K.R. MANGALAM UNIVERSITY
THE COMPLETE WORLD OF EDUCATION

1st International Conference
On

"Innovations and Future Prospects of Advanced Materials"

(IFPAM2023- Online Mode) 23-24 March, 2023

In Collaboration

with

Centre of Nanoscience and Nanotechnology

A Brief Report

Organized by

School of Basic and Applied Sciences

K.R. MANGALAM UNIVERSITY

Sohna Road, Gurugram

Venue : Online Mode

Contents

Preface and acknowledgements

We are delighted to present the report of the "Innovations and Future Prospects of Advanced Materials" conference (IFPAM2023) held online on 23rd and 24th March 2023. This conference aimed to bring together researchers, scientists, academicians, and industry professionals from around the world to explore the latest advancements and potential future directions in the field of advanced materials.

The conference provided a platform for sharing knowledge, exchanging ideas, and fostering collaborations among participants from diverse backgrounds. Through keynote speeches, technical sessions, and interactive discussions, IFPAM2023 aimed to facilitate a comprehensive understanding of emerging trends, challenges, and breakthroughs in the field of advanced materials.

First and foremost, we express our sincere appreciation to all the researchers, scientists, academicians, and industry professionals who presented their research work, shared their expertise, and actively participated in the conference.

We are immensely grateful to our esteemed keynote speakers, Prof. J.L. Sanchez Llamazares and other invited speakers, for sharing their expertise, delivering enlightening talks, and inspiring the participants with their profound knowledge in the field of advanced materials.

We would also like to thank the session chairs for their valuable contribution in moderating the technical sessions and ensuring a smooth flow of presentations and discussions throughout the conference. Our sincere appreciation goes to the organizing committee members for their meticulous planning, coordination, and dedication in organizing the conference. Their tireless efforts and commitment played a pivotal role in the successful execution of IFPAM2023.

Furthermore, we express our gratitude to the technical support team, IT professionals, and administrative staff for their invaluable assistance in setting up and managing the online conference platform, ensuring seamless communication, and addressing technical issues promptly. We sincerely hope that IFPAM2023 provided a platform for fruitful discussions, valuable networking opportunities, and paved the way for future advancements in the field of advanced materials..

Thank you all for your enthusiastic participation and making IFPAM2023 a memorable event!

Introduction

The field of materials science and engineering is constantly evolving, with new advancements and innovations being made every day. These advancements have the potential to revolutionize many areas of our lives, from energy storage to medical devices to aerospace technology. To highlight the latest developments in this field, an international conference on Innovations and Future Prospects of Advanced Materials was recently held.

The conference brought together researchers, scientists, engineers, industry professionals, and students from all around the world to discuss the latest research findings and innovations in materials science and engineering. The conference provided a platform for participants to exchange knowledge, share their findings, and form new collaborations.

The conference featured keynote speakers who are experts in their respective fields and provided valuable insights into the latest advancements in materials science and engineering. The parallel sessions allowed participants to choose the sessions that were most relevant to their interests, while the poster sessions provided an opportunity for participants to showcase their research findings and interact with other researchers in their fields.

The conference demonstrated the significant impact that materials research can have on society and highlighted the importance of continued research and innovation in this field. This conference report provides a detailed account of the conference proceedings, highlighting the key findings and insights shared by the participants. The report aims to provide readers with an overview of the latest developments in materials science and engineering and demonstrate the potential for future advancements in this field.

Objective

The objective of the international conference on Innovations and Future Prospects of Advanced Materials was to provide a platform for researchers, scientists, engineers, industry professionals, and students to exchange knowledge and share their findings on the latest advancements in materials science and engineering. The conference aimed to promote discussions on the potential of advanced materials to shape the future, and to highlight the impact that materials research can have on society.

Specifically, the conference aimed to achieve the following objectives:

1. Showcase the latest research findings and innovations in the field of materials science and engineering.
2. To provide a forum for participants to exchange ideas and form new collaborations with researchers, scientists, engineers, industry professionals, and students from around the world.
3. To discuss the potential of advanced materials to address global challenges and to provide practical training opportunities in specific topics related to materials science and engineering, such as advanced characterization techniques, computational modeling, and materials design.
4. To encourage young researchers and students to participate in the conference and engage with experienced researchers, thus fostering the next generation of materials scientists and engineers.

Overall, the objective of the conference was to foster discussions on the latest developments in materials science and engineering, and to provide a platform for researchers and professionals to collaborate and drive innovation in this important field.

DAY 1- Inaugural Ceremony IFPAM 2023

The inaugural ceremony of the International Conference on Innovations and Future Prospects of Advanced Materials 2023 was graced by the presence of Co-Convener Dr. Seema Raj, an esteemed Associated Professor from K.R Mangalam university. As a prominent figure in the field, Dr. Seema Raj emphasized the significance of the conference, which was organized in collaboration with the prestigious Centre for Nano science and Nanotechnology (UNAM) at the National Autonomous University of Mexico. She highlighted the pivotal role that advanced materials play in shaping the future of various industries and the immense potential they hold for scientific advancements and technological innovations. Dr. Seema Raj's insightful remarks lay the foundation for an engaging and productive conference, bringing together experts, researchers, and professionals from around the world to exchange knowledge, explore new frontiers, and foster collaborations in the exciting realm of advanced materials. Dr. Seema Raj passionately discussed the expansive scope of the International and Future Prospects of Advanced materials 2023. The conference delved into a wide range of topics, including Advanced materials, Functional materials, Nano-electronics and Nano-electronic devices, Surfaces, coatings & films. It also explored emerging areas in material science, physics and chemistry of materials, with a specific focus on carbon nanostructures and graphene, biosensors, bio- electronic materials, electrical, optical, and magnetic materials, and materials science and engineering.

In addition to these areas, the conference embraced optoelectronic materials, mining and metallurgy, corrosion engineering, corrosion protection, bio materials, medical devices, ceramics, glasses, and composite materials, Nano engineering, and computational modelling of materials were also prominent subjects of discussion.

She also acknowledged the patrons, Conveners, co-conveners, and organizing team who played pivotal roles in making IFPAM 2023 a success. The event commenced with Dr. seema Raj leading the attendees in chanting the Saraswati mantra, adding a touch of spirituality and setting a focused atmosphere for fruitful discussions and knowledge sharing.

Dr. Pawan kumar, the converner of IFPAM 2023 and Associate Dean of Research, delivered a warm and welcoming address to Kickstart the conference. His role as Associate Dean underscored his expertise and leardership in the field of research. Dr. Pawan Kumar then introduced the distinguished Keynote speaker, Prof. Oscar Raymond Herrera, Nanoscience and Nanotechnology Center of the National Autonomous University of Mexico (CNyN-UNAM). Currently, he is the Head of the Department of Advanced Materials, Member of the Material Research Society and the Mexican Society of Materials, who delivered a captivating lecture on the topic of "Nanocomposite based on metal and/or semiconductor nanoparticles embedded on zeolitic matrices and their applications" Prof. Herrera's Keynote lecture delved into the fascinating realm of nanotechnology, exploring the potential of incorporating metal and semiconductor nanoparticles within zeolitic matrices. This emerging field of nanocomposites holds promise for a wide range of applications and offers exciting opportunities for advancements in materials science. The audience was privileged to gain insights from prof. Herrera's expertise, paving the way for further discussions an exploration of this innovative topic throughout the conference. After the lecture Co-Convener Dr. Diwaker Padalia thanked the keynote speaker and also informed regarding all parallel paper presentation tracks.


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Address of the invited speakers

1. **Dr. Oscar Raymond-Herrera**- Born in Havana, Cuba, in 1963. Mexican by naturalization. He received his Bachelor of Education degree in the Specialty of Physics at the Pedagogical Institute of Havana City in 1985.

He acquired the category of Assistant Professor in the aforementioned Institute in 1995. From 1985 to 2000 he worked in the Faculty of Physics of said institution, serving as Participating Professor-Researcher of the Research Group in Zeolites and Dielectric Properties in Solids, and Senior Lecturer in Microelectronics (from 1996 to 2000).

He received his Doctor of Physical Sciences (PhD) degree, awarded by the National Council of Scientific Degrees of Cuba, in February 1999, in the specialty of Crystallography.

He is Titular Researcher in the Nanoscience and Nanotechnology Center of the National Autonomous University of Mexico (CNyN-UNAM) from 2002 and belongs to the National System of Researchers (Conacyt) with Level II. Today is Head of the Department of Advanced Materials. Member of the Material Research Society and the Mexican Society of Materials.

Specialty areas:

1. Solid State Physics.

2. Crystallography and Physical Properties

3. Multi-functional Multiferroic Materials. Ceramics and thin films.

4. Zeolites. Photoactive Nanocomposites for Photocatalysis.

Publications: 69

Congress: International 152 and National 110

orcid.org/0000-0001-7832-1486

2. Dr. Rakesh Kumar Dwivedi-

Dr. Rakesh Kumar is currently a Professor in the Department of Physics and Materials Science & Engineering at JIIT Noida, India. He holds an impressive educational background with a Postdoc Research from the Department of Metallurgical Engineering and Materials Science at IIT Bombay (2000-2002), a Ph.D. in Materials Science and Technology from the Indian Institute of Technology, Banaras Hindu University, Varanasi (1999), and an MTech in Materials Technology from the same institution (1994).

With a research experience spanning 26 years (1996-2022), Dr. Rakesh has contributed significantly to the field. He has published 115 papers in national and international journals and conferences. His areas of interest include nano-materials synthesis, electro-ceramics, dielectric materials, MEMS (Micro-Electro-Mechanical Systems), and piezoelectric energy harvesters.

Dr. Kumar is an active member of esteemed professional organizations, including being a life member of the Materials Research Society of India (MRSI) and the Institute of Smart Structures and Systems (ISSS).

Throughout his career, Dr. Rakesh has successfully completed five sponsored projects, including ones funded by AICTE (All India Council for Technical Education), DRDO (Defense Research and Development Organization), DST (Department of Science and Technology), NPMASS (National Programme on Micro and Smart Systems), and UGC-NRCM (University Grants Commission - National Resource Centre for Micro and Nano Characterization) in collaboration with IISc Bangalore.

As an experienced academician, Dr. Rakesh has supervised several students, including five Ph.D. theses, ten MTech dissertations, and sixteen B.Tech. major projects. His expertise is recognized through his participation in 28 keynote and invited talks, where he has shared his knowledge and insights in various academic forums.

Overall, Dr. Rakesh has made significant contributions to the field of materials science and engineering, particularly in the areas of nano-materials, electro-ceramics, and MEMS. His research, publications, and extensive involvement in sponsored projects and academic mentorship reflect his dedication to advancing knowledge and fostering innovation in the field.

3. Dr. Jitendra Pal Singh- Dr. Jitendra Pal Singh is working as Ramanujan Fellow at Manav Rachna University, Faridabad, India. He has been associated with Pohang Accelerator Laboratory, Pohang, South Korea, Korea Institute of Science and Technology, Seoul, Korea, Krishna Engineering College, Ghaziabad, National Chung Cheng University and Inter University Accelerator Center, India.

His research interests are irradiation studies in nanoferrites, thin films, magnetic multilayers and cathode materials. He has expertise in X-ray absorption spectroscopy and X-ray imaging techniques. He has more than 100 SCI-indexed publications.

He worked as a Guest Editor in Vacuum, Applied Nanoscience, Materials Letters, Journal of Electronic Materials and Journal of Alloys and Compounds. He has edited five books with ELSEVIER which are in production.

4. Dr. Mukesh Kumari- Dr. Mukesh Kumari is currently working as a principal R & D scientist at Western Digital,California, USA. At Western digital, her research and development activities involve fabrication of the next generation magnetic memory devices. Her broad research area includes magnetoelectric memory devices, electric field manipulation of spins, pressure dependent electrical and magnetic transport studies of strongly correlated electron systems etc.

