers			

16:00 – 17:30 **PARALLEL SESSION 7.B: Regulatory Aspects of accelerator facilities** [M Plenary](#)
Chairpersons: R. P. Jimenez (IAEA) & [N. Ramamoorthy](#) (Indep. Consultant, India)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
16:00–16:15	47	M. Heimann	CNSC-CCSN, Canada	Agile Regulatory Oversight: Adapting Regulations to Accommodate Rapidly Changing Accelerator Technology Slides – Recorded Presentation
16:15–16:30	98	F. Schmitz	Bel V, Belgium	Licensing Unconventional Accelerator Projects: A Quest for the Safest Compromise Full Paper – Slides – Recorded Presentation
16:30–16:45	56	G. Rabi	Autoridad Regulatoria Nuclear, Argentina	Regulatory Control at the Construction Stage of a Radiopharmaceuticals Production Facility with Cyclotron in the Context of Covid-19 Pandemic Full Paper – Slides – Recorded Presentation
16:45–17:00	78	G. Garcia-Fernandez	Universidad Politecnica de Madrid, Spain	Commissioning of Operational Radiation Protection in Compact Proton Therapy Centers (CPTC) with Small Accelerators Slides – Recorded Presentation
17:00–17:30	Questions and Answers			

WEDNESDAY, 25 May 2022

9:00 – 10:30 **PLENARY SESSION 8: Accelerators for Nuclear Data and Materials Research**

M Plenary

Chairpersons: [F. Ott](#) (CEA, France) and [A. Koning](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
9:00–9:30	213	M. Rubel	Royal Inst. of Technology, Sweden	Accelerator Techniques and Nuclear Data needs for IBA of wall Materials for Fusion reactors Full Paper – Slides
9:30–10:00	218	Y. Wang	Los Alamos National Lab, USA	Application of Accelerators in Nanomaterials Research Slides
10:00–10:30	220	Z. Siketic	Ruđer Bošković Institute, Croatia	Sustainability of the Tandem Accelerator Facility at the Ruđer Bošković Institute Slides
10:30–11:00	Coffee / Tea Break			

11:00 – 12:30 **PARALLEL SESSION 9.A: Accelerators for Nuclear Data**

Board Room A

Chairpersons: [M. Rubel](#) (Royal Inst. of Technology, Sweden) & [A. Koning](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
11:00–11:15	232	J.C. Sublet	IAEA	Radiation Damages Bohr' s Metrics: Accelerator & Elemental Landscapes Slides
11:15–11:30	154	N. Patronis	Univ. of Ioannina, Greece	Status Report of the n_TOF Facility after the 2nd CERN long Shutdown Period Full Paper – Slides – Recorded Presentation
11:30–11:45	157	R. Vlastou-Zanni	National Technical Univ. Athens, Greece	The Neutron Facility at NCSR "Demokritos" and Neutron Activation Research Activities of NTUA Full Paper – Slides – Recorded Presentation
11:45–12:00	109	P. Ström	Uppsala University, Sweden	Ion Accelerators for Modification and Analysis of Materials: Present Status and an Outlook Towards the Future Slides – Recorded Presentation
12:00–12:15	132	A. Widdowson	UKAEA, United Kingdom	Determination of Fuel Retention in Tokamaks by Accelerator-based Methods Slides – Recorded Presentation
12:15–12:30	Questions and Answers			
12:30–14:00	Lunch Break			

11:00 – 12:30 **PARALLEL SESSION 9.B: Radiation Technologies and their applications.**

M Plenary

Chairpersons: [A. Chmielewski](#) (INCT, Poland) and [V. Starovoitova](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
11:00–11:15	92	K. Howie	Texas A&M University, USA	Electron Beam Technology for Preserving Quality Attributes of Mandarins for Enhancing Export Potential Full Paper – Slides – Recorded Presentation
11:15–11:30	159	D. Kaoumi	North Carolina State Univ., USA	The Use of In-situ Transmission Electron Microscopy to Investigate Microstructure Evolution under Ion Irradiation Slides
11:30–11:45	198	R. Schwarz	Pacific Northwest Nat. Lab., USA	Penelope-based User-Friendly Fast Interface for Calculating Distribution in Irradiated Products Slides – Recorded Presentation
11:45–12:00	32	D. Chmielewska-Śmietanko	Inst. of Nucl. Chemistry & Technology, Poland	Application of Electron Beam Accelerator for Preservation Biodeteriorated Cultural Heritage Paper-Based Objects: Multiparametric Analysis Slides – Recorded Presentation
12:00–12:15	163	S. Ramarad	Heriot-Watt University, Malaysia	Rubber Recycling: Compatibilization of Waste Tire Rubber/Poly(ethylene-co-vinyl acetate) Blends Using Liquid Rubber and Electron Beam Irradiation Full Paper – Slides – Recorded Presentation
12:15–12:30	Questions and Answers			
12:30–14:00	Lunch Break			



