International Conference on

Current Trends in Physics and Photonics - 2022

Organized By

School of Physics,

Dr. Vishwanath Karad MIT World Peace University – Pune (M.S.), India

9 June - 11 June, 2022

e-SOUVENIR

MIT WPU Philosophy

Social Innovations

Inspire students to come up with innovative solutions for our world family.

Research

Foster the spirit of scientific inquiry in students, to push the envelope of human knowledge and wisdom.

Technology

Nurture the ability of students to apply scientific knowledge for the well-being of the world.

Partnerships

Partner with all individuals and organisations who can help students realise their fullest potential.

We Believe

“Union of Science and Spirituality alone will bring Peace to Mankind”

About MIT-WPU Pune

Dr. Vishwanath Karad MIT World Peace University – Pune promotes the "Culture of Peace" through Value-based "Universal Education System", with a firm belief that "Union of Science and Spirituality alone will bring peace to mankind".

With the sole objective of meeting the long felt need for a centre of scientific and educational research, which would meet the challenges of the present and the future, MIT Group of Institutions was established in 1983 as a society and charitable trust. Since then, the MIT Group of Institutions has grown exponentially and has made a strong impact in the field of education throughout the country and is known amongst the top education institutions in India. The Founders of MIT Pune, have embarked upon a journey to make their vision of 'Attaining World Peace through Education' a reality. A step towards this vision has been that MIT Group of Institutes, Pune has been accorded status of University by name Dr Vishwanath Karad MIT World Peace University, Pune (MIT–WPU). Dr Vishwanath Karad MIT World Peace University is established under Govt. of Maharashtra Act No. XXXV 2017 and is recognized by UGC. The MIT-WPU provides education in the fields of Science, Engineering, Medicine, Pharmacy, Marine Engineering, Insurance, Distance Education, Telecom Management, Lighting, Design, Food & Technology, Retail Management, Masters in Business Administration, School of Government and School Education. At any given point of time, more than 50,000 students are pursuing various courses across 65+ Institutes of MIT World Peace University through campus programs.

About School of Physics

The Physics department at MIT Pune, established in 1983, is one of the core science department, now it has been transformed to School of physics since 2017 under MIT World Peace University. The School offering M.Sc. Physics (Photonics) program which is a perfect blend of core Physics and Photonics. School has launched some open electives and in due course, the School also envisages introducing UG programs in Pure and Applied Physics.

The School has highly qualified and experienced faculty members catering services to various schools under MIT World Peace University. Faculties are well engaged in research. Our re-search spans over condensed matter physics, nonlinear Optics, radiation physics, laser, organic electronics, nano materials, thin films and computational physics.

Faculty members are associated for research with reputed organizations - Queensland University of Technology, Australia; Singapore University of Technology and Design, Singapore; Cinvestav University, Mexico; Dalian University of Technology, China; Tokushima University, Japan; Bhaba Atomic Research Centre, India; National Chemical Laboratory, India; CMET-Pune, SPP University-Pune; Banaras Hindu University, India; IIT Delhi.

About the Conference

School of Physics at Dr. Vishwanath Karad MIT World Peace University, Pune organized an online International Conference on Current Trends in Physics and Photonics (ICCTPP - 2022). This peer-reviewed international conference has been planned to be the first of a yearly series and aims to be the world's premier conference on Physics with an emphasis on Photonics.

Nature and its many processes can be understood very elegantly by Physics and hence it is regarded to be a very beautiful and fascinating natural science. Photonics can be said to be a branch in the vast tree of Physics. Photonics is the physical science of light waves. It deals with the science behind the generation, detection and manipulation of light. Photonics plays an important role in driving innovation across an increasing number of fields. The application of photonics spreads across several sectors, from optical data communications to imaging, lighting and displays, to the manufacturing sector, to life sciences, health care, security and safety.

The purpose of this conference is to bring together leading academic scientists, researchers, industry professionals to exchange and share their experiences and research results on all aspects of Physics and in particular the upcoming field of photonics. It provides a forum for the exchange of latest advances, dissemination of the high-quality research results, presentation of new developments in the area and the debate and shaping of future directions and priorities.

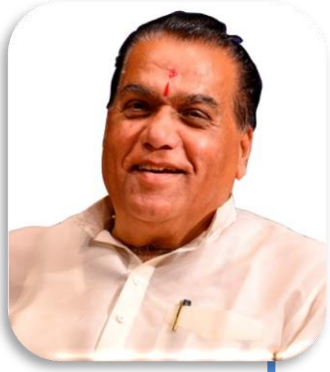
The three-day conference program has been carefully structured to encourage mutual inspiration and fruitful debate among researchers. Well known experts across India and the world will be associated with the conference for plenary sessions and invited talks. In addition, high quality research will be presented by academicians, industry professionals, and research scholars from leading institutions across India and the world through oral and poster sessions.

Themes of the Conference

Nature and its many processes can be understood very elegantly by Physics and hence it is regarded to be a very beautiful and fascinating natural science. In particular, photonics is the physical science of light waves which deals with the science behind the generation, detection and manipulation of light. The conference themes have been split broadly into two categories of Photonics and General Physics.

In Photonics, the focus is on primarily on Lasers, Nanophotonics, Green photonics, Solar Energy, Plasmonics and Nonlinear Optics. Lasers can concentrate extremely high powers in either pulses or continuous beams and have major applications in medicine, industry and defence. Nanophotonics is the study of the behaviour of light on the nanometer scale, and of the interaction of nanometer-scale objects with light. Nanophotonics researchers pursue a very wide variety of goals, in fields ranging from biochemistry to electrical engineering to carbon-free energy. Green photonics is the study and development of applied optical systems for generating clean, renewable energy. This includes solar cells and photovoltaic devices, creating energy-efficient optical sources for lighting and display applications and developing environmentally friendly materials for optoelectronic devices and components. Plasmonics deals with the interaction of electromagnetic fields (i.e. light) with metallic structures. Plasmonics is a quickly developing subject that combines fundamental research and applications ranging from physics to engineering, chemistry, biology, medicine, food sciences, environmental sciences. Nonlinear optics is the study of how intense light interacts with matter. Nonlinear optics allows us to change the color of a light beam, to change its shape in space and time, and to create the shortest events ever made by humans. Nonlinear optics play a major role in many of the optical applications such as optical signal processing, optical computers, ultrafast switches, ultra-short pulsed lasers, sensors, laser amplifiers, and many other.

In General Physics, the focus is mainly on material science, computational physics, and theoretical physics. Materials science is an interdisciplinary field concerned with the understanding and application of the properties of matter. Materials scientists study the connections between the underlying structure of a material, its properties, its processing methods and its performance in applications. Computational physics is the study of scientific problems using computational methods; it combines computer science, physics and applied mathematics to develop scientific solutions to complex problems. Computational physics complements the areas of theory and experimentation in traditional scientific investigation. Theoretical physics is the development of mathematical formalisms and computational protocols for describing all aspects of objects found in the world around us and their interaction. This can involve both providing models for understanding empirical results or constructing self-logical theories for explain phenomena beyond current experiments.



Message from The Patron

I am extremely happy to know that School of Physics at DVK MIT World Peace University, Pune is organizing International Conference on Current Trends in Physics and Photonics (ICCTPP - 2022), also this international conference aims to be the world's premier conference on Physics with an emphasis on Photonics.

It is said that "Photonics is the new electronics". This sentence contains the essence of the boom in the photonics industry. We are at the beginning of a photonics revolution. Twentieth century was century of electronics & twenty first century is century of photonics, Photonic devices have become part of everyday life but often go unnoticed. Photonics devices effect a very wide range of applications. Telecommunications is heavily dependent on photonics devices for fibre optic networks that greatly increase the capacity and speed of internet communications all the way down to the home. Lighting has been transformed with the advent of affordable, powerful LEDs that cut power consumption while providing high-quality, flexible lighting solutions. Solid-state lasers are now commonly found in applications from medical to industrial. Light weight, compact light sensors are found in devices as diverse as cell phone cameras, bar code scanners, printers, DVD players and automotive sensors. The emerging field of photonic computing is working towards the goal of supplementing or replacing traditional electronic-based printed circuit boards and integrated circuits with optoelectronic circuits.