Dr. Kumari received her Ph.D. from the Indian Institute of Technology Delhi. She has been an INSPIRE fellow for her Ph.D at IIT Delhi. During her Ph.D.,

she also received 'Young ScientistParticipation Award' from DST-DFG Germany to meet Nobel laureates in Physics, held in Germany. After her Ph.D., Dr. Kumari got 'Postdoctoral Research Fellowship' from National University of Singapore (NUS) in 2017. In 2018, she got the prestigious 'INSPIRE Faculty Award' from the Department of Science and Technology (DST), India.

Followed by NUS research, in 2019, she was awarded with Fulbright research fellowship from IIE Washington, USA to carry out her research at University of California Berkeley, USA. Recently in 2022, she has also been identified as the "individual with extraordinary abilities" by the USCIS, USA. She has demonstrated accomplishments in publication, patent, peer-reviews and delivered several conference talks to internal and external audience.

5. Dr. Mukesh kumar Thakur- Dr.Thakur was born in Bihar and did his basic schooling at Bihar Board, after completing the basic schooling, he moves to Delhi University to pursue his bachelor's degree in Physical Science in 2008-2011. After completing their bachelor, he moves to Jamia Millia Islamia for an MS in Physics (2011-2013). From 2014-2015 he was the Project Fellow at CSIR-National Physical Laboratory, Delhi, India. In 2015 he received a prestigious National Yang-Ming University Taiwan Scholarship for Ph.D. studies and completed it in March 2020. After finishing the Ph.D. he joined as a postdoctoral fellow at J. Heyrovsky Institute of Physical Chemistry, Czech Academy of Sciences, Czech Republic, till December 2022. Since Jan 2023 Dr.Thakur has been working as a collaborator at IIT, Italy (Italian Institute of technology, Genova, Italy).

6. H. K. Singh-

H. K. Singh is an accomplished Chief Scientist and Professor of Physics at AcSIR (Academy of Scientific and Innovative Research). He has a strong educational background, holding an M.Sc. in Physics from Magadh University. He has also cleared prestigious exams such as CSIR-UGC NET JRF in 1992 and GATE-92 with a percentile score of 96.5. To further his expertise, he completed his Ph.D. in the Physics Department at Banaras Hindu University.

H. K. Singh specializes in various areas, including magnetism and superconductivity, thin films and superlattices, quantum resistance metrology, and high-precision electrical transport measurements. His research interests lie in exploring the properties and behaviors of magnetic and superconducting materials, as well as investigating the unique characteristics of thin films and superlattices.

Throughout his career, H. K. Singh has been actively involved in thesis supervision and research. He has successfully supervised and completed the M.Sc./M.Tech. dissertations of 22 students. Additionally, he has supervised and completed the Ph.D. research of 11 students as the main supervisor. Currently, he is supervising the research work of four Ph.D. students.

H. K. Singh's contributions to the field are evident through his numerous publications. He has published 116 papers in SCI (Science Citation Index) journals, showcasing his dedication to advancing scientific knowledge. He has also contributed to conferences by presenting his research findings in 11 conference proceedings. Furthermore, he has published four book chapters, further expanding the dissemination of his work. Additionally, he holds one US patent, reflecting his innovative contributions in his specialized field.

With his extensive experience and expertise in various areas of physics, H. K. Singh continues to make significant contributions to the field. His commitment to research, thesis supervision, and publication of research

findings highlights his passion for advancing knowledge and fostering scientific excellence.

7. **Prof. J.L. Sanchez Llamazares-** J.L Sánchez Llamazares is a senior scientist at the Advanced Materials Division of the Instituto Potosino de Investigación Científica y Tecnológica A.C. (IPICyT), Mexico. He received the PhD title from the University of Havana, Cuba. Currently, his research interests focus on the synthesis and study of alloys for magnetocaloric applications. He has over 180 peer-reviewed publications and belog to the editorial board of both Metals and Magnetochemistry MDPI journals."
8. **Prof. Krishan Lal-** Prof. Krishan Lal was the former director of CSIR-NPL, New Delhi India and holds many International and National positions in his name. He also got many national and international fellowships (like, Fellow-INSA, Fellow-NASI, and Fellow-Russian Academy of Sciences). He also has many honours and awards on his name (like, DS Kothari Memorial Lecture, Honoured by Prime minister of India during Inaugural session of Indian Science Congress Session and many more)
9. **Dr. Subhash Chander-** He joined Aeronautical Development Establishment laboratory of Defence Research and Development Organizaion (DRDO) Ministry of Defence Government of India in 1995 at Bengaluru, after passing Master of Technology in Microwave Electronics from Delhi University. Currently he is Scientist F in Solid State Physics Laboratory of DRDO in Delhi. He received Doctorate of Philosophy (Ph.D.) in 2019 from Delhi University India. He has 34 years of experience in industry. His experience involves design, development, fabrication and testing of various RF circuit and components such as directional coupler, power dividers, amplifiers, tracking Antenna of

Ground control station of Unmanned air vehicles. He has been involved in number of field trial at various places in India and abroad. Last 15 years he is working in development of Gallium Arsenide and Gallium Nitride MMIC technology specifically design, development and modeling of active (HEMT) and passive components (Resistor, Inductors, capacitors etc.) up to 40 Ghz. He held various administrative post in DRDO during his career. He has published more than 20 papers in National, International conferences and Journals He is the recipient of the 'Path breaking Award-2019' of DRDO two times and Technology Group Award-2017'for contribution in Development of GaN based MMICs Technology

Session wise and Track wise Report

DAY 1- Track 1- Morning Session

Session Chair: Dr. Jarnail Singh

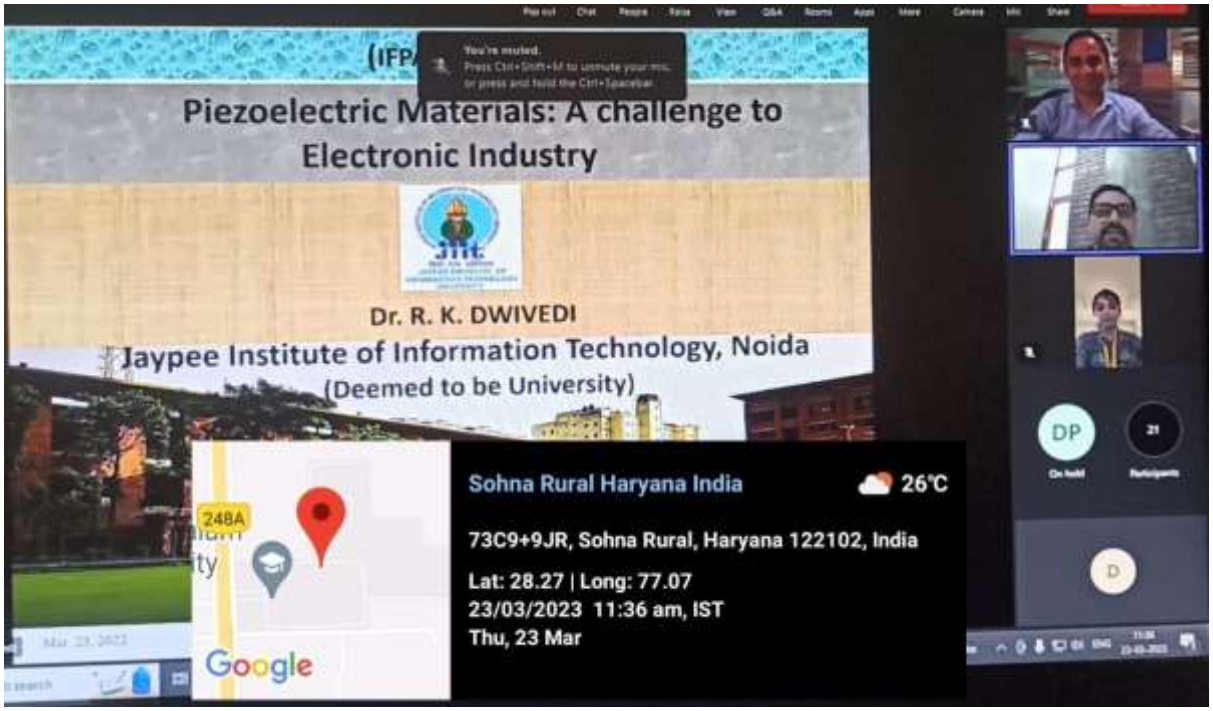
Moderator: Dr. Ritika Khatri

The session commenced with a keynote speech delivered by Prof. R.K. Dwivedi from Jaypee Institute of Information Technology (JIIT), Noida, India. The talk titled "Green Piezoelectric Materials: A Challenge to the Electronic Industry" explored nanomaterials, ferroelectricity, and piezoelectric materials, concluding with a discussion on the future of environmentally friendly piezoelectric materials. The audience actively participated in the session, showing great interest in the potential applications of these materials in industries like automotive and energy harvesting. The session, which took place on the Teams platform, saw over 35 participants, including researchers from across the country who presented five papers. The titles of paper presented are mentioned below-

1. Microwave Greener Synthesisof 2-Acetyl-Pyrrole-Schiff base by Meghasham N. Narule.
2. Photocatalytic degradation of Rose Bengal dye by Fe doped Zinc Oxide nanoparticles by Pooja Devi.
3. Significance of Plants' Secondary Metabolites and Optimum Reaction Parameters as Ideal Requirements in the Synthesis of Nanoparticle
4. on Selective Electrode based on PVC Membrane for Determination of Metal Ions by Jaskiran Kaur.
5. Mechanistic view of MoS2 confined chitosan-polyaniline hybrid composite for the photo-oxidation of cationic dyes by P. Sirajudheena.

The presentations provided valuable insights. Narule's presentation showcased greener synthesis using microwaves. Devi highlighted the use of nanoparticles for dye degradation. The significance of plants' metabolites and nanoparticle synthesis was emphasized. Kaur discussed a selective electrode for metal ion

determination. Sirajudheena explored hybrid composites for dye photo-oxidation. Overall, the audience learned about innovative synthesis, sustainable approaches, and the applications of nanomaterials and advanced materials.