14:00 – 15:30 **SIDE EVENT 2: Collaborating Centres of IAEA**

Board Room A

Chairpersons: [A. Simon](#) (IAEA) and [B. S. Han](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
14:00-14:15	240	S. Hollins	ANSTO, Australia	New and Advanced Techniques and Applications of Nuclear Science & Technology towards a Sustainable Environment Slides
14:15-14:30	241	M. Kiskinova	Elettra Sincrotrone,	The IAEA-Elettra Collaborating Center Full Paper – Slides
14:30-14:45	243	L. Bertrand	ENS Paris-Saclay, France	Implementation of the IAEA Collaborating Center “Atoms for Heritage” at the Université Paris-Saclay
14:45-15:00	242	R. Nchodu	iThemba LABS, South Africa	iThemba LABS: The IAEA Collaborating Centre for Accelerator Based Scientific Research and Applications Slides
15:00-15:15	244	S. Pillai	Texas A&M University, USA	The National Center for Electron Beam Research at Texas A&M University - Two Decades of Advancing Electron Beam and X-ray Technologies Around the World Slides
15:15-15:30	Round Table Discussion - Questions and Answers			
15:30-16:00	Coffee / Tea Break			

14:00 – 15:30 **SIDE EVENT 3: Women in Accelerator-based Science**

M Plenary

Chairpersons: [C. S. Cutler](#) (BNL, USA) and A. Peeva (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
14:00-14:10		C. S. Cutler	BNL, USA	Opening Remarks
14:10-14:20		J. Donner	SGIM, IAEA	Overview of the IAEA’s effort in promoting gender parity
14:20-15:20		Panel Discussion	Moderator: A. Peeva (IAEA) Participants: D. Cohen (ANSTO, Australia), N. Alamanos (CEA, France), S. Carvalho (NCNE, Brazil), C. Gutierrez (Elettra, Italy; recipient of the Marie Curie Fellowship Programme)	
15:20-15:30	Round Table Discussion - Questions and Answers			
15:30-16:00	Coffee / Tea Break			

16:00 – 17:30 **PARALLEL SESSION 10.A: Applications of heavy ion beams** **Board Room A**

Chairpersons: [B. Sharkov](#) (JINR, Russian Federation) and [R. Padilla Alvarez](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
16:00–16:15	179	P. Kluth	ANU, Australia	Swift Heavy Ion Modified Materials: Applications and Characterisation Using Synchrotron Small Angle X-ray Scattering Slides – Recorded Presentation
16:15–16:30	69	M. Wagner	GSI, Germany	3D Nanochannel Networks Fabricated with Ion Track-Etch Technology and Their Applications Full Paper – Slides – Recorded Presentation
16:30–16:45	233	N. Pessoa Barradas	IAEA	Specific Considerations and Guidance for the Establishment of Ionizing Radiation Facilities Slides
16:45–17:00	195	M. Lang	Univ. of Tennessee, USA	Investigating Radiation Effects in Materials Using State-of-the-Art Particle Accelerators Slides – Recorded Presentation
17:00–17:15	165	C. Vyas	MSU (USA)/India	Isotope Harvesting Project: from White Paper to Implementation Slides – Recorded Presentation
17:15–17:30		Questions and Answers		

16:00 – 17:30 **PARALLEL SESSION 10.B: Societal Applications of Accelerators and Sustainable Development** **M Plenary**