I hope that this conference will be a perfect platform for students, research scholars, faculties, scientists and industry personnel from the domain of Physics, Optics and Photonics to express their innovative thoughts and unique research ideas at a global platform, while exchanging scientific knowledge.

I extend all my best wishes to all participants of the conference.

Dr. Vishwanath Karad

Founding President

MIT World Peace University

Message from The Patron

I am very much delighted about the "International Conference on Current Trends in Physics and Photonics (ICCTPP-2022)", organized by the School of Physics on 9th, 10th and 11th June 2022. This Conference is a step towards achieving vision of MIT World Peace University (MIT WPU) in becoming a world-class academic and research institution in order to produce graduates and postgraduates with innovative minds and employability skills. This online forum will address various research challenges and latest innovations in the field of Physics, particularly in Photonics.

I would like to congratulate Dr. Milind Pande, Pro Vice Chancellor, MIT WPU, and his team from the School of Physics for their commitment and drive in organizing this Conference. It is my vision that through this Conference we create opportunities for the growth of new ideas, and it should result in fruitful research and innovation. We, at MIT WPU, believe that it is a place to learn and grow intellectually. I wish you all have a great learning experience in this Conference.

Going forward, we plan to make it an annual affair so that the momentum is maintained and rich yield of ideas and research in this comparatively new field of science is reaped at the global level.

Shri. Rahul V. Karad

Executive President

MIT World Peace University

Message from The Co- Patron

It is a proud moment for MIT World Peace University to have organized an International Conference on the Current Trends in Physics and Photonics. The core subject of Physics and its specialized domain of Photonics have been integral parts of nature since the existence of the entire universe of which we are a tiny part. At the same time, the two subjects have a great impact on our being in day-to-day life as well as macro-level aspects. Therefore, discussions and deliberations of renowned experts, scientists, researchers on the latest trends in Physics in general and Photonics in particular, play an important role in understanding the developments in these subjects. While MIT World Peace University has its founding principles in the core thoughts on mind, matter and consciousness; it has always encouraged deep thinking and brainstorming discussions on the vital subjects of pure sciences like Physics. The ICCTPP 2022 is a result of those thought processes and it is indeed an honor to have distinguished personalities as panelists in the various themes of the Conference. Special compliments to the entire organizing team from the School of Physics for bringing this coveted conclave for the participants to get enlightened. It is very notable that the research papers submitted in the Conference will be published in reputed journals like Journal of Physics. Our best wishes for the successful conduct of the Conference for fulfilling its goals and objectives.

Prof. Dr. R. M. Chitnis

Vice Chancellor, MIT World Peace University

Message from The Co- Patron

I would like to congratulate School of Physics for organising a three-day International conference on "Current Trends in Physics and Photonics". I am pleased to welcome you all for this unique International Conference organized during 9th to 11th June, 2022.

Photonics is future electronics, it is the Physical science of light waves and also science behind the generation, detection and manipulation of light. Now a days lighting Industry is getting more prominent as LED is capturing the domestic market as well.

Types of lighting are Ambient Lighting also known as general lighting provides an area with overall illumination. Task Lighting helps users performs routine chores (such as reading, cooking food etc.) which should be free of distracting glare and shadows bright enough to prevent eye strain. Accent Lighting offers a complete service for all aspects of interior or exterior lighting.

Indian LED lighting market has already reached around Rs 2000 crores. Less than 40% of the domestic consumption is manufactured in India.

Four Trends in Photonics are 1) Artificial intelligence: AI use cases are often far less dramatic than the dancing robots that have gone viral. AI is a key element in the machine-learning tools that provide improvements in cybersecurity, image-recognition software, online shopping experiences and almost anything else that is digitally executed., also for mobile devices and miniature 3D sensing and imaging solutions for robotic surgery applications.

2) Lidar: The Lidar market is forecast to reach $7 billion by 2027, driven by the demand for self-driving cars and reliable 3D maps. While autonomous cars are the most well-known application for lidar technology, lidar is also used in health care, defense, aerospace and urban planning.

3) Investment in chip manufacturing: According to Reuters, the "chip investment boom is just getting started." The biggest companies in the chip-making industry have recently announced major investments in multiple jurisdictions, with the goals of meeting customer demand and avoiding another painful global shortage.

4) Directly modulated lasers at higher speeds: Consistent laser execution is critical to photonics success. The optoelectronics industry has managed to incorporate directly modulated lasers (DMLs) to deliver 100G and 200G performance.

Thus, Photonics is an emerging branch of Physics which have applications spread across several sectors from optical data communication to imaging, lighting and displays, manufacturing sector, life sciences, healthcare, security & safety.

I hope that this conference will bring together leading academic scientist, researchers, industry Professionals and it will be forum for exchange of ideas and latest advancements in this field and will shape future directions, priorities in this field. I further extend all my best wishes for this conference.

Prof. Dr. Milind Pande

Pro Vice Chancellor, MIT World Peace University

Message from The Co- Patron

It is indeed a pleasure to welcome all of you to the ICCTPP-2022 organized by the School of Physics. The conference will be a virtual meeting ground of educationists, teachers and academicians from all over India and abroad. Total Ten oral and poster sessions have been planned with topics ranging from Photonics, Optics, Nano Science and Material Science. I appreciate all the participants from all over India, UAE, South Korea, Republic of Korea, Thailand, Tunisia and Algeria for joining with us.

Optics and physics are common to everything we do, but not always in the ways you might expect. Ray tracing and elementary optics principles are, obviously, employed for designing the laser, but they are also necessary for delivering the laser output beam to the target, often with rather complex geometries. Lenses and mirrors may seem simple enough, but as one involves articulated arms and/or long path lengths, the problem becomes difficult indeed. Conservation of energy is a fundamental principle of physics and it is also fundamental to troubleshooting laser problems. Moving on to 20th century physics, a working knowledge of the uncertainty principle provides a basis for understanding limits on frequency bandwidth and pulse duration (especially for pulses in the picosecond range and shorter). The Kerr effect, Raman effects and a host of related nonlinear effects make it possible to generate very short pulses (tens of femtoseconds) and are used in numerous spectroscopic applications. And finally, there is Murphy's law, which predicts that any speck of dust or other contamination will settle on (and damage) the most expensive optic in the system. A physics training, multidisciplinary in nature, provides a solid basis for developing specialization in any number of fields, or being versatile enough to work on and solve a wide range of problems.

All the faculty members and the staff members of School of Physics have tirelessly worked hard in the last few months in the organisation of ICCTPP-2022 and I thank them from the bottom of my heart. The generous support and encouragement from our management and administration, ably led by our Founding President, Rev. Prof. Dr. Vishwanath D. Karad; Executive President, Shri. Rahul V. Karad; Vice Chancellor, Dr. R. M. Chitnis and Pro- VC, Dr. Milind Pande helped us travel the path with comfort. Organising a virtual conference has its own trials and challenges and a warm thanks to the members of the IT team of MIT-WPU, who have risen the occasion creditably.
Once again, I welcome all of you to the virtual ICCTPP-2022 and hope all of you have an enlightening and enjoyable three days.

Prof. Dr. Shubhalaxmi Joshi

Associate Dean, Faculty of Science, MIT World Peace University

Message from the Conference Chairman

It is an honor and great privilege to chair this International Conference on Current Trend in Physics and Photonics (ICCTPP-2022) in collaboration with IOP from 9th June to 11th June 2022.