DAY 1- Track 1- Evening Session

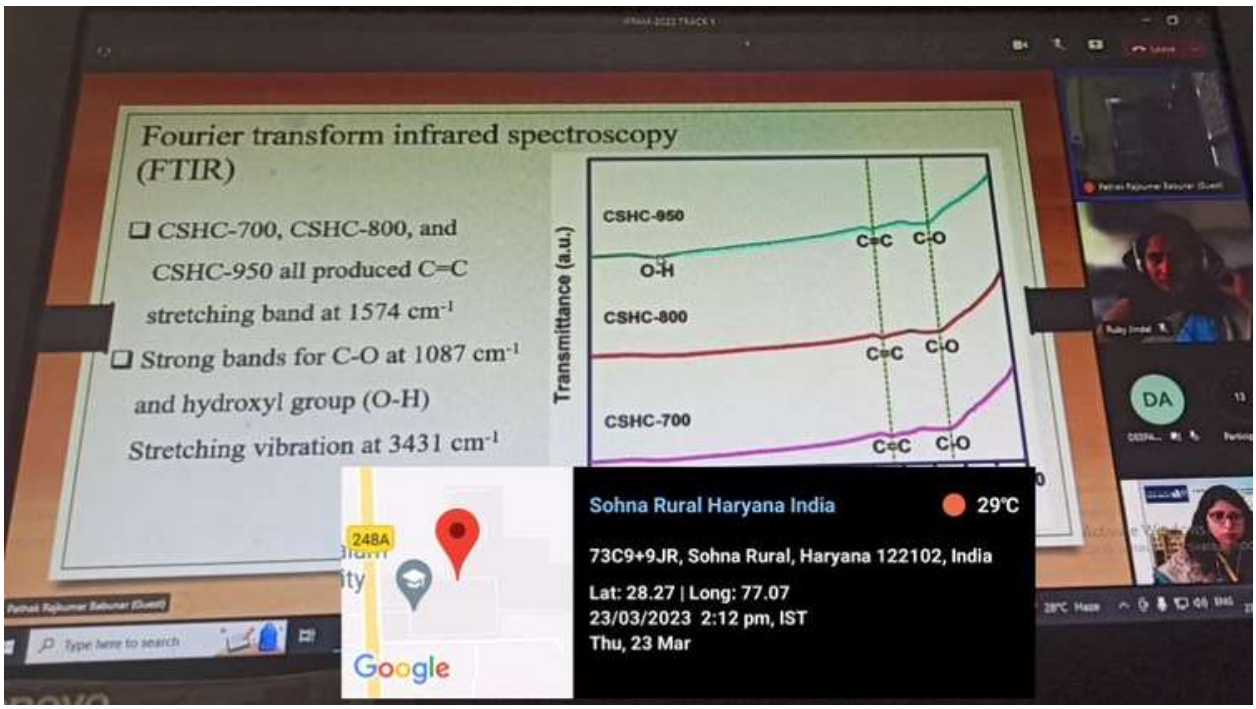
Session Chair: Dr. Roopam Gaur

Moderator: Dr. Ruby Jindal

During this session, participants showcased their research work on various topics. These included the utilization of hard carbon from coconut shell as an anode material for sodium-ion batteries, the optimization of inorganic RbGeI3-based perovskite solar cells through conduction band offset engineering, the surface passivation for defect-free lead halide perovskites in solar cell fabrication, the deposition and characterization of yttrium iron garnet (YIG) thin films using a pulse laser deposition system (PLD), and the study of double perovskites Cs2GeXCl6 (X = Ni, Fe, Co) for spintronics applications using density functional theory. The audience also learned about the strategies employed to engineer the conduction band offset, leading to improved device characteristics. Presentations also highlighted he importance of surface passivation in achieving high-performance and long-lasting perovskite solar cells. The audience gained insights into the properties and potential applications of YIG films, particularly in the field of spintronics.

Both participants and the audience displayed a keen interest in the various applications of perovskite materials in solar cells and pulse laser deposition systems. The session attracted over 15 participants through the Teams platform, with researchers from across the country presenting five papers.

Dr. Roopam Gaur, Assistant Professor at K.R. Mangalam University's School of Engineering and Technology (SOET), chaired the session, while Dr. Ruby Jindal, Assistant Professor at K.R. Mangalam University's School of Basic and Applied Sciences (SBAS), effectively moderated the proceedings.


Fourier transform infrared spectroscopy (FTIR)
CSHC-700, CSHC-800, and CSHC-950 all produced C=C stretching band at 1574 cm-1
Strong bands for C-O at 1087 cm-1 and hydroxyl group (O-H) Stretching vibration at 3431 cm-1
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CSHC-700
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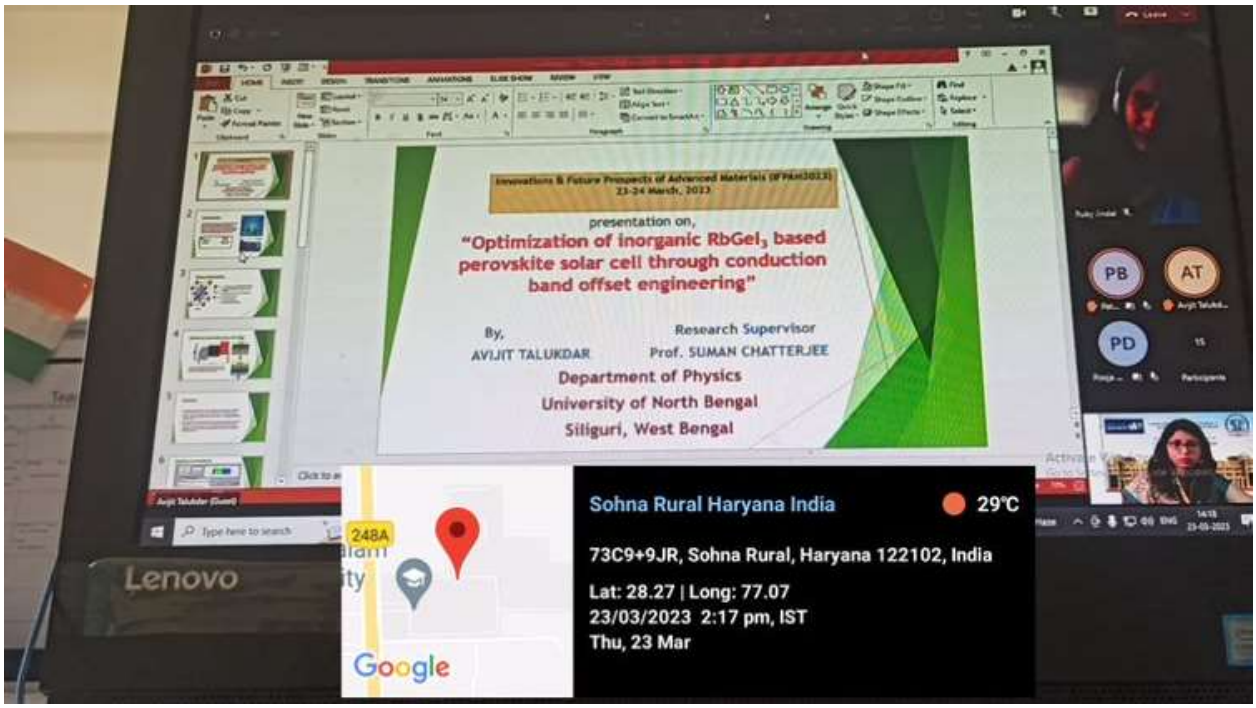
presentation on,
"Optimization of inorganic RbGeI3 based perovskite solar cell through conduction band offset engineering"
By,
AVIJIT TALUKDAR
Research Supervisor
Prof. SUMAN CHATTERJEE
Department of Physics
University of North Bengal
Siliguri, West Bengal
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Day 1 Track-2 Morning Session

Session Chair: Dr. Prabhakar Bhandari

Moderator: Dr. Sonu Mehla

In this session participants presented their research work related to Impact of melting heat transfer of Casson magntohybridynamic nanofluid over a stretching sheet with outer velocity, Analysis of heat and mass transfer in cross fluid along a stretching wedge, Modeling of Enhanced Oil Recovery Using Nanofluid, Impact of Entropy Generation in Oblique Nano Fluid Flow past a Stretching Sheet, Power Optimizer using Quaternary Logic: Its Design and Implementation.

This presentations provided insights into the fundamental understanding of fluid dynamics and heat transfer phenomena in complex flow configurations and mechanisms and benefits of using nanofluids for enhanced oil recovery techniques. The presentation on the impact of melting heat transfer of Casson magnetohydrodynamic nanofluids over a stretching sheet offered insights into the behavior of nanofluids during melting processes and the influence of magnetic fields on the heat transfer characteristics. The presentation also provided insights into the thermodynamic aspects of nanofluid flow and how entropy generation affects the overall efficiency and performance of the system. Audience also gained knowledge about the use of quaternary logic in optimizing power consumption and improving the efficiency of electronic devices.

The session was attended by more than 14 participants through Teams platform including 5 paper presentations by the researchers across the country.

The session was chaired by **Dr. Prabhakar Bhandari**, Assistant Professor, SOET, K.R. Mangalam University. Dr. Sonu Mehla, Assistant Professor, SBAS, K.R. Mangalam University moderated the session effectively.

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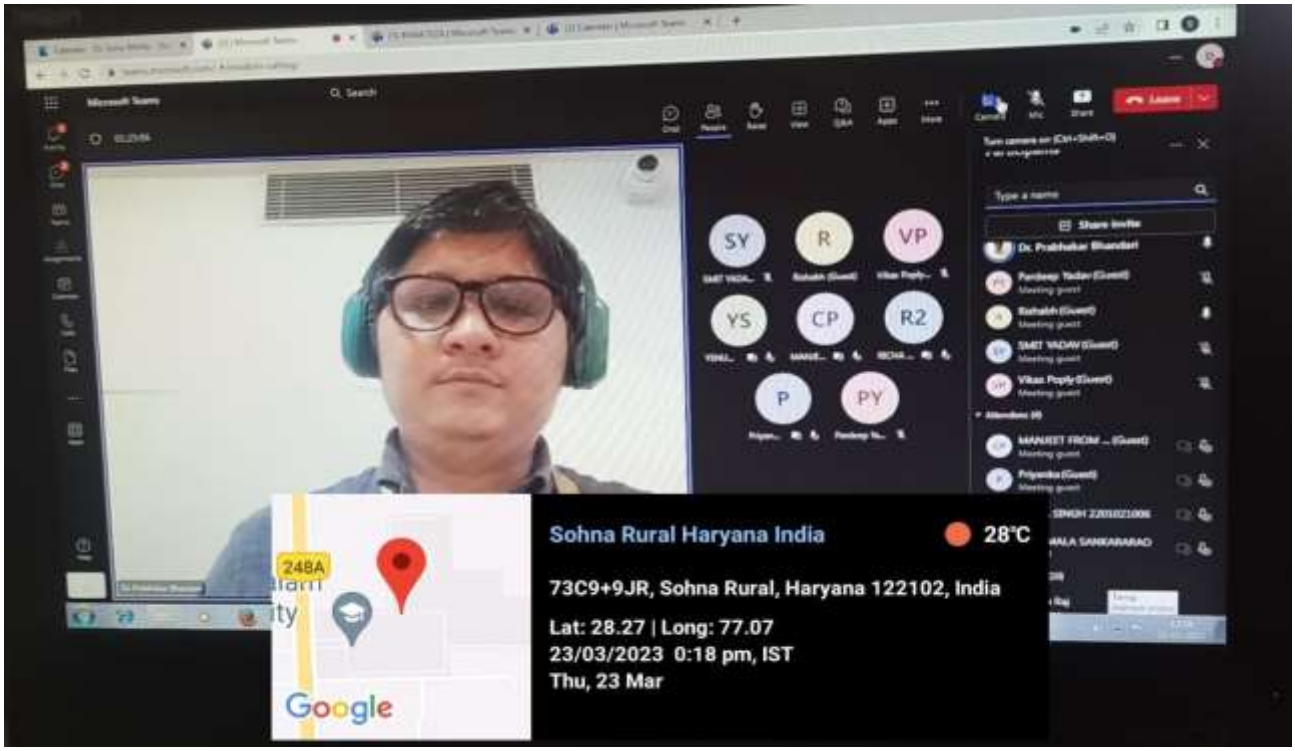