Chairpersons: F. Zanini (Elettra Sincrotrone, Italy) and [K. Kanaki](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
16:00–16:15	189	S. Norris	DOE/NNSA, USA	How Support for Machine-Based Sources of Radiation Contributes to Sustainable Development Full Paper – Slides – Recorded Presentation
16:15–16:30	58	B. Nsouli	LAEC, Lebanon	On the Use of Ion and Cluster Beams Analysis at LAEC for Forensic Sciences: Infrastructure and Applications Slides
16:30–16:45	106	A. Magazinik	CERN, Switzerland	Societal Impact of the Compact Linear Collider Study. Full Paper – Slides – Recorded Presentation
16:45–17:00	74	T. Edgecock	University of Huddersfield, U.K.	IFAST Accelerators for Societal Applications Full Paper – Slides – Recorded Presentation
17:00–17:15	54	B. List	DESY, Germany	Sustainability Studies for Linear Colliders Full Paper – Slides
17:00–17:30		Questions and Answers		

THURSDAY, 26 May 2022

9:00 – 10:30 **PLENARY SESSION 11: Emerging Accelerator Technologies – Accelerators for Food Safety and Security.** **M Plenary**
Chairpersons: [T. Gutberlet](#) (FZ Jülich, Germany) and [S. Charisopoulos](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title	
9:00–9:30	219	Y. Otake	RIKEN, Japan	RIKEN Accelerator-driven Compact Neutron Systems and RANS Project	Slides
9:30–10:00	214	M. Roth	IKP, TU Darmstadt, Germany	Laser-driven Ion Accelerators: Unique Beams and Compact Neutron Sources	Slides
10:00–10:30	217	S. Pillai	Texas A&M University, USA	Accelerator Technologies for Food Safety and Food quality: Response of Microbial Populations to Ionizing Technologies	Slides
10:30–11:00		Coffee / Tea Break			

11:00 – 12:30 **PARALLEL SESSION 12.A: Future Accelerator-based Neutron Sources** **Board Room A**
Chairpersons: [A. Kreiner](#) (CNEA, Argentina) & [H. Ben Abdelouahed](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title	
11:00–11:15	129	N. Mayordomo	HZ Dresden-Rossendorf, Germany	CANS Production of Technetium-99m and Technetium-101	Full Paper – Slides – Recorded Presentation
11:15–11:30	27	R. Frost	Lund University, Sweden	A Compact Accelerator Driven Neutron Source at the Nuclear-Applications Laboratory, Lund University	Full Paper – Slides – Recorded Presentation
11:30–11:45	221	F. Ott	CEA, France	The SONATE Project, a New Neutron Scattering Platform for Materials Science Research	Slides – Recorded Presentation
11:45–12:00	77	A. Maffini	Politecnico di Milano, Italy	Towards Compact Laser-Driven Accelerators: Exploring the Potential of Advanced Double-Layer Targets	Full Paper – Slides – Recorded Presentation
12:00–12:15	227	I. Swainson	IAEA	IAEA activities in support of Compact Accelerator based Neutron Sources	Slides
12:15–12:30		Questions and Answers			
12:30–14:00		Lunch Break			

11:00 – 12:30 **PARALLEL SESSION 12.B: Electron beams and Applications** **M Plenary**

Chairpersons: [S. Pillai](#) (Texas A&M Univ., USA) and [B. S. Han](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
11:00–11:15	139	A. Bryazgin	Budker Inst., Russian Federation	ILU RF Electron Accelerators for E-beam and X-ray Applications Slides
11:15–11:30	174	W.A.P. Calvo	IPEN / CNEN / SP, Brazil	Electron Beam Processing to Improve Biodegradable Polymers and for Industrial Wastewater Treatment and Recycling Full Paper – Slides
11:30–11:45	15	S. Jebri	NCNST, Tunisia	Effect of E-beam Irradiation on the Microbial Quality of Minimally Processed Products: a Case of a Commercialized Ready to Eat Salad Full Paper – Slides – Recorded Presentation
11:45–12:00	8	P.A.S. Vasquez	IPEN / CNEN / SP, Brazil	Preservation of Photographic and Cinematographic Films by Electron-Beam Irradiation Slides – Recorded Presentation
12:00–12:15	235	A. Jalilian	IAEA	IAEA support for accelerator-based radio-isotopes and radiopharmaceuticals production Slides
12:15–12:30	Questions and Answers			
12:30–14:00	Lunch Break			

