

Reports from conferences, theme meetings, symposia, and outreach



Program dignitaries unveiling the Book of Abstracts on PPSTA-2024.

PPSTA-2024

National Conference on Pulsed Power Science, Technology & Applications

The DAE-BRNS maiden National Conference on “Pulsed Power Science, Technology & Applications” (PPSTA-2024) took place from September 12-14, 2024, at the BARCF Facility in Visakhapatnam, organized by the Pulsed Power & Electro-Magnetics Division in collaboration with the Power Beam Society of India. Dr. Ashish Kumar Ray, former Director of BTDG, was the Chief Guest; Dr. Archana Sharma served as Chairperson, and Dr. Rishi Verma was the Convener.

Approximately 170 participants attended from various institutions including DAE, DRDO, CSIR-CEERI Pilani, IIT-BHU, IISc Bangalore, BITS Pilani, and several industries.

Among them were 113 from R&D (92 from DAE and 15 from DRDO), 44 from academia, and 13 from industry. A total of 113 submissions were received for presentations, with 45 delivered as oral talks and the rest as posters.

The conference highlighted advancements in pulsed power science and technology while fostering knowledge exchange among researchers, academics, and industry professionals across diverse fields. It also featured the release of a Book of Abstracts on papers submitted for discussion at the conference.

Reports from conferences, theme meetings, symposia, and outreach



Group photograph of participants to MCQAAM-2024 held at NCCCM-BARC, Hyderabad.

Program dignitaries unveiling MCQAAM-2024 souvenir during the inaugural session.

MCQAAM-2024

Material Characterisation - Quality Assurance in Analytical Measurements

A one-day theme meeting titled “Material Characterization - Quality Assurance in Analytical Measurements” (MCQAAM-2024) was held on September 13, 2024, at NCCCM-BARC, Hyderabad, marking 30 years of excellence in analytical measurements.

Dr. Awadhesh Kumar, Associate Director of the Chemistry Group at BARC and Chairman of the meeting, welcomed attendees and discussed the vision behind NCCCM's establishment, emphasizing the efforts to set up a clean room facility for ultra-trace analytical measurements. He expressed gratitude to former leaders and the current Director of BARC for their support.

The chief guest, Dr. Komal Kapoor, Chief Executive of NFC, acknowledged the foundational contributions of Shri K. Balaramamoorthy and Dr. S. Gangadharan in establishing NCCCM in 1993. He highlighted collaborative programs with Control Lab and stressed the importance of producing Certified Reference Materials (CRMs) for validating analytical measurements.

Dr. Balamuralikrishnan, Director of DMRL, underscored the significance of material characterization from a metallurgical perspective and called for collaboration between NCCCM and DMRL in producing CRMs and analyzing strategic materials.

Shri K. Srinivas, Director of ESG at BARC, reminisced about his early experiences with the project and detailed the complexities involved in constructing India's first non-metallic clean lab at NCCCM.

Dr. K. Dash, Head of NCCCM-BARC, outlined key activities over the past three decades, particularly focusing on CRM production in analytical measurements.

The meeting featured invited talks from eminent scientists across various topics, including materials development using high-energy radiation, chemical sensors, quality assurance in materials characterization, and more. A souvenir commemorating NCCCM-BARC's significant activities over the past thirty years was released during the event.

Reports from conferences, theme meetings, symposia, and outreach



Release of BTDG Colloquium Book of Abstract.

ALA-2024

One day Theme Meeting on Advancements in Laser Applications

The Advancements in Laser Applications (ALA-2024) technical theme meeting convened leading researchers from prestigious institutions, including NPL, TIFR, RRCAT, IIT Delhi, IIT Bombay, and BARC, to explore the latest developments in laser technology.

The meeting featured six invited lectures and a keynote address, covering a diverse range of topics such as:

1. Advances in Laser-based Instrumentation
2. Laser-based Terahertz Generation and Applications
3. Laser-based Quantum Computation

The event attracted over 100 participants, all of whom engaged enthusiastically throughout the day. In the inaugural session, chief guest of the meeting Prof. Jayaram Chengalur, Director, TIFR, Mumbai addressed the audience by his exemplary speech. Next was the inaugural address by Dr. Archana Sharma, Director, BTDG which was followed by overview of the Theme meeting by Shri Martin Mascarenhas, AD, BTDG and Head, LPTD. The keynote address, titled "Laser in Metrology," was delivered by Prof. Venu Gopal Achanta, Director of NPL, Delhi.

The morning sessions concentrated on Laser-Based Instrumentation. Dr. S. K. Dubey from IIT Delhi delivered a compelling presentation on Electro-optic Sensing and Imaging, emphasizing its applications in both medical and strategic fields while discussing potential collaborations between BARC and IIT Delhi. Following him, Dr. Jolly Xavier, also from IIT Delhi, presented on Quantum Enhanced Optical Imaging and Sensing, detailing innovative techniques such as quantum microscopy of biological organisms utilizing spatial and polarization entanglement. Shri A. S. Rawat from BARC concluded the morning session with an insightful talk on Laser-Based Vibration Measurement, highlighting significant advancements in measurement techniques.