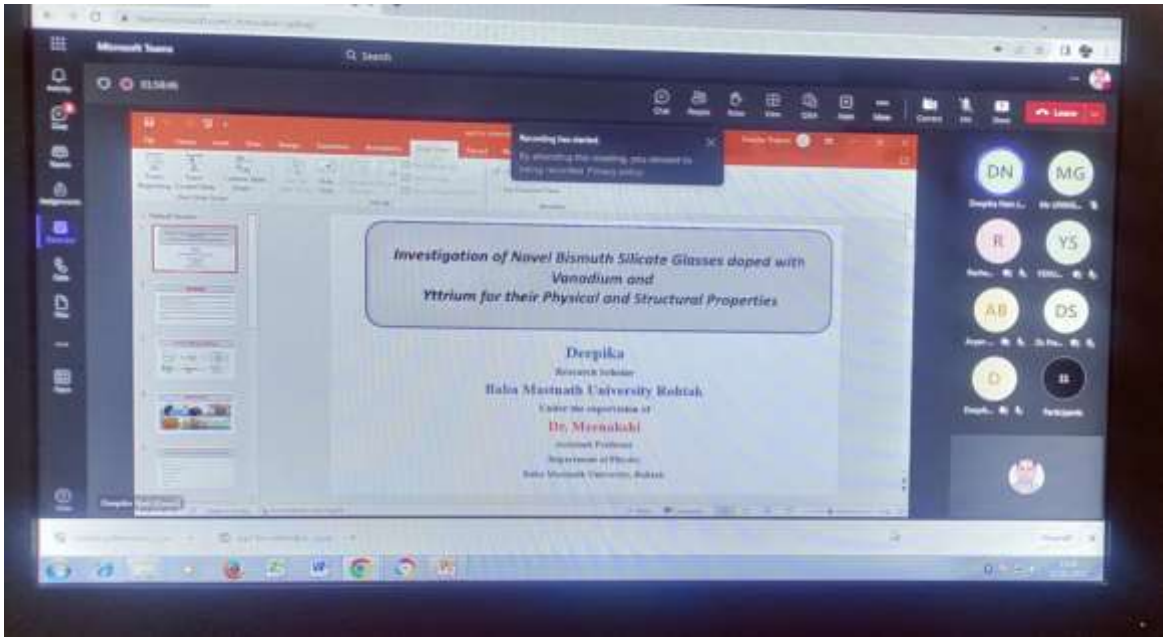
<u>Day 1 Track-2 EveningSession</u>

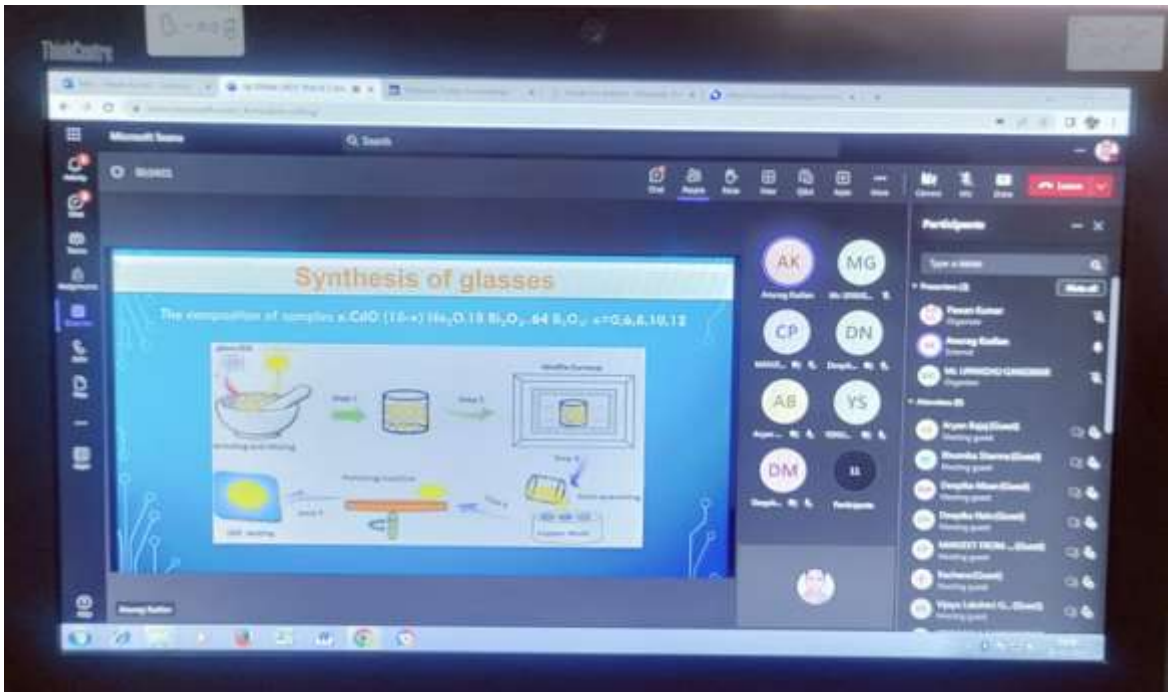
Session Chair: Dr. Upanshu

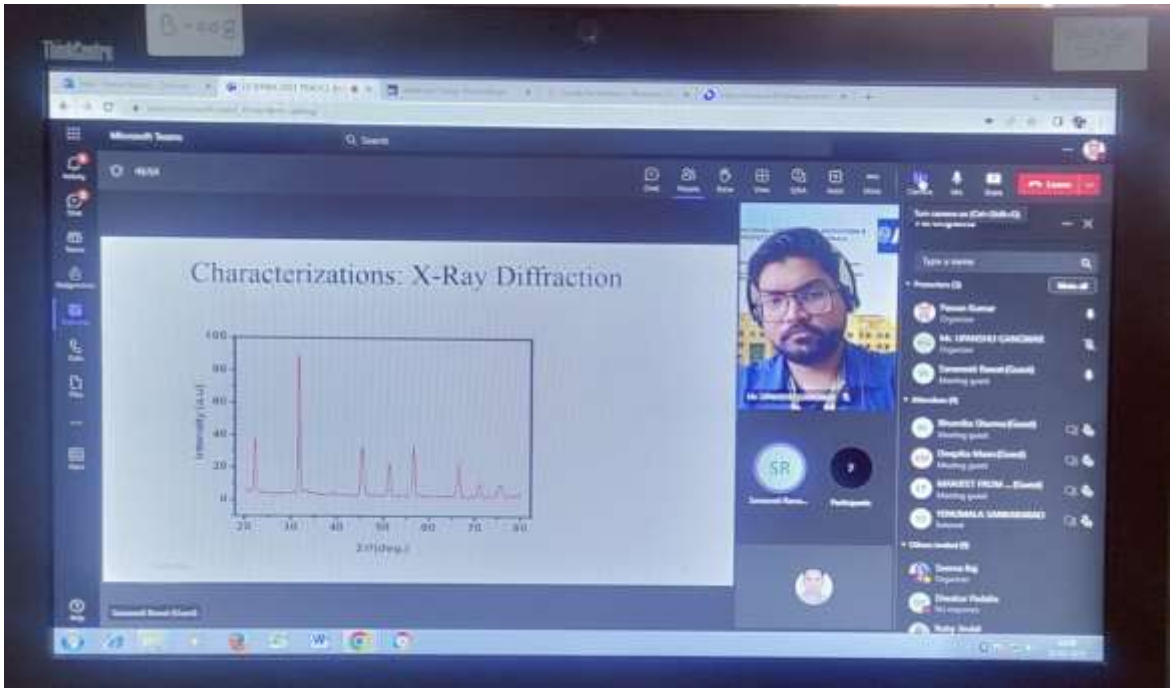
Moderator: Dr. Pawan Kumar

The session was chaired by Dr. Upanshu Gangwar, Assistant Professor, Department of Chemistry, School of Basic & Applied Sciences, K.R. Mangalam University, Gurugram. During this session, total 6 participants presented their research work via Microsoft teams platform. Participants given 10 minutes for the presentation and 2 minutes for the Q&A. Participant Saraswati Rawat presented her research in the area of enhanced electrical and ferroelectric properties of SnO2 doped KNN based lead free piezoceramics. N. Jyothi presented on the topic of synergistic effect of samarium doping on lead-free NBT ceramics. Deepika Maan discussed on physical and structural properties of cadmium sodium bismuth borate glasses. Manjeet presented on the topic of study of dysprosium ions doped zinc sodium lead borate glasses. Deepika Nain presented on the topic investigation of bismuth silicate glasses doped with vanadium and yittrium for their novel physical and structural properties.

Rachana Gaur presented on the topic of group theory calculations for orthothombic MnV2O6 compound using correlation method. Session was full of knowledge for the participants they shared their experience after the session. The moderator Dr. Pawan Kumar, given vote thanks to all the participants and the session chair.







Day 1 Track-3 Morning Session

Session Chair: Dr. Diwakar Padalia

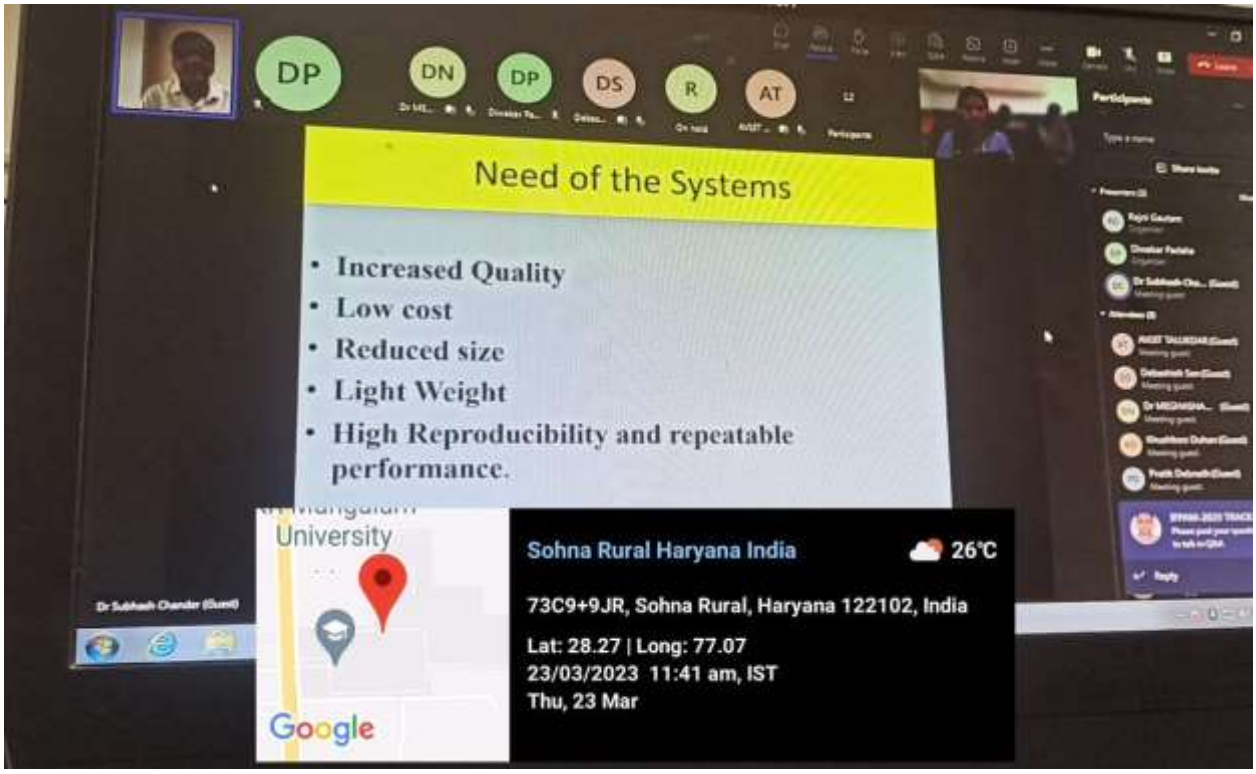
Moderator: Dr. Rajni Gautam

Dr. Subhash Chandra, Scientist F, DRDO invited speaker for day 1 track 3 session on 23 March 2023 during the two days International Conference "Innovations & Future Prospects of Advanced Materials" (IFPAM2023) Organised by School of Basic and Applied Sciences, K.R. Mangalam University, Gurugram in collaboration with the Centre for Nanoscience and Nanotechnology- UNAM, Mexico from March 23rd to March 24th, 2023 deliberated on the topic "GaN material Technology and Applications".