14:00 – 15:30 **SIDE EVENT 4: Promoting Self-Reliance and Sustainability of National Nuclear Institutions** **Board Room A**

Chairpersons: [N. Ramamoorthy](#) (Indep. Consultant, India), [N. Pessoa Barradas](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
14:00–14:10		N. Pessoa Barradas	IAEA	Opening remarks Slides
14:10–14:25	248	F. A. Deluchi	CNEA, Argentina	Research and Industrial Applications Electron Beam Accelerator Project Slides
14:25–14:40	249	C. Arcilla	PNRI, Philippines	The new Nuclear Medicine Research and Innovation Center Slides
14:40–14:55	250	S. A. Hashim	WiN, Malaysia	Promoting Application of Electron Accelerator and Radiation Processing in Malaysia Slides
15:00–15:15	251	S. Rugmai	SLRI, Thailand	The synchrotron projects of Thailand Slides
15:15–15:30	Round Table Discussion - Questions and Answers			
15:30–16:00	Coffee / Tea Break			

14:00 – 15:30 [POSTER SESSION 2](#) All posters (see separate page) [M-Building \(2nd Floor\)](#)

16:00 – 17:30 [PARALLEL SESSION 13.A: Selected Applications of](#) [Board Room A](#)
[of Accelerator-based Analytical Techniques](#)

[Chairpersons: M. Jaksic](#) (RBI, Croatia) and [A. Migliori](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
16:00–16:15	191	M. Chiari	INFN, Italy	PIGE Analysis of Fluorine in Materials for the Circular Economy Slides
16:15–16:30	115	C. E. Iochims dos Santos	Federal Univ. Rio Grande, Brazil	Study of Silver Nanoparticles Uptake by Helianthus annuus Crop in Salinity Conditions Full Paper – Slides – Recorded Presentation
16:30–16:45	111	P. Pongrac	JSI, Slovenia	Using Micro-PIXE to Evaluate Nutritional Value of Edible Parts of Plants Slides – Recorded Presentation
16:45–17:00	104	S. Möller	FZ Jülich, Germany	Lithium Depth Profiling in Battery Anodes by Nuclear Reaction Analysis Slides – Recorded Presentation
17:00–17:15	119	G. Provatas	RBI, Croatia	Study of charge Transport in Semiconductors by Ion Beam Induced Charge (IBIC) Microscopy Slides – Recorded Presentation
17:15–17:30	Questions and Answers			

16:00 – 17:30 [PARALLEL SESSION 13.B: Accelerators & Interdisciplinary Applications](#) [M Plenary](#)

[Chairpersons: L. Beck](#) (CEA, France) and [N. Pessoa Barradas](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title
16:00–16:15	231	K. Hain	VERA, Austria	Ultra-trace analysis of anthropogenic long-lived radionuclides in the environment with AMS Slides
16:15–16:30	110	J. M. Lopez-Gutierrez	Univ. de Sevilla, Spain	Characterization of Nuclear Waste by Accelerator Mass Spectrometry Slides – Recorded Presentation
16:30–16:45	215	N. Skukan	IAEA	IAEA Activities in Support of Sustainable Operation of Electrostatic Accelerator Facilities Slides
16:45–17:00	40	N. Arbor	Univ. of Strasbourg France	A Monte Carlo and Experimental Tool for Activation Calculations in High Energy X-rays Irradiation Process Slides – Recorded Presentation
16:45–17:00	20	S. Masic	Vinca Inst. of Nuclear Sciences, Serbia	Surface Treatment of Special High-Protein Products Using Low Energy Beams from Machine Sources Full Paper – Slides – Recorded Presentation
17:00–17:30	Questions and Answers			

FRIDAY, 27 May 2022

9:00 – 10:30 **PLENARY SESSION 14: Accelerator and emerging applications** **M Plenary**
Chairpersons: [T. Ohshima](#) (NIQRST, Japan) and [A. Simon](#) (IAEA)