With the support of all the authorities of MIT WPU and hard work of the team of faculty members from school of Physics, this conference is organized.
ICCTPP-2022 will explore the recent developments and research in the field of Physics and Photonics. Though there is an emphasis on advanced Photonics in this conference, it also gains its inclusive character in physics as well. The three days program includes invited talks from eminent personalities and distinguished professors from various countries, keynote addresses, plenary talks by experts, oral presentations and poster sessions. The conference strives to impart the knowledge and understanding in current scientific evidence-based information in the field of Physics & Photonics.
We have received a great response in terms of wide range of research papers in the fields of Photonics, Optics, Computational Physics, Material science and Nano materials from well-established and highly recognized National & International institutions. I would specially like to thank our speakers from various countries for accepting our invitation for the conference. We look forward to your talks for sharing insights and having brain storming discussions to stimulate ideas.
We are committed to make ICCTPP-2022 a memorable event through interactions and exchange of ideas at an international level. I extend my salutations to the pioneers and stalwarts participating in this conference. It is a great pleasure for me to welcome all the participants, on behalf of the ICCTPP Organizing Committee, to the International Conference on Current Trend in Physics and Photonics in collaboration with IOP.

Finally, I would like to thank everybody involved in the organization of this event. It will be a great forum for research findings and is expected to be biannual event in the future.

I wish all the participants a very successful Conference with fruitful discussions.

Dr. Sachin Kulkarni

Head, School of Physics, MIT World Peace University

Speakers of the Conference

Prof. Jagadish Chennupati - Distinguished Professor, Australian National University

Professor Jagadish is an acknowledged world leader in the research field of semiconductor optoelectronics.

Prof. Jagadish received the B.Sc. degree from Nagarjuna University, Guntur, India, the M. Sc (Tech) degree from Andhra University, Waltair, India and the M.Phil. and Ph.D. degrees from the University of Delhi, India. He was a Lecturer in Physics and Electronics at Sri Venkateswara College, University of Delhi, during 1985-88 and worked at Queen's University, Kingston, Canada, during 1988-90 as a post-doctoral research fellow. He moved to Australia in 1990 and established a major research program in the field of optoelectronics and nanotechnology.
He is currently a Distinguished Professor and Head of Semiconductor Optoelectronics and Nanotechnology Group in the Research School of Physics, Australian National University. Recently he has honored as the President of the Australian Academy of Science and he is the first Australian of Indian heritage to be in this role. He was the Founding Director of Australian National Fabrication Facility, ACT node (2007-March 2020) and Convenor of the Australian Nanotechnology Network.

Prof. Jagadish is the Editor-in-Chief of Applied Physics Reviews (a high impact factor journal), Editor of 2 book series and serves on editorial boards of 20 other journals.

He has published more than 1000 research papers (710 journal papers), holds 7 US patents, co-authored a book, co-edited 15 books and edited 12 conference proceedings and 20 special issues of Journals.

He is a fellow of 11 Science and Engineering Academies (US, Australia, Europe, India) and 14 Professional Societies (IEEE, MRS, APS...).

He received many awards including IEEE Pioneer Award in Nanotechnology, IEEE Photonics Society Engineering Achievement Award, OSA Nick Holonyak Award, IUMRS Somiya Award, UNESCO medal for his contributions to the development of nanoscience and nanotechnologies and Lyle medal from Australian Academy of Science for his contributions to Physics. He has received Australia's highest civilian honor, AC, Companion of the Order of Australia, for his contributions to physics and engineering, in particular nanotechnology.

Prof. Jagadish holds several Honorary Positions: Visiting Professor, Oxford University (April 2019-present); Leverhulme Visiting Professor, Cambridge University (deferred from Apr-Sept 2020 to 2023 due to COVID); Honorary Professor, Nanjing University (2012-present); Honorary Professor, Central South University, China (2018-present); Visiting Professor, University of Electronic Science and Technology of China, Chengdu, China; (2012- present); Fellow, School of Engineering, University of Tokyo, Japan (2011-present) Anna University (2012-present); Visiting Professor, Mangalore University, India (2018-present); Distinguished Adjunct Professor, Institute of Chemical Technology, India (2019-present) Distinguished Chair Professor for Research, National Taiwan University (2019- present); Adjunct Professor, Indian Institute of Technology, Hyderabad (2021-present)

Prof. Venu Gopal Achanta - Director of CSIR-National Physical Laboratory, India

Prof. Venu Gopal Achanta is the Director of CSIR-National Physical Laboratory, India.

He did his M.Sc. in Physics from Central University Hyderabad. He obtained PhD in Physics from TIFR in 2000 for his work on Exciton dynamics in low dimensional semiconductors. In 2006 he was awarded PhD in Electronics Engineering from Tokyo University for work on design and demonstration of an ultrafast all-optical switch. This work was done as a NEDO Fellow at the headquarters of Japanese National Femtosecond Technology project, FESTA Labs between 2000 and 2003. From 2003 to 2004 he worked as JST Fellow in the Quantum Information Technology group, Basic Research Labs, NEC, Japan.

He joined TIFR as faculty in 2004 where he was a Professor (H) since 2018. His research interest is in classical and quantum information processing with dipolar emitters like quantum dots embedded in photonic and nanophotonic structures.

Prof. Venu Gopal also holds several Leadership and Administrative roles:

- Adjunct faculty at IISER, Berhampur
- Adjunct faculty of Department of Chemical Sciences and Department of High Energy Physics, TIFR
- Indian Coordinator for Global Nanophotonics network – a consortium of universities from 10 countries.
- Editorial board member of Scientific Reports
- Associate Editor of Encyclopedia of Applied Physics (Wiley, 2017-)
- Review editorial board member of Frontiers in Physics (Frontiers journals)
- Executive council member of Optical Society of India (OSI)
- Senior member of IEEE
- Member of OSA and OSI

Prof. Prasanta Kumar Datta – Head, Dept. of Physics, IIT-Kharagpur, India

Dr P K Dutta is a Professor in the Department of Physics at IIT Kharagpur, India. An expert of LASER Physics and Non-Linear Optics.

He has earned his doctoral degree from the University of Burdwan, India. He completed his MSc in Physics from the reputed The Presidency College affiliated to the University of Calcutta. He earned his B.Sc. degree (with distinction) in Physics from the Ramakrishna Mission Vidyamandira of the University of Kolkata. After his post-graduation he had also qualified for the national exam for research fellowship conducted by the university grants commission and council for industrial and scientific research.

He has a vast experience of over 30 years in research and teaching and has held various positions in reputed institutes nationally and internationally. His teaching interests includes the following areas of physics, at the undergraduate level: Physics-I, Optics, Nonlinear Optics, Mathematical Methods in Physics, Experimental Methods in Physics, Atomic & molecular Physics, at the postgraduate level: Physics of Photonic devices, Nonlinear Optics, Modern Optics, Analytical Techniques. He has taught a wide spectrum of courses. For his research work and collaborations, he has travelled across the globe. He has published over 200 research articles in high impact journals and conferences. He has supervised around 11 PhD students and over 70 MS students in their dissertation and thesis. Dr Dutta has been a 'Regular Associate' of The International Centre for Theoretical Physics (ICTP), 2003-2011, Trieste, Italy.

He has successfully completed seven sponsored research projects and seven international collaborative research projects. Dr Dutta has represented in the National Core Committee of Photonics under the Chairmanship of the Principal Scientific Adviser of Govt. of India. He has been instrumental in developing a state-of-the-art laboratory for studying ultrafast nonlinear optics where most of the lasers and measurement set-ups are developed in the laboratory. He has organized 5 events on Photonics (Symposium, workshop, seminar & short-term course) as convener at IIT Kharagpur in 2003, 2005, 2007 and 2009 and 2013, 2014 and 2017. He has also organized a Theme meeting on Optical Parametric Oscillators at BARC, Mumbai as convener in 2009. His Ph.D. students received Royal Society fellowship in Oxford University, fellowship from Max Born Institute, Berlin, Rutherford Fellowship and fellowship from Sheffield University for post-doctoral work. One of the Ph.D. students has been trained for one year at Pavia University, Italy under a collaboration project funded by the Italian Education Ministry. Five Ph. D students have been trained for one year at Scuola Superiore Santanna, Pisa, Italy under a collaboration project funded by the Ministry of Science, Italy under the MoU with IIT Kharagpur. He has served as a Vice-Chairman of GATE-JAM : 2018-2019, 2019-2020.