In his didactic discourse with the participants, Dr. Chandra focussed on the recent advancements in Gallium Nitride (GaN) technology. He discussed basic properties of GaN in comparison with conventional materials like Si, Ge and GaAs. The session was chaired by Dr. Diwakar Padalia, Assistant Professor, SBAS, K.R. Mangalam University. Dr. Rajni Gautam, Assistant Professor, SBAS, K.R. Mangalam University moderated the session effectively. The session was attended by 20 participants through Teams platform including 5 paper presentations by the researchers across the country. The details of paper presentations are mentioned below-

1. Thermoluminescence of Tb doped LiF Nanophosphorson irradiation of gamma rays by Debashish Sen.
2. Performance enhancement of CsPbI3/CsPbBr3 heterojunction with different ETL and HTL through SCAPS-1D simulation by Pratik Debnath.
3. Collisional Damping of Pure and Shear Alfven Modes in Beam Plasma System by Rajesh Gupta.
4. Propagation Characteristics of Lower Hybrid Waves in a Density Gradient Dusty Plasma by Himank Sagar.
5. Calculation of Density of states of Pristine and Functionalized Carbon Nanotubes: A DFT Approach by Sarita Tyagi.

Overall, the audience will gain knowledge about diverse topics such as thermoluminescence, perovskite solar cells, plasma waves, dusty plasmas, and carbon nanotubes. These presentations contribute to the understanding and advancements in materials science, renewable energy, plasma physics, and nanotechnology.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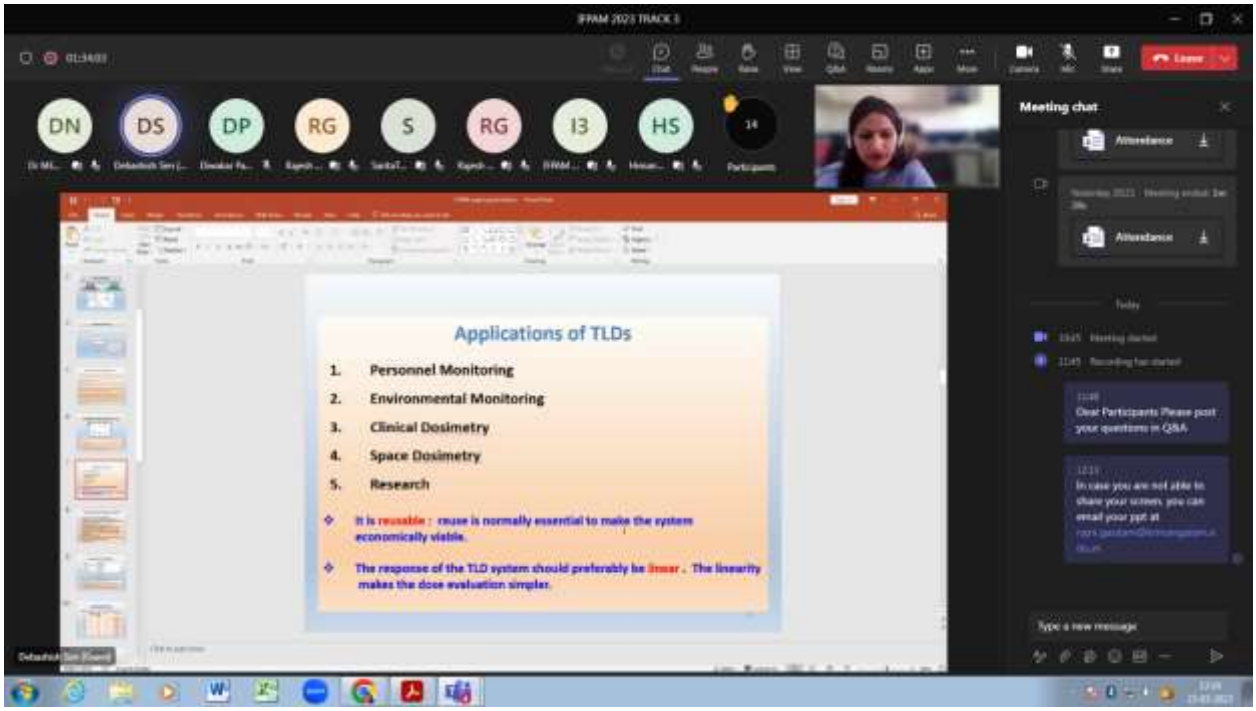
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Applications of TLDs
1. Personnel Monitoring
2. Environmental Monitoring
3. Clinical Dosimetry
4. Space Dosimetry
5. Research
It is reusable : reuse is normally essential to make the system economically viable.
The response of the TLD system should preferably be linear . The linearity makes the dose evaluation simpler.

Day 1- Track 3- Evening Session

Session Chair: Dr Ritika Khatri

Moderator: Dr Ragini Pandey

The session was kick started again with presentation by multiple participants in the field of chemistry. The topics which were covered by the participants were –

1. Structural and optical properties of Li+ ion implanted CuO thin films
2. A study on Copper Sulfide coated cotton thread for electrical and optical properties
3. Growth Mechanism and optical properties of pure NiO and Glucose - NiO Nanostructure Materials (NSM)
4. Dielectric and Magnetic Study of ZnFe2O4 Nanoparticles Synthesized Through Exploding Wire Technique
5. Structural and Shielding Properties of Ferrite as a Magnetic Filler in Reduced Graphene Oxide based Composites.
6. Study of lattice dynamics of tetragonal ruddlesdenpopper compounds (sr, ba)2zro4

Each presentation was well-organized and effectively communicated the research findings. The speakers were knowledgeable and engaged in thoughtful discussion with the audience. One area for improvement would be to provide more context and background information for non-expert audiences. The findings presented by the speakers have the potential to make a significant impact on a range of important issues. Future research should continue to explore in various fields to further our understanding and utilize their full potential


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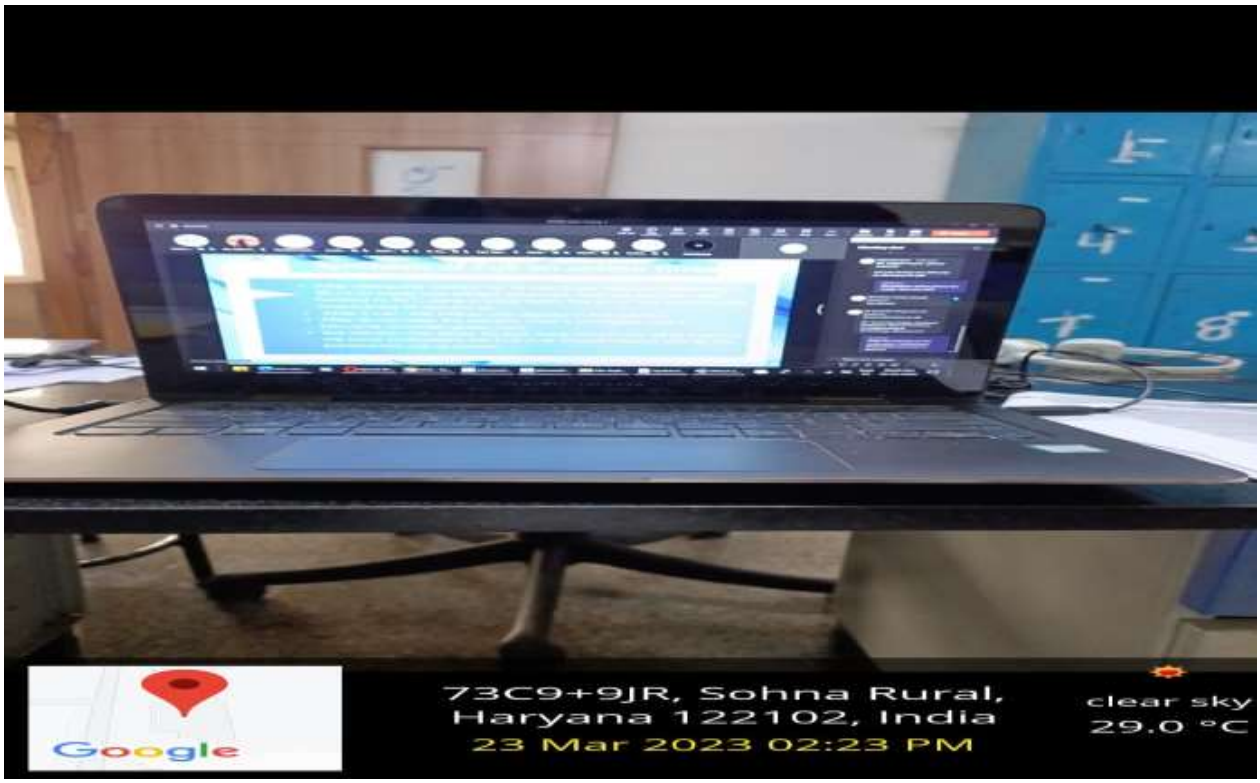
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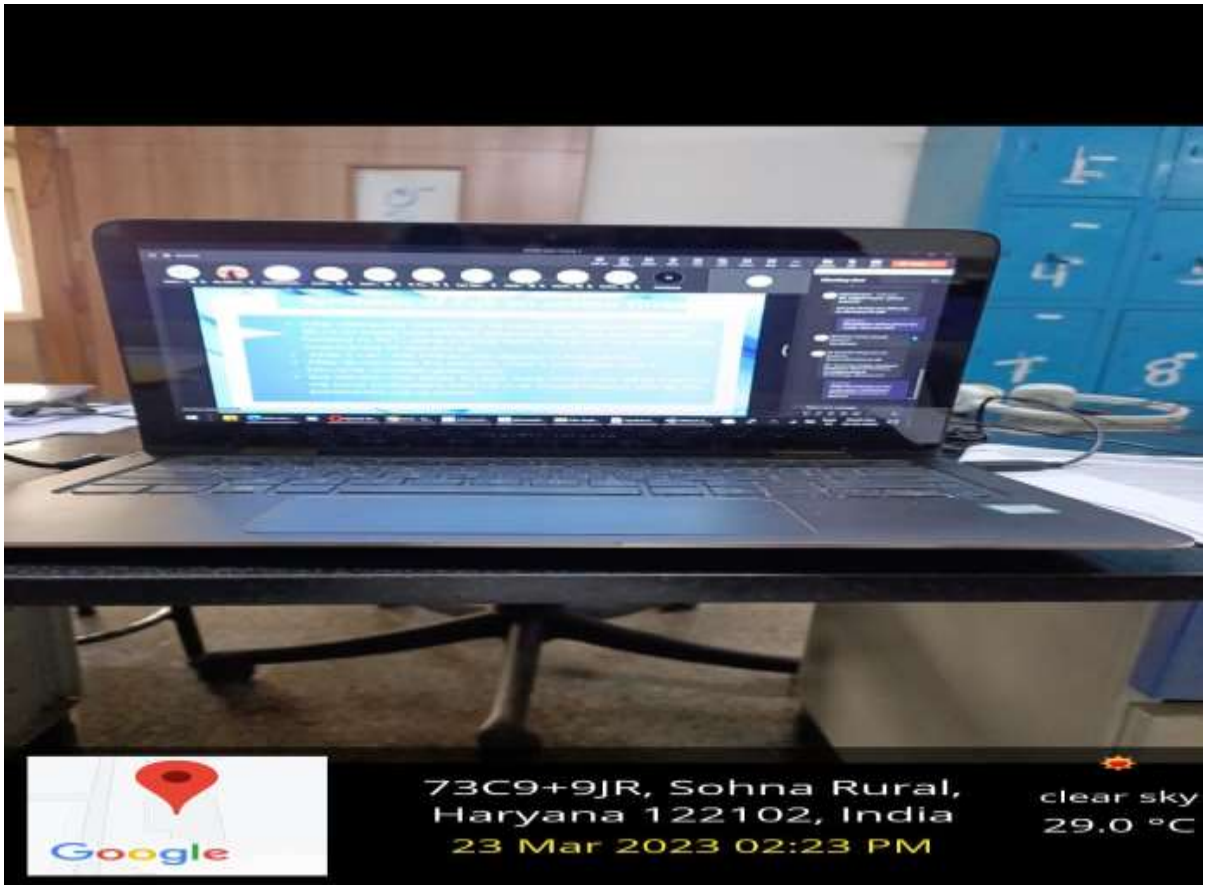


Day 2- Track 1- Morning Session

Session Chair: Dr. Manoj Gadewar

Moderator: Dr. Roopam Gaur

Track 1 of Day 2 started with the welcome of the invited speakers, session chair and the participants. Dr. Roopam Gaur (Assistant Professor-Physics, SBAS) introduced the invited speaker of the session, Dr. Mukesh Thakur and session chair, Dr. Manoj Gadewar to the listeners. Dr. Mukesh Kumar (Collaborator at IIT, Italy - Italian Institute of technology, Genova, Italy) delivered a lecture on the title "The Role of 2-D Materials for sustainable Growth and Future Optoelectronic Device Applications".