The first session after lunch was focused on Applications of Ultra-intense Lasers in THz Generation. Dr. J. A. Chakera from RRCAT shared insights into recent achievements in High-energy X-rays, Attosecond Pulse Generation, and Advanced Particle Accelerators, including updates on collaborative programs with CERN for their LHC project. Following this, Dr. S. S. Prabhu from TIFR Mumbai elaborated on Far-Field and Near-Field Terahertz (THz) Spectroscopy of Materials, underscoring its critical role in material analysis.

In the last session, the topic of Lasers in Quantum Computing was discussed. Dr. Gopal Dixit from IIT Bombay presented on the Alley-Transistor for Quantum Technologies at Ambient Conditions, exploring novel approaches for integrating quantum technologies. This was followed by Dr. Sourav Dutta from TIFR Mumbai, who discussed Laser Cooling and High-resolution Spectroscopy using External Cavity Diode Lasers built at TIFR. The session concluded with Dr. B. Dikshit from BARC presenting on Ion/Atom Trapping for Quantum Computing, emphasizing the transformative potential of laser technologies in advancing quantum computational capabilities.

The meeting was concluded by Dr. S Baruah, Scientific Secretary, ALA-2024 by summarizing the important points of the invited talks. Dr. Padma Nilaya, also attended and served as Co-chairperson of the theme meeting ALA-2024.

Overall, ALA-2024 served as a vital platform for knowledge exchange and collaboration among experts in laser applications, focusing on advancements in instrumentation, THz applications, and quantum computing technologies. The meeting not only highlighted current research but also paved the way for future innovations in these dynamic fields.

Reports from conferences, theme meetings, symposia, and outreach



Participants of the Mid-Term Review Meeting for the IAEA technical cooperation project (RCA RAS-7040) pose for a group photograph.

IAEA RCA PROJECT RAS-7040

Water Resources Management through Environmental Isotope Analysis & Applications

The Isotope and Radiation Application Division of Radiochemistry and Isotope Group (RC&IG), BARC held a Mid-Term Review Meeting for the IAEA technical cooperation project (RCA RAS-7040) titled “Improving Water Resources Management Practices by Enhancing Regional Collaboration in Environmental Isotope Analysis and Applications” from October 21 to 25, 2024 in Mumbai, India.

The project's goal is to enhance water resource management through improved regional collaboration in isotope analysis. Considering the uncertain future of many agrarian regions across the world due to global warming and its associated threats water resources, this regional collaborative project assumes a greater importance.

Twenty-two representatives from National Project Teams (NPTs) and National Project Coordinators (NPCs) from countries including Australia, Fiji, India, Indonesia, and others participated in this event. Notable attendees included Mr. Gashaw G. Wolde (Section Head, Division for Asia and the Pacific, IAEA), Mr. U. D. Saravana Kumar (Technical Officer, IAEA) and Dr. Y.K. Bhardwaj (Associate Director, RC&IG, BARC), who inaugurated the event. Mr. Dang Duc Nhan, the lead country coordinator, from Vietnam Atomic Energy Agency (VINATOM) presented the project's objectives and expected outcomes. Dr. K. Tirumalesh, Scientific Officer-G, IRAD, BARC acted as local coordinator for this event.

During the five-day meeting, the national project work plans and the achievements were reviewed, the work plan for the remaining period was finalized and upcoming regional training programs were discussed.

Additionally, delegates visited BARC's low-level counting facility at BARC Hospital on October 24 to observe radiocarbon sampling from natural water. The meeting concluded with remarks from Dr. R. Acharya, Head of IRAD at BARC.

The Regional Cooperation Agreement (RCA) aims to enhance research, development, and training in nuclear science and technology across Asia and the Pacific. Among its various initiatives, the current program specifically promotes the application of nuclear techniques to identify groundwater sources and pollutants, thereby facilitating effective remedial actions.

Reports from conferences, theme meetings, symposia, and outreach



(From left): Dr. N. Choudhury (Head, Chemistry Division), Dr. Swapan K. Ghosh (Distinguished Professor and Dean, UM-DAE-CEBS), Dr. J. P. Mittal (Former Director, Chemistry Group), Dr. A. K. Tyagi (Dean, HBNI) and Dr. Awadhesh Kumar (Associate Director, Chemistry Group).