Prof. Prashant Sonar - Professor, Queensland University of Technology

Prof. Prashant Sonar is ARC Future Fellow and Professor in School of Chemistry and Physics and Centre for Material Science at Queensland University of Technology, (QUT), Australia.

He was Visiting Professor at Indian Institute of Technology, Kanpur in 2017. He holds adjunct position with Griffith University, Australia and Adjunct Research Fellow position at Organic Electronic Research Centre, Ming Chi University of Technology, Taiwan. Currently, he is serving as an Associate Editor of the journal Flexible and Printed Electronics, Material Research Express (Institute of Physics, London) and Frontier in Chemistry and Energies (MDPI, Switzerland). Recently, he has been elected as Fellow of Royal Chemical Society (FRSC) and Foreign Fellow of Maharashtra Academy of Sciences (FFMAS). He is a recipient of the Award for Excellence-Impact and Translation (2020), Centre for Materials Science, QUT, Australia and IAAM Scientist Award from International Association of Advanced Materials, Sweden (2020) respectively. He also received Thiemann Exchange Program Award to visit Technion-Israel Institute of Technology (2017), Israel and Foreign Collaborator Award from Grant-in-Aid for Scientific Research on Innovative Areas, MEXT, (2016) Japan [19]. He was awarded Vice-Chancellors Performance Award from QUT Australia (2016) and received Long Service Award from IMRE, A*STAR Singapore (2012).

Prof. Sonar delivered 90 talks at various international conferences and institutes. He has published 215 peer-reviewed research papers and H-index-49. He has filed 3 US, 3 China, 1 Singapore and 1 Japan patents. His two patents have been successfully licensed to the Corning, USA.

Mr. Milind Deore - Director, Bureau of Energy Efficiency, Government of India

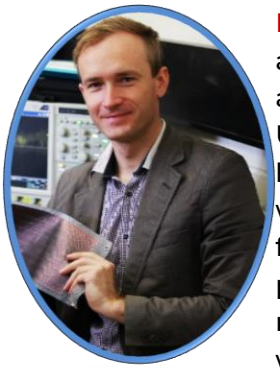
Mr. Deore as Director is leading team at Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India for Implementation of Energy Conservation Act, Policies & Schemes of Govt. of India into industries & commercial sectors.

He has developed and also involved in implementation of various National level energy efficiency and demand side management schemes & programs like Perform, Achieve & Trade (PAT) Scheme for industrial sectors, Bachat Lamp Yojana (BLY) for domestic sector, Agriculture DSM, Energy Efficiency for SMEs etc. He is also leading the Project Management Units for the implementation GEF funded Energy Efficiency programs through UNIDO & World Bank for small & medium industrial sectors across 35 clusters of India. He is pioneer to include three new sectors i.e. Petroleum Refineries, Electricity Distribution Companies & Railways into PAT scheme. He is also leading the implementation of Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE) and Venture Capital Fund for Energy Efficiency (VCFEE) under National Mission on Enhanced Energy Efficiency (NMEEE). He is also involved in many international cooperation activities with Japan, France, China for energy efficiency. He is a member on various government committees for energy & environmental issues. He holds a business & post graduate engineering degree and also Certified Energy Auditor by Govt. of India.

Prof. Abir De Sarkar - Professor, Nano Science and Technology, India

Prof. Abir De Sarkar is with the Institute of Nano Science and Technology, India since March 2014.

In an administrative capacity, Prof. De Sarkar has served as the Dean (Academics) from March 2018 to May 2022, while he has been taken over as the Dean (Faculty) from 1st June 2022. In the broad area of Computational Nanoscience, Prof. De Sarkar pursues research on nanomaterials for different kinds of energy conversion and futuristic electronics. He completed his Ph.D. from the Saha Institute of Nuclear Physics, Kolkata, India in 2004 under the supervision of Prof. Badal C. Khanra. Then, Prof. De Sarkar had his first and last postdoctoral stints at the Fritz-Haber-Institute of the Max-Planck Society, Berlin, Germany, and Uppsala University, Sweden in the group of Prof. Karsten Reuter & Prof. Matthias Scheffler, and Prof. Rajeev Ahuja. In between, he has worked with Prof. Christian Joachim, Exceptional Class CNRS Director, Toulouse, France. He has been the recipient of the President of India, medal for the year 2000 and the CNR Rao award for excellence in Nanoresearch for the year 2018. To his credit, he has published 94 articles in leading International Journals, such as the Journal of Materials Chemistry A, ACS Applied Materials & Interfaces, Physical Review B, Nanoscale, PRL, ACS Nano, etc. He has guided four students to the successful completion of their Ph.D. In recognition of his research on 2D materials, he has been conferred the Prof. CNR Rao Award for excellence in Nanoresearch for the year 2018. Prof. De Sarkar has been the recipient of the President of India, medal for the year 2000 for having topped all the postgraduate disciplines at the Calcutta University.



Dr. Almantas Pivrikas has graduated Bachelor and Master's degrees in physics at Vilnius University, Lithuania. He obtained his PhD degree at the end of 2006 at Abo Akademi University. After postdoctoral research at Johannes Kepler University Linz, Austria and The University of Queensland in Brisbane, Australia, he is now employed at Murdoch University, Perth. His area of expertise lies within opto-electronic devices, such as photovoltaic cells, light emitting diodes, field-effect transistors and sensors. He discovered an unexpected photophysical phenomena called non-Langevin photocarrier recombination in organic materials which led to significant improvement in fundamental knowledge as well as device performance improvements.

Dr. Nayana Vaval is working as a senior scientist at CSIR National Chemical Laboratory (CSIR NCL), Pune. She joined CSIR NCL in 2002. She completed her Ph.D. in Physics in 1996 under the supervision of Dr. Sourav Pal, Director, IISER, Kolkata. After Ph.D. she received Alexander von Humbolt fellowship and worked in University of Heidelberg, Germany. Her field of research is quantum mechanical methods for solving problems in Chemistry. Her specific interest is in using coupled cluster method. She has more than 90 publications international peer reviewed journals.

Dr. Sreekanth K V is currently working as a Research Scientist at the Institute of Materials Research and Engineering, A*STAR, Singapore. He received his M. Tech degree in Optoelectronics & Laser Technology from Cochin University of Science & Technology and PhD degree in photonics from Nanyang Technological University, Singapore. He then worked as a Postdoctoral researcher at the department of Physics, Case Western Reserve University, USA and a Senior Researcher at the Centre for Disruptive Photonic Technologies (CDPT), Nanyang Technological University, Singapore. He is also serving as an Editorial Board member for Scientific Reports and Chemosensors. He has published several book chapters and more than 60 peer-reviewed international journal papers. He is holding one US patent. His major research interests include nanophotonics and plasmonics for advanced biosensing, active nanophotonics devices and Bionanotechnology.

Dr. Dmitry Vasilyev has graduated Bachelor and Master's degrees in physics at SAINT-PETERSBURG STATE POLYTECHNIC UNIVERSITY. He obtained his PhD degree in Solid State Physics entitled "Spin transport in superlattices with low conduction band offset" in the year of 2009 at SAINT-PETERSBURG STATE POLYTECHNIC UNIVERSITY. After postdoctoral research at MAX-PLANK INSTITUTE OF MICROSTRUCTURE PHYSICS- Halle (Saale), Germany, he is now joined at JOHANNES GUTENBERG- UNIVERSITÄT, Mainz, Germany. His area of expertise lies within Time-of-flight coincidence electron spectroscopy, Spin-polarized electron energy loss spectroscopy and Spin transport in superlattices with low conduction band offset.