2-D materials are the future of Optoelectronic Industry. He discussed optoelectronic devices based on graphene and related two-dimensional (2D) materials. The lecture included basic considerations of process technology, including demonstrations of 2D heterostructure growth, and comments on the

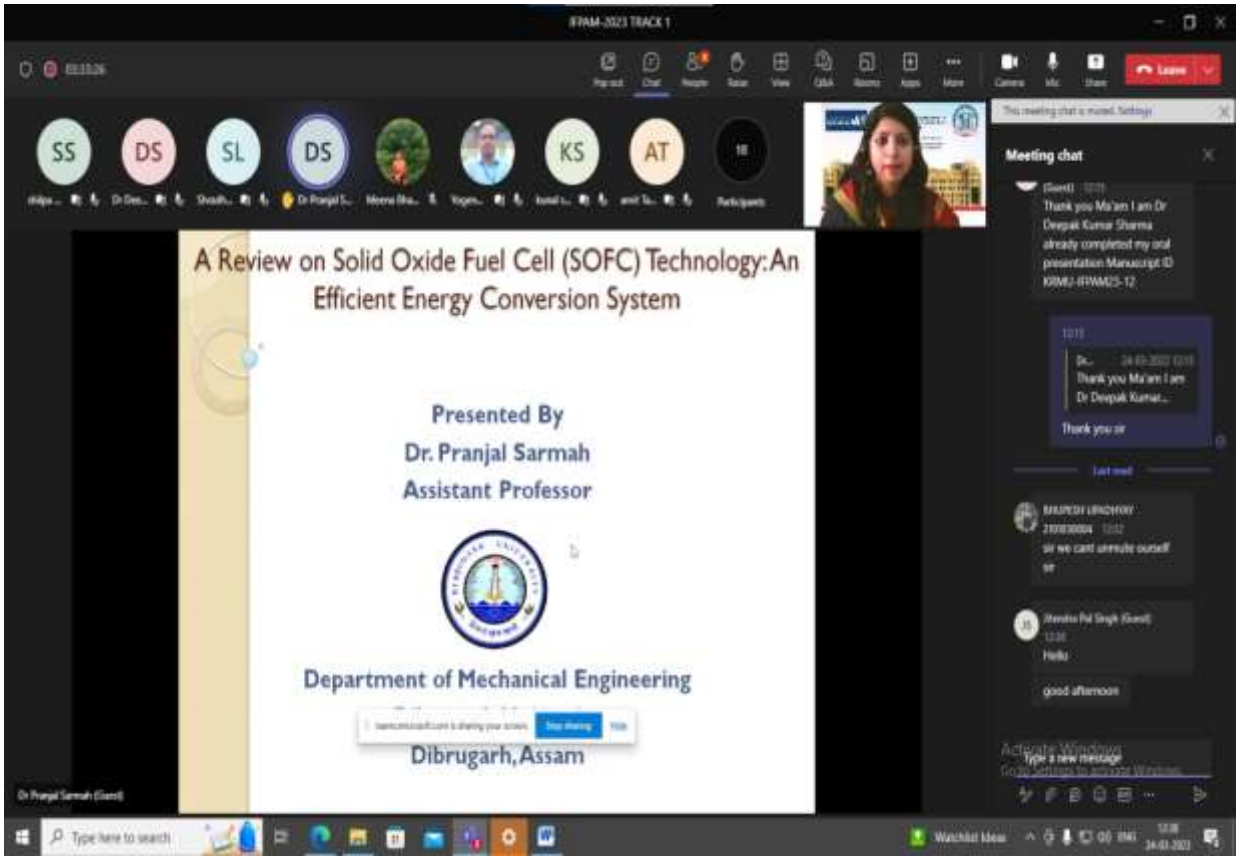
scalability and manufacturability of the growth methods. The session witnessed large number of participation, both from faculty members and research scholars from various institutions. The session was chaired by Dr. Manoj Gadewar, Assistant Professor, SOET, K. R. Mangalam University and was attended by more than 30 participants through Teams platform. After the invited lecture, the participants from various institutions presented their work through PowerPoint presentations. 10 paper presentations by the researchers across the country were delivered. Each presentation was followed by questions from the session chair and the participants. Every presentation was unique in its way and participants showed absolute enthusiasm. The details of all the paper presentations are mentioned below-

1. Electrochemical investigation of a novel quaternary composite based on Reduced Graphene Oxide, Polyaniline-Polypyrrole, and Iron Oxide as a high-performance electrode for hybrid supercapacitor applications by Shilpa Simon.
2. Synthesis and characterization of fluorescent coumarin substituted phosphazene by Shanki Sharma.
3. Chalcogenide fiber designed to achieve low dispersion in graded index fiber by Priyanka.
4. Role of pH change on the dynamics of Carbon nanotube and Protein structure by Sandeep kumar.
5. Low power resistive switching characteristics in Metal Oxides for transparent neuromorphic devices by Darshika Sanjay Khone.
6. Enhancement of the Electronic and Optical Properties of Superalkali Metal Adsorbed Al10N10 Nanocage by Meenakshi Rana.
7. Synthesis and characterization of PPY-Copper oxide (CuO)with GO for electron transporting layer for OLEDapplication by Rimpi.
8. he morphological and structural changes with calcination temperature in ZnNiO2-μ nano particulates (NPs) by Tanuja Kumar.

9. Antimony Oxide decorated Reduced Graphene Oxide-Bismuth Oxide nanocomposite by reduction of Graphene Oxide using pomegranate peel extract by S. Arockia Anushya.
10. Physical properties of Bi1-xLaxFeO3 –PbTiO3synthesized by solid state reaction route by Aquib Amir.
11. A Review on Solid Oxide Fuel Cell (SOFC) Technology: An Efficient Energy Conversion System by Pranjal Sarmah.

Overall, the audience can learn about a wide range of topics in materials science, nanotechnology, energy conversion, and related fields through these presentations. These topics contribute to the development of advanced materials, devices, and technologies with various applications.

In conclusion, Dr. Roopam Gaur expressed gratitude to the invited speaker, the session chair, and all the participants for their valuable contributions and active participation. Dr. Gaur also extended an invitation to everyone to join the evening session, which will be the valedictory session of the event. This gesture showed appreciation for the collective efforts and enthusiasm displayed throughout the day, emphasizing the importance of continued engagement and collaboration.


IFPAM-2023 TRACK 1
A Review on Solid Oxide Fuel Cell (SOFC) Technology: An Efficient Energy Conversion System
Presented By
Dr. Pranjal Sarmah
Assistant Professor
Department of Mechanical Engineering
Dibrugarh, Assam
Meeting chat
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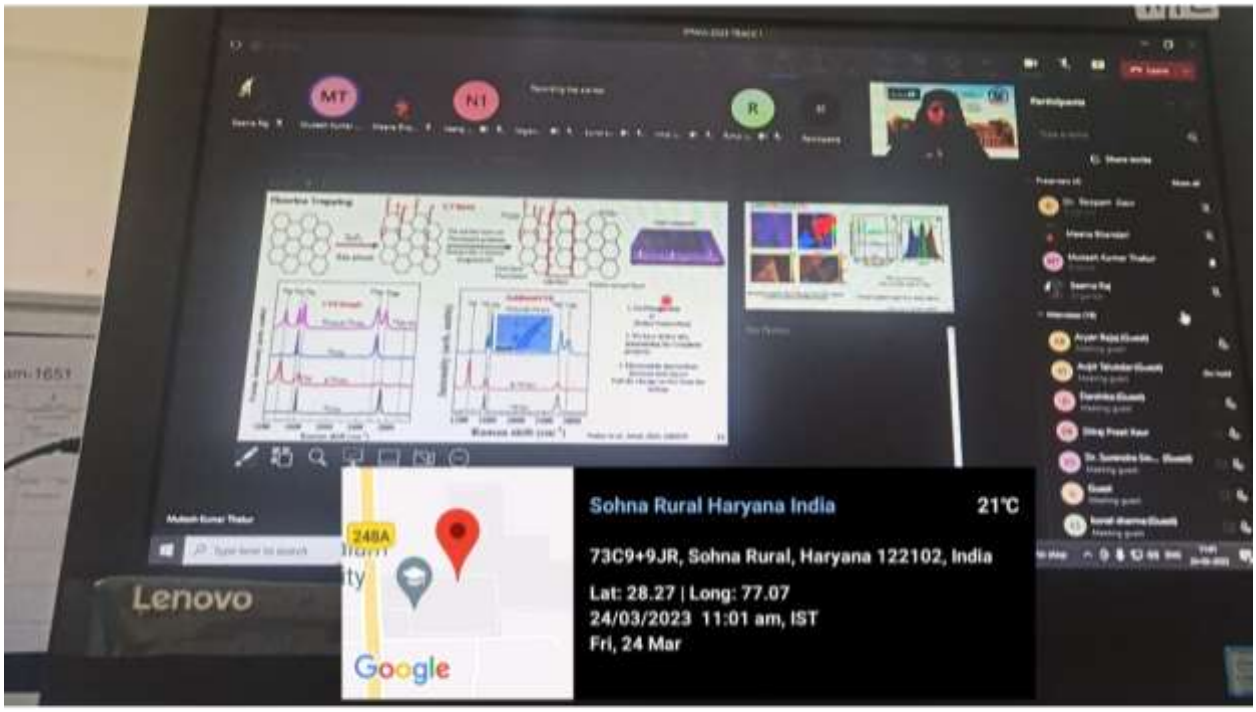
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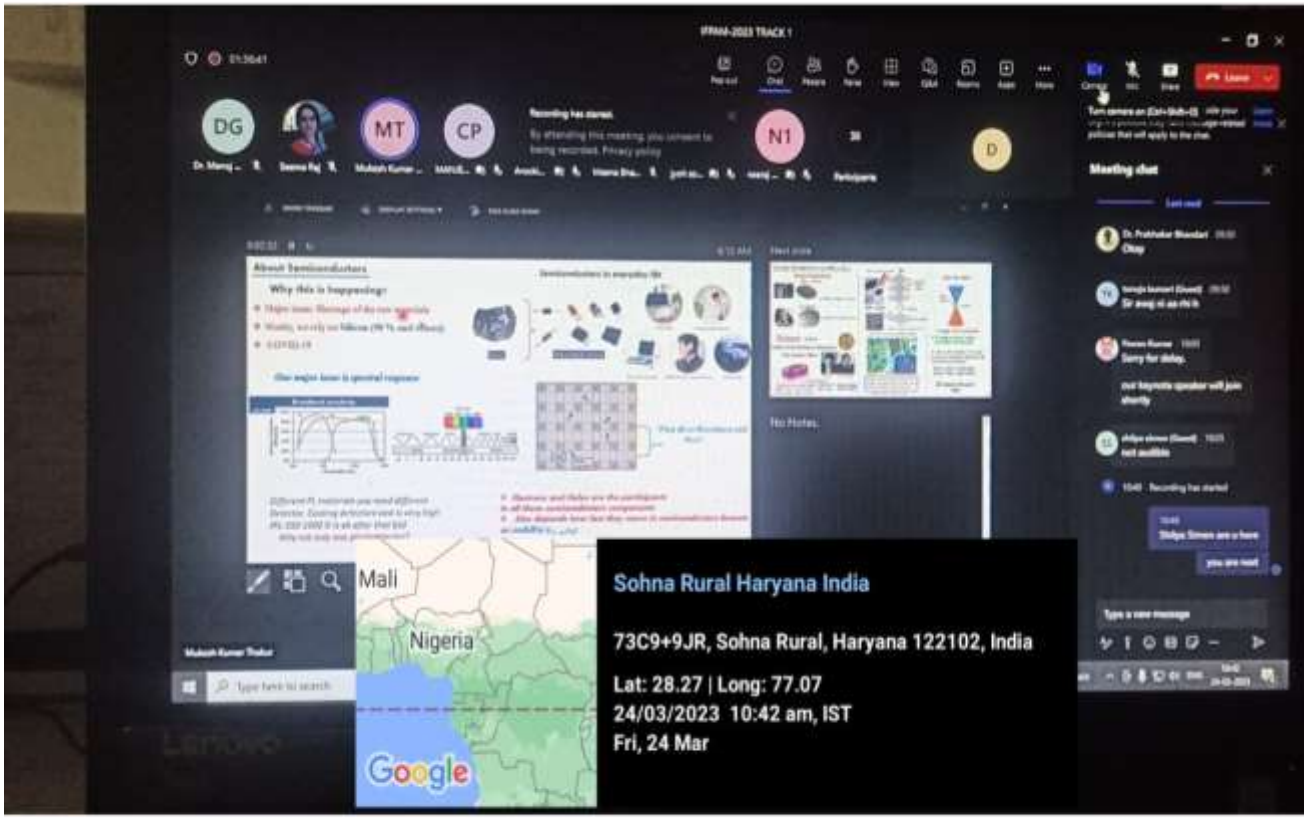
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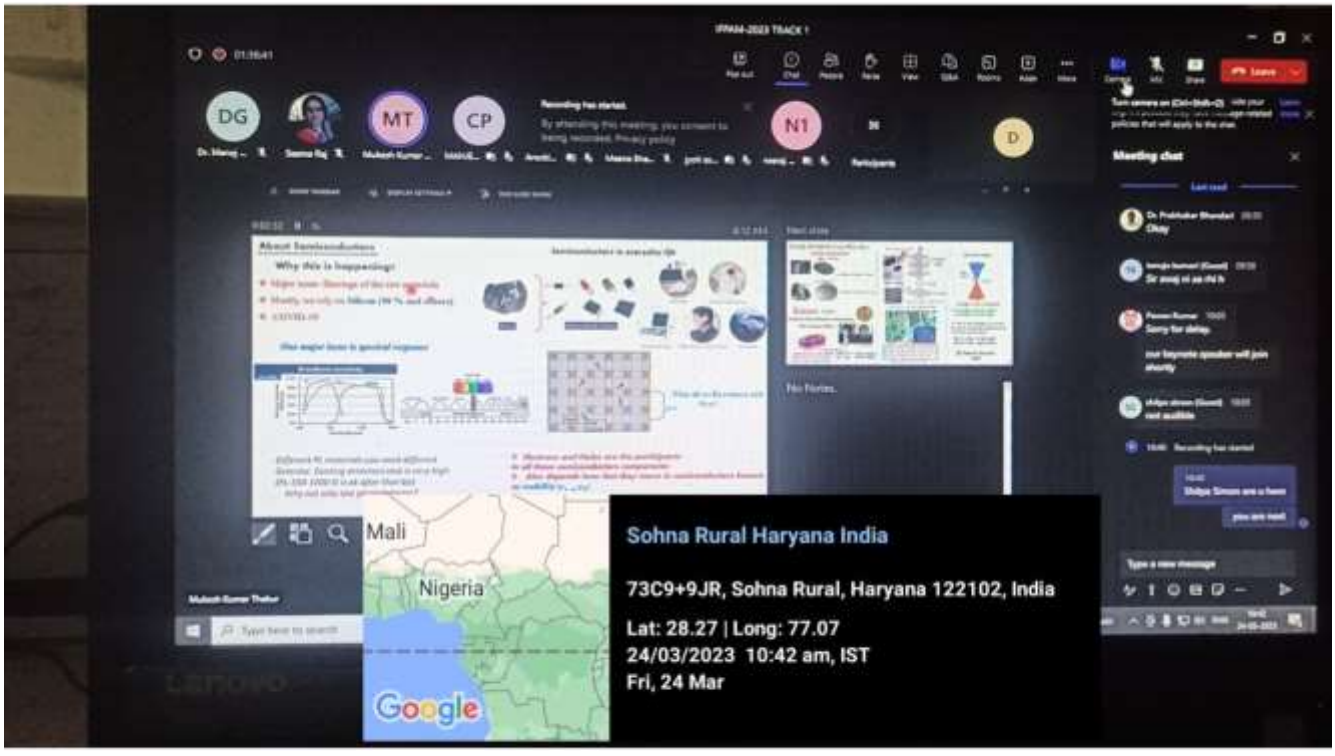
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<u>Day 2- Track 2- Morning Sessions</u>