CTTC-2024

Symposium on Current Trends in Theoretical Chemistry

The Chemistry Division, BARC in collaboration with the Society for Materials Chemistry (SMC), organized the DAE-BRNS symposium on Current Trends in Theoretical Chemistry (CTTC-2024) from September 26-28, 2024, at the DAE Convention Centre, Anushakti Nagar. The event was chaired by Dr. A. K. Tyagi (Dean, HBNI), with Dr. Awadhesh Kumar and Dr. N. Choudhury serving as Co-Chairman and Chairman of the Local Organizing Committee, respectively. The symposium aimed to foster academic interactions and discussions on contemporary trends and future directions in theoretical and computational chemistry. Key topics included: Theoretical formalisms and simulation strategies; Electronic structure and spectroscopic properties; Chemical dynamics, reactivity, and catalysis; Soft matter; Computational biology; Energy; Nuclear waste management; and Machine learning applications in chemistry.

The event attracted participants from various institutes across India, featuring eminent researchers in theoretical chemistry. The inaugural session was enlightened by the Chief Guest address by Prof. J. P. Mittal. Three plenary lectures were delivered in the symposium by three distinguished speakers: Prof. Sourav Pal, Prof. Rajeev Ahuja, and Prof. Swapan K. Ghosh. Over the three days, the symposium included: 3 Plenary Lectures; 22 Perspective Talks; 12 Short Talks; 9 Lightning Talks; and 3 Technical Talks.

In order to encourage and include more number of young researchers, many short and lightning talks were arranged. Approximately 126 contributory papers were presented as posters and awards were given for the best contributions. The proceedings of CTTC-2024 include abstracts from all invited talks and contributory papers. After 3 days of intense deliberation, the symposium concluded successfully, with participants expressing appreciation for the platform it provided for meaningful interactions and collaborations among leading research groups in theoretical chemistry across India.

Reports from conferences, theme meetings, symposia, and outreach



Empowering Students through Science

The team of BARC scientists with the Students & Faculties of Guru Ghasidas University.

BARC's Nuclear Outreach in Raipur

The BARC team that visited colleges in Raipur from August 5 to 10, 2024, as part of an outreach program, meticulously crafted the initiative to enhance understanding of advancements in nuclear technology and to dispel common myths regarding nuclear energy.

The participating institutions in this program included

1. Guru Ghasidas University, Bilaspur 2. Government Bilasa Girls' P.G. College, Bilaspur 3. Dr. C.V. Raman University, Bilaspur 4. Government G.N.A.P.G. College, Bhatapara 5. Pandit Ravishankar Shukla University, Raipur.

Approximately 1,200 students and faculty members from these five colleges engaged in the program, which featured a variety of activities including a written test, scientific and technical lectures, edutainment skits, and an audio-visual quiz.

Program Activities

- Written Test:** A preliminary quiz covering physics, chemistry, biology, mathematics, and radiation science, for the selections of top students for a final quiz round.
- Lectures:** Topics included myths about radiation, reactor technology, food irradiation, and career opportunities within the Department of Atomic Energy (DAE).
- Interactive Sessions:** Engaging Q&A sessions followed the lectures and skits to foster active participation from students and faculty.

4. **Edutainment Skits:** Performances designed to illustrate the benefits of nuclear technology while addressing misconceptions.

5. **Final Quiz Round:** Conducted with audio-visual elements showcasing BARC technologies and encouraging student interaction.

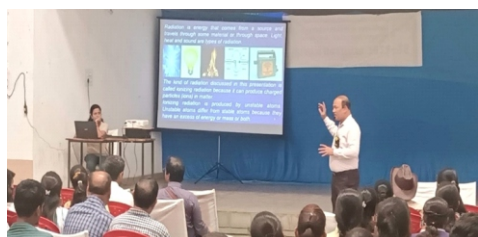
Prizes were awarded to quiz winners, with appreciation expressed by participating colleges.

Lecture Topics during the program included

- "Radiation: Myths and Misconceptions" by Shri R.K.B. Yadav (Scientific Officer, Health, Safety and Environment Group).
- "Reactor Technology" by Shri S.K. Mondal (Scientific Officer, Reactor Group).
- "Food Irradiation: Need of the Hour" and "Career Opportunities in DAE and BARC" by Shri S.P. Prabhakar (Scientific Officer, Reactor Design and Development Group).

Dr. S. Adhikari, Group Director of the Knowledge Management Group at BARC, served as the convener for the outreach program.

The strong interest shown by attendees in lecture sessions and inquiries regarding recruitment and higher education opportunities within DAE and BARC underscored the program's success in promoting scientific knowledge and dispelling myths about nuclear energy.



The lecture on "Radiation: Myths and Misconceptions" by Shri R.K.B. Yadav for the students of Govt. G.N.A.P.G. College.



Interactive session moderated by Shri S.K. Mondal for the students of C.V. Raman University.



Written quiz test at Govt Bilasa Girls P. G. College being supervised by Shri S.P. Prabhakar and others.