ICCTPP-2022 Committee

Patrons -

Rev. Prof. Dr. Vishwanath D. Karad, Founder & President
Dr. Vishwanath Karad MIT-World Peace University Pune

Mr. Rahul V. Karad, Executive President
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- Dr Dmitry Vasilyev, Johannes-Gutenberg University of Mainz, Germany

Conference Program Schedule

Day 1: June 9, 2022	
Time	*Event*
9:30 am to 10:30 am	*Plenary Talk by* *Dr. Achanta Venugopal, Director, CSIR-National PhysicalLaboratory, New Delhi*
10:35 am to 11:35 am	*Keynote Address by* *Prof. Dr. Chennupati Jagadish, President, Australian Science Academy.*
1:35 pm to 2:20 pm	*Invited Talk by* *Dr. Nayana Vaval Scientist, NCL, Pune, India*
2:25 pm to 3:10 pm	*Invited Talk by* *Dr. Almantas PivrikasSenior Lecturer, Murdoch University, Australia*
3:15 pm to 4:15 pm	*Oral Presentation -1*
4:15 pm to 5:15 pm	*Poster Presentation -1*
4:15 pm to 5:15 pm	*Poster Presentation -2*
Day 2: June 10, 2022	
9:30 am to 10:30 am	*Plenary Talk by* *Prof. Prashant Sonar* *Professor & ARC Future Fellow, Queensland University of Technology, Australia*
10:35 am to 11:30 am	*Oral Presentation -2*
11:30 am to 12:30 am	*Oral Presentation -3*

Time	Event
1:35 pm to 2:20 pm	Invited Talk by Dr. K. V. Sreekanth Scientist-II, IMRE, A-Star, Singapore
2:25 pm to 3:10 pm	Invited Talk by Dr. Dmitry Vasilyev Research Associate, Dept of Physics, Johannes Gutenberg-Universität Mainz, Germany
3:15 pm to 4:15 pm	Oral Presentation -4
4:15 pm to 5:15 pm	Oral Presentation -5
4:15 pm to 5:15 pm	Poster Presentation -3
Day 3: June 11, 2022	
9:30 am to 10:30 am	Plenary Talk by Mr. Milind Deore Director, Bureau of Energy Efficiency,Ministry of Power, Govt. Of India
10:35 am to 11:35 am	Plenary Talk by Dr. Abir De Sarkar Scientist-F and Dean, Institute of Nanoscience and Technology(DST, India), Mohali, Punjab, India
11:40 am to 12:40 pm	Plenary Talk by Prof. Prasanta Kumar Datta Head, Dept of Physics, IIT Kharagpur, India
1:30 pm to 2:30 pm	Poster Presentation -4
2:00 pm to 3:30 pm	Oral Presentation -6

Accepted Abstracts in Conference

Sr. No.	Abstract ID	Paper Title
1	ICCTPP 1	Optical Parameters of SnO_2 Nanoparticles Synthesized Via Sol-gel Method
2	ICCTPP 107	Biploar Resistive Switching Behavior of Polycrystalline $BiFeO_3$ Thin Films Synthesized via Sol-gel Assisted Spin Coating Technique
3	ICCTPP 111	Fabrication of Near Ultraviolet Photodetector using Polyvinyl-alcohol Coated Fe_2O_3 Thin Film
4	ICCTPP 120	Effect of Finite Ion Larmor Radius Corrections (FLR) on Thermal Instability of Rotating Radiative Porous Astrophysical Plasma in Interstellar Medium (ISM)
5	ICCTPP 127	Polymeric Nanofibriller Matrix on ITO Substrate for Flexible Chemical Sensing Applications
6	ICCTPP 144	Mid-IR Supercontinuum Generation In Dispersion Flattened $As_{38}Se_{62}$ Chalcogenide Photonic Crystal Fiber
7	ICCTPP 145	Simple and Productive Method to Develop Highly Sensitive and Fast Infrared Photodetector Using Spray Deposited Nanocrystalline PbS Thin Film
8	ICCTPP 146	Quantifying effects of final state interactions on pion production in DUNE using Monte Carlo event generators
9	ICCTPP 148	A comparative study of Raman spectroscopic and photoluminescence properties of the eggshell powder and conventional calcium carbonate
10	ICCTPP 149	Lyoluminescence study of γ-ray irradiated Cu doped $YCa_4O(BO_3)_3$ microcrystalline phosphors for Radiation Dosimetry applications
11	ICCTPP 150	Gamma-Ray Sensing Properties of Nd Doped Phosphate Glasses
12	ICCTPP 151	Effect Of Critical Beam Power on The Propagation Dynamics Of q-Gaussian Laser Beams In Isotropic Collisional Plasma
13	ICCTPP 152	Evaluation of Selected Rare-Earth Scintillators for Gamma-Ray Sensing
14	ICCTPP 153	Impact of Hydrostatic pressure and Temperature on the matrix elements of a Cylindrical Quantum Wire
15	ICCTPP 156	Physical, Optical And Mechanical Properties Of Commercially Available Windshield Glasses Using Various Cars

Sr. No.	Abstract ID	Paper Title
16	ICCTPP 158	Study of Non-linear Optical Properties of an ENZ Composite Metamaterial
17	ICCTPP 160	All Optical Integrated MOEMS Optical Coherence Tomography System
18	ICCTPP 162	A Novel Chirped Bragg Grating Based Spectral Domain Delay Generator
19	ICCTPP 165	Synthesis and Micro hardness Studies of Polymer Nanocomposites of ZnS with PVK
20	ICCTPP 166	TerahertzWave Propagation Characteristics In Graded Teflon Based Solid-Core Photonic Crystal Fibre
21	ICCTPP 168	Design and Analysis of Low Loss Solid-core Hexagonal Photonic Crystal Fiber for applications in Terahertz regime
22	ICCTPP 171	Identification of Microplastics Using a Custom Built Micro-Raman Spectrometer
23	ICCTPP 174	Structural and Electronic Properties of Wurtzite Gallium Nitride Doped with Transition Metals
24	ICCTPP 175	A Theoretical analysis of Milk adulteration/contamination detection in camel, buffalo and cow milk using SPR Technique
25	ICCTPP 179	Microstrip Patch Antenna As A Paper Moisture Sensor
26	ICCTPP 182	Investigations Towards the Measurement of Displacement using Lateral Shearing Interferometry and Fourier Fringe Analysis Technique
27	ICCTPP 184	Tailoring Of Poly(N-Methyl Pyrrole) Thin Film Surface With Au-Nanoparticles For Selective Sensing Of H_2S
28	ICCTPP 185	Thermal Properties of Nano-silica Added Concrete
29	ICCTPP 189	Security and Cost Optimization in Laser Based Fencing Solutions
30	ICCTPP 190	Interaction Between Cold atmospheric Plasma Jet and water contaminated with Pseudomonas aeroginosa bacteria for Decontamination Purpose

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32	ICCTPP 195	High-pressure equations of state and elastic properties of the hcp-Iron
33	ICCTPP 196	DETERMINATION OF L X RAY SATELLITE LINES FOR MOLYBDENUM(MO) AND MOLYBDENUM TRIOXIDE(MOO3) BY WAVELENGTH DISPERSION X RAY FLOUROSCENCE WD-XRF
34	ICCTPP 203	Williamson-Hall and Size-strain plot based micro-structural analysis and evaluation of elastic properties of Dy3+ substituted Co-Zn nano-spinels
35	ICCTPP 204	Detection Of Vitiligo Using Optical Sensor Based On 2-D Photonic Crystals
36	ICCTPP 205	Analysis of road divider for impact testing and material selection
37	ICCTPP 209	Nickel Ferrite Nanofluid Functionalized Tapered Microfiber Based Magnetometer
38	ICCTPP 212	Vector Magnetic Field Sensing at Tiny Angles Through a Nanofluid Functionalized Ultrathin Taper Interferometer
39	ICCTPP 217	A Recent Development Of Luminescence properties Of Yb^{3+} Doped Metal Halide Perovskite Nanocrystals For Photonic Applications: A Review
40	ICCTPP 218	Optical, Compositional and Electrical Properties of Transparent MgO Thin Film for ReRAM Devices
41	ICCTPP 219	Thermal effects on bright dark soliton pairs in biased centrosymmetric photorefractive crystals
42	ICCTPP 220	Indium Antimonide Based Terahertz Plasmonic Ring Resonator Filter
43	ICCTPP 223	Optical band-gap evolution and local structural change in Ge2Sb2Te5 phase change material
44	ICCTPP 224	Study of structural and spectroscopic characterization of co-doped ZnS Nanoparticles capped with L-Arginine
45	ICCTPP 225	Co-dopant (Li^+ - Cs^+) Concentration Dependant Optical Responses of CdS Nanoparticles