Time	Abstract No.	Name	Affiliation & Designating Member State	Title	
9:00–9:30	216	O. Girshevitz	BINA, Israel	Implementation of Ion Beam Analysis for Forensic applications: The way to Global Forensic Database through the unification of different analytical techniques	Slides
9:30–10:00	206	A. A. Bettiol	Nat. Univ. Singapore, Singapore	Accelerators and Ion Beams for Quantum Technologies	Slides
10:00–10:30	222	T. Stora	CERN, Switzerland	Radioactive Ion Beams: from Large Scale Facilities to Nuclear Medicine Applications	Slides
10:30–11:00		Coffee / Tea Break			

11:00 – 12:00 **PLENARY SESSION 15: Conference Summary and Highlights** **M Plenary**
Chairpersons: [D. Ridikas](#) (IAEA) and [C. Horak](#) (IAEA)

Time	Name - Affiliation	Title	
9:00–9:30	N. Alamanos (CEA, France)	Conference Summary and Highlights	Slides
9:30–10:00	N. Ramamoorthy (Independent Consultant, India)	Conference Summary and Highlights: Focus on Applications and the IAEA support	Slides

12:00 – 12:30 **PLENARY SESSION 16: Conference Closing and Award Ceremony** **M Plenary**

Time	Name - Affiliation	
12:00–12:15	C. Horak , V. Starovoitova D. Ridikas , S. Charisopoulos (Scientific Secretaries, IAEA)	Award Ceremony
12:15–12:30	N. Mokhtar (DDG-NA, IAEA)	Closing Remarks

12:30–17:00 **Technical tour to [VERA](#) and [MEDAUSTRON](#) accelerator facilities**

TUESDAY, 24 May 2022 and THURSDAY, 26 May 2022

Poster Sessions

Time: 14:00 – 15:30

Venue: M-Building, 2nd Floor

Abstract No.	Authors	Designating Member State / Organization	Poster Title
5	A. Zaouak Ep Ammar	Tunisia	Removal of Hydroxychloroquine and Acid Red 51 Aqueous Solutions by the Electron Beam Process Recorded Presentation
7	L. Yu	Thailand	Ion Beams & Ion-accelerators for Biology-oriented Applications and Research – CMU Practices Full Paper – Recorded Presentation
11	I. Vujcic , S. Masic	Serbia	Possibility of Using Sludge from Drinking Water Treatment Plant as Fertilizer in Agriculture after E-beam Treatment: Effects of aging Full Paper – Recorded Presentation
12	S. Ghosh	India	Low and High Energy Ion Irradiation on Structural and other Properties of Cubic Zirconia and Ceria: from the Perspective of Nuclear Energy Material Recorded Presentation
13	A. Coulibaly	Mali	Shielding Considerations of a Bunker to be taken into Account by the Regulatory Body for Authorization Purposes: Case Study of Radiotherapy Center in MALI Full Paper
14	G. Stankunas	Lithuania	Concrete and stainless-steel activation/decay heat data for the IFMIF-DONES Test Cell components Recorded Presentation
16	S. Petrović , N. Starčević, M. Ćosić	Serbia	The Rainbow Ion-Solid Interaction Potential Full Paper – Recorded Presentation
17	A. Mejri , H. Trabelsi, J. Chatti, Z. Trabelsi, M. Kraiem	Tunisia	Developing Radiation Treatment Methodologies for Decontamination for First Use of Personal Protective Equipment (PPE) using Tunisian Electron Beam Accelerator Recorded Presentation
21	S. Mejri , I. Hemissi, C. Brinsi, A. Asmi, M. Saidi, Y. Mabrouk	Tunisia	Radiosensitivity of Two Lens Culinaris Medikus Subsp. Culinaris Varieties to Electron Beam Irradiation Recorded Presentation
22	A. Akhavan	Iran	Electron Beam Crosslinking of PE/NG Nanocomposite for Solar Collector Applications Recorded Presentation