Session Chair: Dr. Rajni Gautam

Moderator: Dr. Upanshu Gangwar

This session began with an invited talk by Prof. H. K. Singh (Scientist and Professor of Physics), AcSIR, National Physical Laboratory, New Delhi, on the title "Phase Separation and Thermomagnetic hysteresis in doped manganite thin films". He talked about the effect of phase separation on magneto transport properties of thin films of $La_{5/8-y}Pr_yCa_{3/8}MnO_3$ ($y\approx0.4$) and the scaling behaviour of thermomagnetic hysteresis in temperature and magnetic field-dependent resistivity. The session was attended by more than 26 participants through Teams platform including 12 paper presentations by the researchers across the country. This session witnessed a decent participation by audience who were quite intersted about various applications and impacts of different materials in dye degradation, green concretes, optical phonon, sensor technology, energy radiation shielding materials etc.

The session was chaired by Dr. Rajni Gautam, Assistant Professor, SBAS, K.R. Mangalam University. Mr. Upanshu Gangwar, Assistant Professor, SBAS, K.R. Mangalam University moderated the session effectively.

Day 2, Track-3-Morning Session

Session Chair: Dr. Ruby Jindal

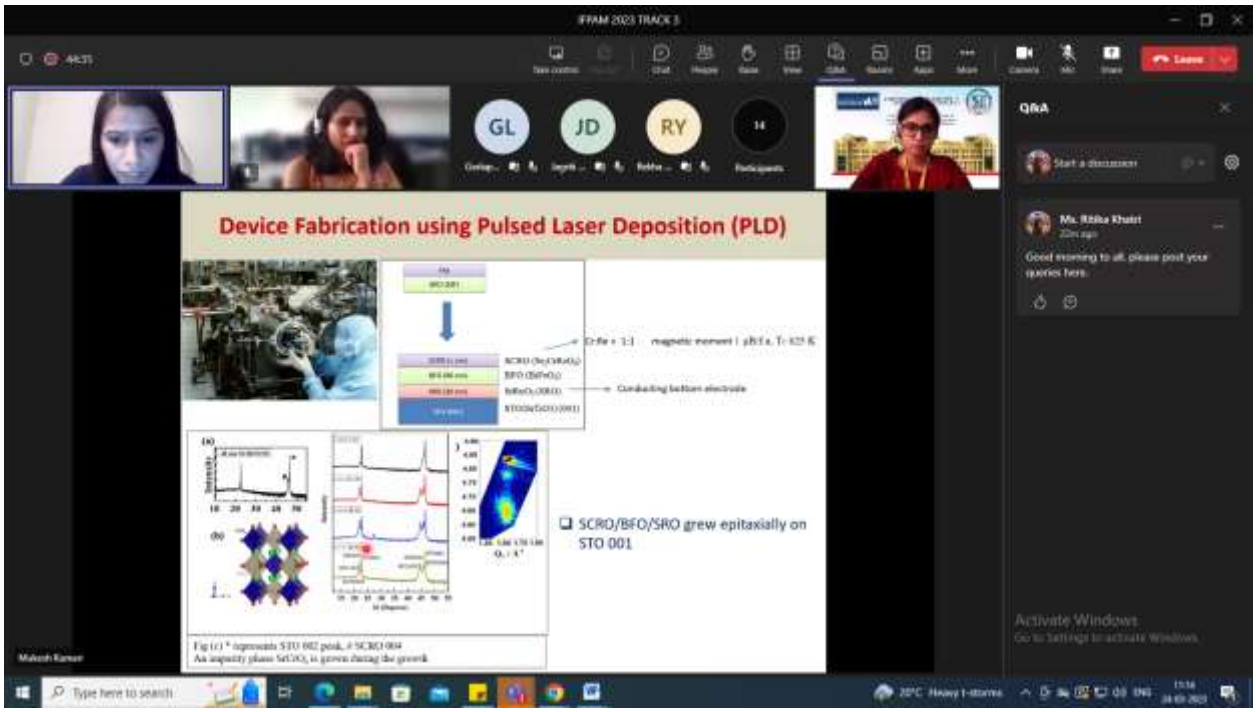
Moderator: Dr. Ritika Khatri

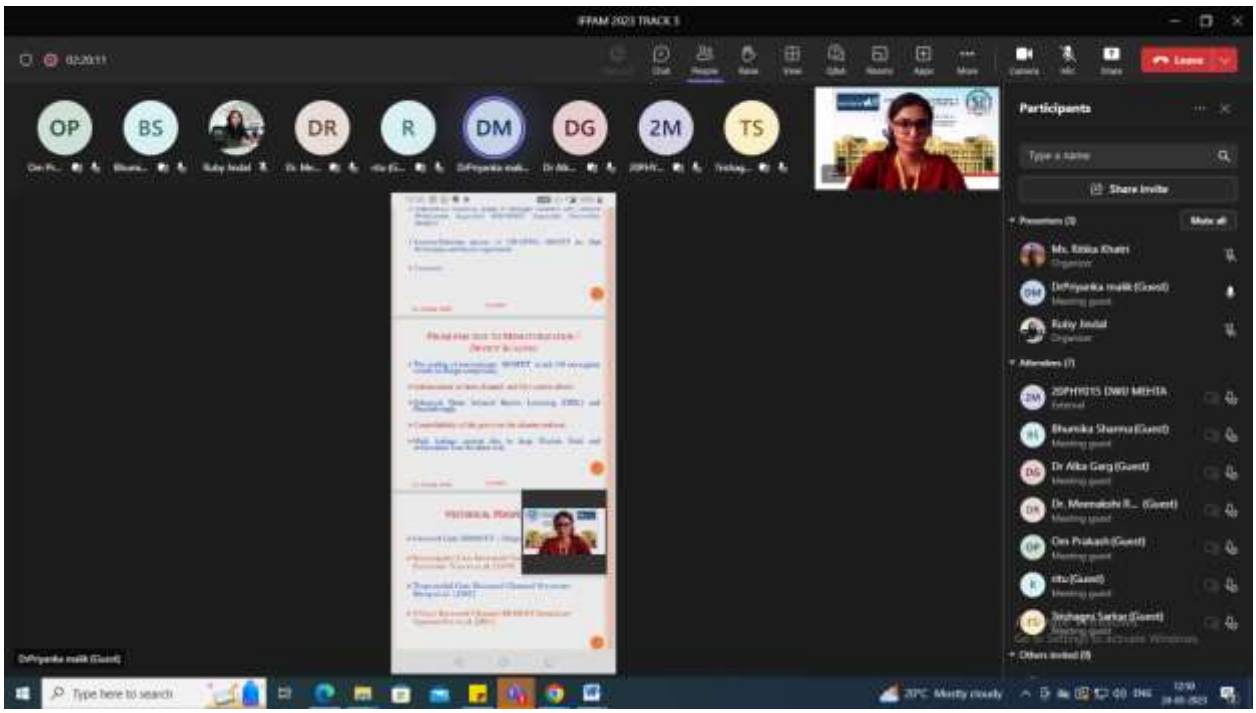
The session commenced with a captivating keynote speech by Dr. Mukesh Kumari, Principal R&D Scientist at Western Digital, California, USA. The talk titled "From Transistor to Quantum: The Exciting Future of Microelectronics by Controlling Magnetism Using Electric Field" not only provided participants with a solid understanding of the foundational science behind microelectronics but also showcased its application potential to revolutionize our world. The audience was deeply engrossed in the lecture and actively engaged by posing various thought-provoking questions to the speaker.