Sr. No.	Abstract ID	Paper Title
46	ICCTPP 226	Design Of Optically Controlled Frequency Encoded Feynman Gate Using Micro Ring Resonator (MRR)
47	ICCTPP 227	A review on the development of Na+ ion conducting solid electrolytes for Batteries
48	ICCTPP 229	Exploring the possibility of Molecular Solar Thermal Energy Storage System using Kirkwood Buff Integrals
49	ICCTPP 234	Effect of cation distribution on structural and mechanical properties of Y^{3+} substituted Co-Zn spinel ferrites nanoparticles
50	ICCTPP 236	Review on Enhancement of Stability and Efficiency of Perovskite Solar Cell
51	ICCTPP 239	Impact of Scintillation Effect on Clear Weather and Fog Conditions using MDM- WDM Modulation Technique
52	ICCTPP 241	Surface Electric Charge Decay Behavior of Polypropylene Films Treated by Atmospheric air Dielectric Barrier Discharge
53	ICCTPP 245	Linear SV Plots Analysis In Steady State And Transient State To Explore Fluorescence Quenching Of Coumarin Derivative By Aniline
54	ICCTPP 246	Lane and Pedestrian Detection System for an Autonomous Vehicle Using Python
55	ICCTPP 247	Uni-directional (001) pressure effect on optical gain spectra of InAs/GaAsSb quantum well heterostructure
56	ICCTPP 248	Mixed Organic Halide Perovskite Energy Harvester For Solar Cells
57	ICCTPP 253	Some Essential Elements of a New Approach to Quantum Physics
58	ICCTPP 257	The influence of electrodes thicknesses on the characteristics of a helium plasma jet
59	ICCTPP 260	Structural properties of Co doped NiO nanoparticles and its Pseudocapacitive behavior
60	ICCTPP 261	Study of Chromatic Dispersion in Single-Mode Optical Fiber
61	ICCTPP 262	Study on the electrochemical characteristics of composite polymer electrolytes based on (PVDC-AN) copolymer

Sr. No.	Abstract ID	Paper Title
62	ICCTPP 263	Synthesis and characterization of nanocrystalline barium strontium titanate powder by a simple solid state reaction route
63	ICCTPP 265	A Review on Thin wall tube energy-absorbing structure: crash box
64	ICCTPP 266	Large Magnetic Entropy Change in van der Waals $CrBr_3$ Single Crystal
65	ICCTPP 267	CdSe quantum dots enhancing blue emission of nematic liquid crystals
66	ICCTPP 268	Enhancement in Photoluminescence of Nematic Liquid Crystals doped with $CsPbBr_3$ quantum dots
67	ICCTPP 272	Tune-out and magic wavelengths for magnetic-sublevel-independent trapping of alkaline-earth ions
68	ICCTPP 273	Study of Radiation Power Spectra Using Periodical Dielectric Structures Media with Polarization in 1D Photonic Crystals
69	ICCTPP 275	Gallium Arsenide and Gallium Nitride Semiconductors for Power and Optoelectronics Devices Applications
70	ICCTPP 276	Tunable omnidirectional high reflector using 1D Superconducting Photonic Quasi Crystals
71	ICCTPP 277	H-Polarised Electromagnetic Wave Propagation in Chalcogenide-Polymeric Cylindrical Photonic Materials
72	ICCTPP 278	A Review on Phase Change Materials: Development, Types and Applications
73	ICCTPP 280	Simulation of Alq3/Alq3:NTCDA/NPB heterostructure based OLED
74	ICCTPP 282	Interferometric Vibration Sensor
75	ICCTPP 283	Heating of Collisional Nanocluster Plasma by Beating of Two High Power Laser Beams
76	ICCTPP 284	Effects of Co-60 Gamma Radiation on the Characteristics of Red, Green and Blue LEDs
77	ICCTPP 287	Preparation & characterization of MnO_2-PANI Nanocomposites
78	ICCTPP 288	The Effect of Deposition Cycles on Structural, Morphological, Optical and gas detection properties of Mg doped ZnO thin films

Sr. No.	Abstract ID	Paper Title
79	ICCTPP 289	Double Interface Terahertz Surface Plasmons Excitation by Nonlinear Mixing of Two Laser Beams in Different Graphene Coated Structures
80	ICCTPP 290	The interplay of anisotropy and sticking probability for growth patterns of different fractal dimensions with modified Diffusion Limited Aggregation model
81	ICCTPP 291	Physico-chemical properties of compression molded glass fiber reinforced polypropylene polymer composites
82	ICCTPP 292	Numerical Simulations Of Growth Dynamics Of Breath Figures On Phase Change Materials: The effect of Accelerated Coalescence Due To Droplet Motion
83	ICCTPP 293	The Al^{3+} doped modified hexagonal ZnO sensor material: Fabrication, characterization and gas sensing study of CO and LPG gas vapors
84	ICCTPP 294	Switchable Wavelength Selective Metamaterial Long-Wavelength Infrared Perfect Absorber: A simulation Study
85	ICCTPP 295	A study of Real-Time Non-invasive Detection Techniques to identify COVID-19 Infected Person
86	ICCTPP 296	Variation in optical properties of Poly vinyl alcohol using zinc halide for UV region applications
87	ICCTPP 297	Ternary Polyaniline nanocomposites: A potential candidate for shielding electromagnetic pollution

Abstract ID: ICCTPP - 01

Optical Parameters of SnO_2 Nanoparticles Synthesized Via Sol-gel Method

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Abstract: This paper discusses the optical parameters of tin oxide nanopowder prepared by the sol-gel method. Tin oxide nanopowder shows 81 % transmittance in the near IR region. In this region, tin oxide nanopowder shows the highest reflectance, 81 %. The optical bandgap was 2.27 eV. The cut-off wavelength of the tin oxide nanopowder is 360 nm. The refractive index and the extinction coefficient of the tin oxide nanopowder were calculated. The real and imaginary values of dielectric constants were calculated and the real value of the dielectric constant is higher than the imaginary value of dielectric constant.

Abstract ID: ICCTPP - 107

Biploar Resistive Switching Behavior of Polycrystalline $BiFeO_3$ Thin Films Synthesized via Sol-gel Assisted Spin Coating Technique

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Abstract: Polycrystalline $BiFeO_3$ thin films have been grown on glass substrates using a simple but efficient method commonly known as the spin coating technique. When used in a Cu / $BiFeO_3$ / Cu configuration, the annealed $BiFeO_3$ film (at 350 °C) exhibits bipolar resistive switching behaviors. The device shows stable resistive switching behavior, where a stable hysteresis in the current–voltage curve was well developed by applying +/- 10 V at room temperature. The ratio of resistance in the high resistance state to the low resistance state of the device is ~ 104 with a good retention time of more than 106 sec. The Poole–Frenkel emission at the Cu / $BiFeO_3$ interface is proposed, and a redistribution of oxygen vacancies along the grain boundaries is found to play a key role in the resistance switching in the polycrystalline pure BiFeO3 films.

Abstract ID: ICCTPP - 111

Fabrication of Near Ultraviolet Photodetector using Polyvinyl-alcohol Coated Fe_2O_3 Thin Film

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Abstract: A near ultraviolet (UV) photodetector is fabricated using a spray deposited Fe2O3 thin film on a glass substrate. The photo detection property of Fe_2O_3 thin film is often restricted by large dark current originating from a number of defect-induced carriers. When this Fe_2O_3 thin film was coated with a thin layer of polyvinyl-alcohol (PVA), the dark current of the device was reduced, leading to a higher responsivity of 0.22 A/W under near UV light of wavelength 340 nm and an intensity of ~ 140 μW/cm^2. The response time of the PVA coated photodetector is approximately 0.06 ms, which is a hundred times lower than the time of the uncoated device (1.6 ms). This faster response time of the PVA coated photodetector is due to suppression of the surface defects via surface passivation, resulting in an increase in free carrier concentration transport.