Abstract No.	Authors	Designating Member State / Organization	Poster Title
26	S. Rimjaem	Thailand	Establishment of the First Accelerator- based Infrared Free-electron Laser Facility in SE Asia Recorded Presentation
28	I. Aljammaz	Saudi Arabia	Socioeconomic Impact of Cyclotrons in King Faisal Specialist Hospitals & Research Centre in Saudi Arabia
30	U. Gryczka	Poland	Determination of the Effectiveness and Control of Food Irradiation Process with a Low-energy Electron Beam Recorded Presentation
34	J. Červenák , O. Lebeda	Czech Republic	Measurement of Excitation Functions of Proton-Induced Nuclear Reactions on Dy- nat. Recorded Presentation
36	M. A. Khan	Pakistan	Low Energy S–band Electron Linear Accelerator(s) Development for Research and Applications Having Socio–economic Impact
39	H. Kumada	Japan	Current Development Status of the Linac-based BNCT Device of the iBNCT Tsukuba Project Full Paper – Recorded Presentation
41	E. Mora-Ramirez, E. Corrales-Corrales	Costa Rica	Ventilation Air System Issue at the University of Costa Rica’s Cyclotron Facility Full Paper – Recorded Presentation
46	L. F. Salas Tapia	Colombia	Preliminary Design for a Cyclotron Extraction Beam Line and External Target for Producing Gallium-68 & Technetium- 99m Isotopes: a Developing Countries Scenario Recorded Presentation
48	F. Kuntz , A. Nasreddine, N. Ludwig, A. Strasser	France	Feerix, a novel Irradiation Platform for R&D, Education and Training Recorded Presentation
51	I. Churkin , V. Bukhtiyarov N. Krasnikov, P. Logachev, E. Levichev	Russian Federation	Siberian circular source of photons Recorded Presentation
53	D. Kottuparamban , A. Muhammed	India	An Optimized Periodic Maintenance Planner for a Commercial Medical Cyclotron Facility Recorded Presentation

Abstract No.	Authors	Designating Member State / Organization	Poster Title
55	A. Maggiolo , G. Rabi, M. Espósito	Argentina	Development and Application of Indicators for the Assessment of Radiation Safety Systems in Radiopharmaceuticals Production Facilities with Cyclotron Full Paper – Recorded Presentation
57	G. Rabi , L. Martiri	Argentina	Regulatory Framework Adopted by the Nuclear Regulatory Authority of Argentina for the Licensing of the Argentine Center of Proton Therapy and Progress Achieved Full Paper – Recorded Presentation
61	Hassan Abd El Rehim	Egypt	The Potential Use of Electron Beam Irradiation to Preserve Micro-biologically Infected Egyptian Papyrus Recorded Presentation
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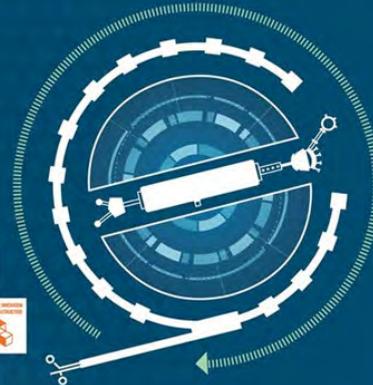
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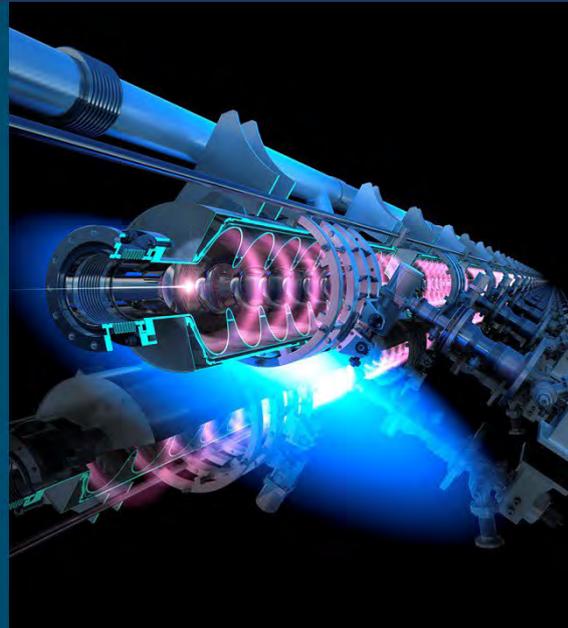
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are tools for
scientific discoveries
and socioeconomic
development



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cancer diagnosis
and treatment

Tandem accelerators

monitor environmental pollution, support cultural heritage science and materials research



Electron-beam irradiators

combat food-borne illnesses and sterilize medical products and devices



Synchrotron light sources

reveal the structure of proteins and viruses and optimize vaccines and new drugs