The session, conducted on the Teams platform, witnessed the participation of over 15 attendees, including researchers from across the country who presented nine research papers. The titles of the research papers presented in the conference includes- a) Design of novel Carrageenan film loaded with bimetallic gold-silver nanoparticles for antimicrobial packaging applications; b) Influence of COFe2O4 on the layered structure of SrBi2Nb2O9 synthesized from hydrothermal method; c) Nanoparticles for targeted drug delivery; d) Triangular core fiber for delivery of femtosecond laser pulses; e) Exploring Thermal Annealing to Study Interaction of Calmodulin Protein with Carbon Nanotube: A Molecular Dynamics Simulation Approach; f) Swastik Design Patch Antenna for K Band Using Metamaterial; g) Lattice Dynamical Investigation of Raman and Infrared Phonons in Double Perovskite Ba2YTaO6; h) Structural and Frequency dependent Electrical Behaviour of Nanocomposite of La doped BiFeO3:SrAlO3; i) Mathematical Modelling Insight of Hetrogate Dielectric Gate Electrode Workfunction Engineered (HD-GEWE) Trapezoidal Groove-Gate MOSFET; j) Factor group analysis of tetragonal ruddlesden-popper a2bo4compounds with correlation method; k) Structural

Characterization of Ce-Zr codoped BaTiO3 Ceramics & k) Synthesis and Structural Investigation of Perovskite Lanthanum Nickel Oxide.

Dr. Ruby Jindal, Assistant Professor at K.R. Mangalam University's School of Basic and Applied Sciences (SBAS), served as the session chair, while Ms. Ritika Khatri, Assistant Professor at SBAS, K.R. Mangalam University, adeptly moderated the proceedings.





Valedictory Session: 24 March 2023

The '1st International Conference on Innovations & Future Prospects of Advanced Materials' concluded with a successful valedictory session on March 24th, 2023, at 2:30 PM. Dr. Roopam Gaur, Assistant Professor of Physics at SBAS, introduced the keynote speaker, Prof. J.L. Sanchez Llamazares, to the participants and attendees. Prof. Jose delivered an enlightening talk on "Magnetocaloric Materials: An Overview."

Prof. J.L. Sanchez Llamazares, a Senior Scientist at the Advanced Materials Division of the Instituto Potosino de Investigación Cientifica y Technológica A. C. (IPICyT), Mexico, highlighted the pressing need for energy-efficient and environmentally friendly refrigeration, heat pumping, air conditioning, and thermal energy harvesting systems. He explained that magnetocaloric energy conversion is a promising solution, extensively researched for the past two decades. Prof. Jose emphasized the interdisciplinary nature of the subject, requiring integration of knowledge from various specialized fields. He discussed different types of magnetocaloric materials, such as ferromagnetic perovskites, glass ceramics, oxide-based composites, and spinel ferrites. Prof. Jose presented a comparative study of their properties, focusing on the potential applications of manganites in magnetorefrigeration technology.

The audience thoroughly enjoyed the talk, evident from the engaging question-and-answer session. Dr. Roopam Gaur expressed gratitude to Prof. J.L. Sanchez Llamazares for his valuable insights and then handed over the session to Dr. Rajni Gautam, Co-Convener of the IFPAM23 session, for the Valedictory Address.

Dr. Rajni Gautam extended congratulations and heartfelt thanks to all the participants, attendees, invited speakers, keynote speakers, session chairs, and organizing committee members for the successful completion of the conference.

The announcement of the Best Paper winners from each session was made during this session. Dr. Rajni Gautam concluded by expressing the desire to organize more such events in the future, leaving the session on a positive note.

Overall, the valedictory session marked the successful culmination of the conference, with an impressive participation of 120 individuals from various academic institutions, research organizations, and industry sectors. This diverse gathering contributed to the richness and interdisciplinary nature of the conference. The conference attracted a large gathering, with over 150 attendees present throughout the event. The enthusiastic participation fostered engaging discussions and networking opportunities among the participants. The conference organizers acknowledged excellence in research and presentation by awarding the Best Paper Presentations to the below mentioned participants-

1. Mr. Avijit Talukdar for presentating paper entitled “Optimizattion of inorganic RbGeI3 based perovskite solar cells through conduction band offset engineering”.
2. Ms. Bhumika for presenting paper entitled “Structural and Frequency dependent Electrical Behaviour of Nanocomposite of La doped BiFeO3:SrAlO3”.
3. Mr. Sanjay Khone for presenting paper entitled “Low Power Resistive Switching Characteristics in Metal Oxides for Transparent Neuromorphic Devices”
4. Ms. Jaskiran Kaur for presenting paper entitled “Ion Selective Electrode based on PVC Membrane for Determination of Metal Ions”.
5. Ms. Neenu Saini for presenting paper entitled “Factor group analysis of tetragonal Ruddlesden-popper A2BO4 compounds with correlation method”

6. Ms. Pinky Yadav for presenting paper entitled “Graphene oxide magnesium hydroxide nanocomposites for highly efficient dye degradation”
7. Mr. Pardeep for presenting paper entitled “Impact of Melting Heat Transfer of casson Magnetohydrodynamics Nanofluid over a stretching sheet with outer velocity”
8. Mr. Prateek for presenting paper entitled “Performance Enhancement of CsPbI3/CsPbBr3 Heterojunction with different ETL and HTL through SCAPS-1D simulation”
9. Ms. Rekha for presenting paper entitled “Effect of 100keV Ni Ion Implantation on Structural, Morphological, Optical and Magnetic Properties of CuO Thin Films”
10. Ms. Saraswati Rawat for presenting paper entitled “Enhanced electrical and ferroelectric properties of SnO2 doped KNN based lead free piezoceramics”

With the overwhelming response and positive feedback received, the organizing committee looks forward to organizing more such impactful conferences in the future, driving advancements and promoting the use of advanced materials for a sustainable and technologically advanced society.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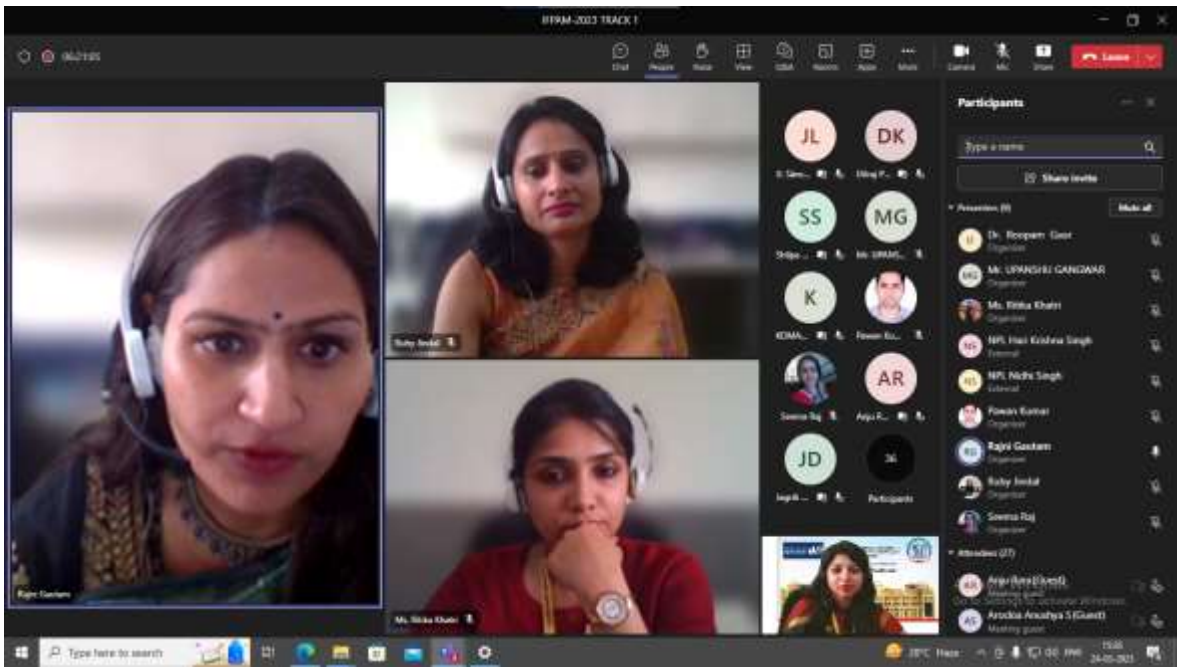
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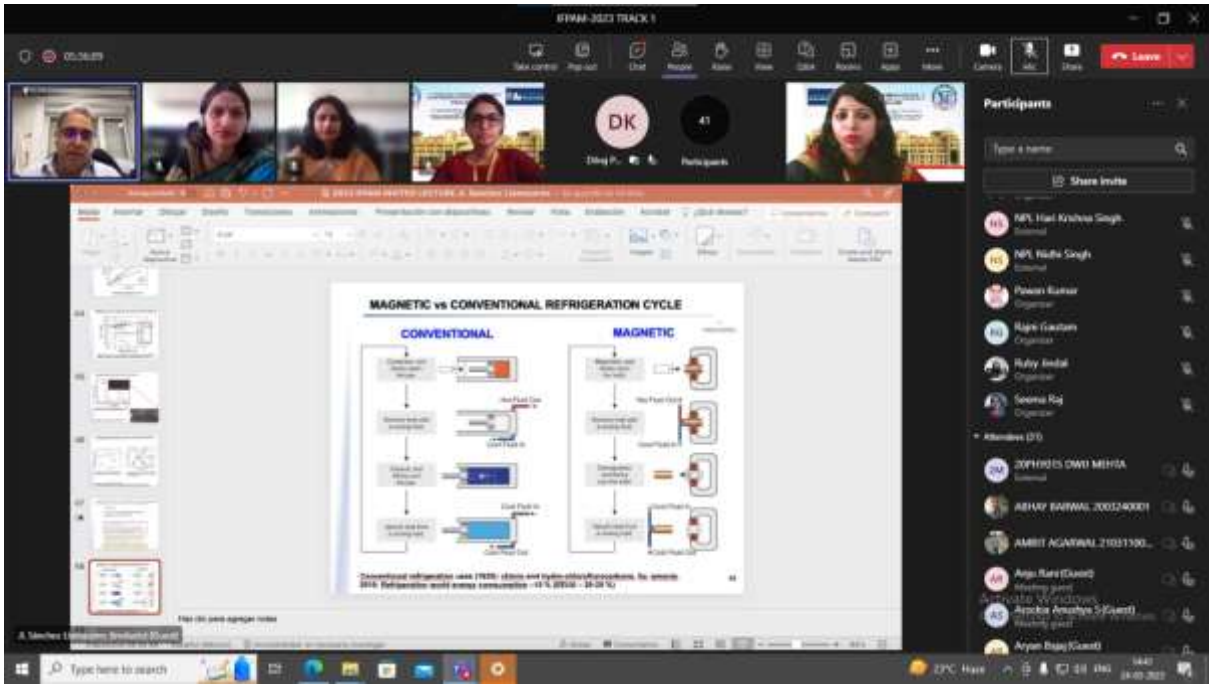
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Participants

Report prepared by	**Ms. Ragini Pandey & Dr. Seema Raj**	
Report verified by Event Coordinator	**Dr. Pawan Kumar & Dr. Diwakar Padalia**	
Report Verified by Dean	**Dr. Meena Bhandhari**	
Report Verified by IQAC Office	**Dr. Shikha Dutt Sharma**	

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