Abstract ID: ICCTPP - 120

Effect of Finite Ion Larmor Radius Corrections (FLR) on ThermalInstability of Rotating Radiative Porous Astrophysical Plasma in Interstellar Medium (ISM)

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Abstract: The effect of finite ion Larmor radius (FLR) corrections, rotation, and porosity on the thermal instability of infinite homogeneous plasma has been explored taking the effects of radiative heat-loss function and thermal conductivity. The general dispersion relation is obtained by means of the normal mode analysis method with the help of appropriate linearized perturbation equations of the problem. This dispersion relations is further reduces for rotation axis parallel and perpendicular to the magnetic field. Stability of the medium is examined by means of Routh Hurwitz's criterion and it is found that thermal instability criterion establishes the stability of the medium. It is found that the presence of radiative heat- loss function, rotation, porosity and thermal conductivity modified the fundamental thermal criterion of instability. Numerical computations have been executed to showthe effect of various parameters on the growth rate of the thermal instability. We find that rotation, FLR corrections and medium porosity stabilize the growth rate of the thermal system in the transverse mode of propagation. Our result demonstrates that the rotation, porosity and FLR corrections affect the dens molecular clouds configuration and star formation.

Polymeric Nanofibriller Matrix on ITO Substrate forFlexible Chemical Sensing Applications

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Abstract: The authors present here a facile electrochemical approach to synthesize Poly(Aniline) nanofibrillar matrix on ITO coated PET substrate for development of wearable or embeddable sensors. Electrochemical parameters were optimized for even diametric synthesis and controlled length of Poly (Aniline) nanofibers. A three – step chronopotentiometry deposition was found to be efficient for the synthesis of the matrix. Precise tuning of galvanic conditions during the synthesis process was highly effective and repetitive towards controlling the nucleation of Poly (Aniline) seeds on the substrate that serves as the basis of nanofibers with presumable diameter range. Charge conduction behavior of the matrix was studied via Linear Sweep Voltammetry and a semiconducting nature was observed. The synthesized nanofibriller sensor platforms were subjected to Scanning Electron Microscopy (SEM), UV-VIS Spectroscopy and FTIR spectroscopy for elucidation of morphological and structural aspects. The distribution of nanofibers network throughout the substrate was uniform and dendritic. Flexibility characteristics of the sensors were studied by bending the sensor to different radii and in-situ monitoring of resistance. The synthesized sensor platforms were subjected to NO_2 sensing in chemoreceptive mode under dynamic conditions to investigate the applicability of the same under real-time applications. Upon exposure to different concentrations of NO_2, the devices exhibit a rapid response at concentrations as low as 01 ppm. The betterment in overall sensing behaviour in comparison to conventional thin film type sensors could be attributed to the one-dimensional structure of nanofibers leading to effective diffusion on analyte molecules and low scattering loss during charge transport. These flexible sensors can be interesting for novel mobile applications.

Abstract ID: ICCTPP - 144

Mid-IR Supercontinuum Generation In Dispersion Flattened $As_{38}Se_{62}$ Chalcogenide Photonic Crystal Fiber

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Abstract: We have designed a square core photonic crystal fiber using chalcogenide glass $As_{38}Se_{62}$ as core and air holes in IR region, which yield very high optical non linearity of 1290 $W^{-1}Km^{-1}$ at 3.5 mm, further gives a flat dispersion profile. The fiber has been used for numerically simulate SCG using low power pump pulses at 50 fs duration at 3.5 mm. At the end of 10mm fiber, SC broadening of about 200 to 1300 nm can be achieved with pulses of 4200 W peak power.

Abstract ID: ICCTPP - 145

Simple and Productive Method to Develop Highly Sensitive and Fast Infrared Photodetector Using SprayDeposited Nanocrystalline PbS Thin Film

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Abstract: The development of a highly sensitive and fast infrared photodetector using a PbS thin film deposited using a simple and scalable method known as "spray pyrolysis" is described in this paper. At 250°C, an aqueous precursor solution was used to deposit a cubic phase of PbS. Silver electrodes with a 1 mm gap are drawn on the film to create photo-detector devices.Low resistive contact between the silver electrode and the PbS film is revealed by linear I-V measurements performed in the dark and under light illumination. Under the illumination of a 100-watt tungsten lamp, the photo-responsivity, sensitivity, response time, and decay time of the PbS film were measured. The Ag/PbS/Ag photodetector device has 4.47 mA/W responsiveness, a sensitivity of 171 at 30 V, and the best response and decay times of 6.4 and 15.6 ms, respectively. The photodetector device produced by this simple and low-cost fabrication method has a fast response and decay time.

Abstract ID: ICCTPP - 146

Quantifying effects of final state interactions on pion production in DUNE usingMonte Carlo event generators

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[2]Department of Physics, Lucknow University, Lucknow, India

Abstract: The study of pion production in neutrino-nucleus interactions is crucial in order to quantify the impact of final state interactions (FSI) in the energy regime of DUNE and other long baseline neutrino experiments, since FSI modify the number of pions that emerge in the final state as compared to the number of pions produced at the initial neutrino-nucleon interaction vertex. Not only the number of pions but also their charge gets changed due to the prevailing FSI effects. In this work, we study the impact of FSI on pions after their production at the initial neutrino-nucleus vertex using two different Monte Carlo (MC) simulation tools viz. GENIE (v-3.00.06) and NuWro (v-19.02.2). Considering the DUNE experimental set up, we observe pion production in $\nu\mu$ and ^{40}Ar nucleus interactions for an event sample of 2 million for each generator. We find that there are some differences the number of pions observed in the initial and final states of two generators and that differences are above statistical fluctuations. We observe that GENIE (v-3.00.06) is more responsive (less transparent) to absorption and charge exchange processes as compared to NuWro (v-19.02.2).

Abstract ID: ICCTPP - 148

A comparative study of Raman spectroscopic and photoluminescence properties of theeggshell powder and conventional calcium carbonate

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Abstract: A comparative study on eggshell powder and commercially available $CaCO_3$ has been conducted. The Raman spectra of eggshell powder show the bands of the calcite phase. However, the bands of eggshell powder are more intense than the conventional $CaCO_3$. The peaks of eggshell powder also show some blue shift, which indicates that the calcite phase of eggshell powder is more Raman sensitive than the conventional $CaCO_3$. Additionally, conventional $CaCO_3$ also exhibits some extra bands of the aragonite phase. The photoluminescence spectra of eggshell powder show a narrow band and merged band than the commercially used $CaCO_3$. This study indicates that eggshells could be a good and pure alternative for commercially available calcium carbonate.

Abstract ID: ICCTPP - 149

Lyoluminescence study of γ-ray irradiated Cu doped $YCa_4O(BO_3)_3$ microcrystalline phosphors for Radiation Dosimetry applications

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Abstract: Cu doped $YCa4O(BO_3)_3$ crystalline materials were amalgamated by solid-state diffusion technique. XRD pattern had confirmed the creation of the material and the diverse elements and phases there in that material. SEM characterization shows particle size of the sample in themicro range and average crystallite size. Lyoluminescence (LL) of the gamma-ray-irradiated sample was evidenced. A single sharp peak was found in the LL glow curve of the sample. It is established that LL increased almost linearly with gamma-ray doses up to 1.5 kGy. Photoluminescence (PL) of the sample was recorded to find out the role of rare earth ions. ThePL emission range shows two peaks lying nearly to each other at 352 nm and 406 nm which are characteristic $3d^94s^1 \leftrightarrow 3d^{10}$ transition of Cu ions. The ready phosphor could also be vital for stress sensing applications and accidental radiation measurement as it responds linearly to γ- ray dose.

Abstract ID: ICCTPP - 150

Gamma-Ray Sensing Properties of Nd Doped Phosphate Glasses

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Abstract. Five selected Nd_2O_3 doped phosphate glass compositions: Nd_2O_3- BaO- Bi_2O_3- Al_2O_3- P_2O_5 are fabricated using the melt quench technique. The physical properties such as density (ρ) and molar volume (V_m) are measured experimentally. The density was found to increase while the molar volume decreases with addition of Nd_2O_3. The gamma-ray attenuation and sensing properties of these rare earth (RE) doped phosphate glass samples have been investigated within framework of WinXCom software. The photon attenuation parameters such as mass attenuation coefficient (μ_m), linear attenuation coefficient (μ_L), optimum thickness range (x_{opt}), effective atomic number (Z_{eff}), and mean free path (mfp) values were computed over wide gamma-ray energy range 1keV -100 GeV. The addition of neodymium oxide and photon energy are observed to appreciably affect the gamma-ray sensing capability of rare earth (RE) doped phosphate glass samples. The mass attenuation coefficient values are found to increase, while the mean free path (mfp) values are found to decrease with increase in Nd_2O_3 concentration.

Abstract ID: ICCTPP - 151

Effect Of Critical Beam Power on The PropagationDynamics Of *q*-Gaussian Laser Beams in Isotropic Collisional Plasma

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Abstract: In the present work, the effect of critical beam power on the propagation of *q*-Gaussian laser beam in isotropic, homogeneous plasma medium under collisional nonlinearity have been investigated. To maintain the competition between diffraction divergence and self-focusing of *q*- Gaussian laser beam propagates through isotropic, homogeneous collisional plasma. The intervals of critical beam power have been explored in the present study. The differential equation governing the dimensionless beam-width parameter *f* is established by following Akhmanov's parabolic equation approach under Wentzel-Kramers-Brillouin (WKB) and paraxial approximations and finally solved it numerically. On the propagation of *q*-Gaussian laser beam in isotropic collisional plasma, the effect of critical beam power has been shown graphically and discussed.

Abstract ID: ICCTPP - 152

Evaluation of Selected Rare-Earth Scintillators for Gamma-Ray Sensing

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Abstract. In the present work, selected dense rare-earth (RE) based scintillators such as gadoliniumtantalate ($GdTaO_4$), gadolinium tantalo-niobates $Gd(Ta_{0.8}Nb_{0.2})O_4$, lutetium based LuF_3:Ce, LuAP:Ce, Lu_2O_3:Yb and Yb_2O_3 have been investigated for their gamma-ray sensing efficacy. The gamma-ray sensing properties of these RE scintillators have been confronted with modern lead tungstate (PWO) and lead fluoride (PbF_2) scintillators being employed recently in high energy physics (HEP) experiments. The attenuation parameters namely mass attenuation coefficient (μ_m), half value layer (HVL) are compared for these rare-earth scintillators over wide energy range 1keV - 100GeV using Photon Shielding and Dosimetry (PSD) software toolkit. We also attempted to estimate build-up factors (BF's) of these scintillation materials computed using the online platform Py-MLBUF. Our calculations depicted that scintillators containing high-Z rare earth elements exhibited better gamma-ray detection capabilities when compared with standard lead based PWO and PbF_2 scintillators.

Abstract ID: ICCTPP - 153

Impact of Hydrostatic pressure and Temperature on the matrixelements of a Cylindrical Quantum Wire

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Abstract: The matrix elements of a 2 – D electron gas restricted in a GaAs cylindrical quantum wire including Rashba Spin Orbit Interaction, under simultaneous effect of hydrostatic pressure and temperature is investigated. The strong dependency of hydrostatic pressure and absolute temperature, on energy band gap and effective mass of charge carriers of the quantum wire, have been found. Because of this, the linear and non-linear properties of the quantum wire also get affected. We also observed that under the influence of electric and magnetic field, the matrix elements get affected strongly with the change in Rashba spin orbit interaction and Magnetic field.

Abstract ID: ICCTPP - 156

Physical, Optical and Mechanical Properties of Commercially Available Windshield Glasses Using Various Cars

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Abstract: Windshield glasses of Maruti Alto 800 (A800), Hyundai i20 (H20), and Maruti Suzuki Eeco (SE) are taken from an automotive repair shop for investigating their physical, optical and mechanical properties to check their durability. X-ray diffraction (XRD) is used to confirm the amorphous nature of these glasses. Energy dispersive spectroscopy confirms that the windshield glasses contain SiO_2, Na_2O, MgO, CaO, Al2O3, and K_2O in variable atomic percentages. The optical bandgap, refractive index, and Urbach energy are calculated using UV-Vis spectroscopy. The highest optical band gap is observed for SE. Micro Vickers hardness test is used to study the fracture toughness and hardness of the glasses. It is found that H20 has the highest hardness as well as toughness in all the windshield glasses.

Abstract ID: ICCTPP - 158

Study of Non-linear Optical Properties of an ENZ Composite Metamaterial

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Abstract: We have designed a composite non-linear metamaterial made up of alternating layer of fused silica glass and silver with thickness that are chosen such that $\varepsilon'=0$ in near infrared region and the structure is theoretically investigated for its optical behaviour. It exhibits a transition in real part of dielectric permittivity from negative to positive as a function of wavelength.
We also have studied the variation of ENZ wavelength with thickness of dielectric layer and plasma frequency. By using the Maxwell Garnett theory, we have calculated non-linear optical properties, and we find that as we increase the thickness of dielectric material the ENZ wavelengthincreases along with the increases in real part of non-linear susceptibility. A significant enhancement in nonlinear parameters has been also observed at ENZ wavelength due to the ENZ nature of the composite material.

Abstract ID: ICCTPP - 160

All Optical Integrated MOEMS Optical CoherenceTomography System

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Abstract: Integrating all optical components of an optical coherence tomography (OCT) device into a single chip is a non-trivial and a challenging job. The design and development of such lab-on-a chip will be possible only via Micro-Opto-Electro-Mechanical System (MOEMS) technology. The reproducible and integrated optical device fabrication would reduce cost and size many fold as compared to bulk or fiber optic OCT systems. Such miniaturized OCT would find wide range of applications in ophthalmology, plant pathology, dermatology, coral imaging, defense systems etc. [1] e designed the entire MOEMS OCT incorporating all optical components such as (i) channel waveguide, (ii) optical delay line [2], (iii) light source and detector coupling and (iv) beam splitters, combiners and circulator. Actual material and optical parameters of the polymer SU-8 are considered during the simulation. Each part of the OCT as mentioned above is independently optimized first. These components are optimized for (i) minimum attenuation, (ii) minimum radiation loss, (iii) maximum feature size and (iv) for appropriate

splitting ratios. These optical components are integrated to a single chip and these optimization values are confirmed again.

The simulation results obtained using COMSOL, promise the possibility of fabrication of all optical components of OCT integrated into a single chip. The final product size is expected to occupy an area of less than 10mm^2. We will present the optimization results and final design in this paper. The fabrication and further optimization studies are currently undergoing.

Abstract ID: ICCTPP - 162

A Novel Chirped Bragg Grating Based Spectral Domain Delay Generator

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Abstract: Optical Coherence Tomography (OCT) is an optical imaging method with medium penetration and high resolution, non-contact, non-invasive or minimal invasive and non-destructive imaging. Spectral domain optical coherence tomography (SD-OCT) works primarily on the dispersion andchirping of spectral lines of a broadband light source [1]. Conventionally a rotating grating-based method or mechanical dispersing devices are used to generate chirped spectrum. We designed spectral domain delay line using multimode interference (MMI) coupler and chirp Bragg grating (CBG). Further we used COMSOL Multiphysics for simulation and to find temporal eigen valuesof the results.

For simulation of the chirped device, we adopted a novel idea. We considered the waveguide material as SU-8 polymer [2]. Our design disperses and delays the spectra. Light from the broad- band light source is first dispersed then delayed in time. The bunches of delayed spectra produce chirping. The design ensure that the bandwidth of each bunches is about 30nm corresponding to a coherence length of 10µm to 20µm. We started with a central wavelength of 780nm.

The design is optimized with (i) number of Bragg grating for optimal dispersion (ii) low attenuation and minimum radiative losses. We simulated the device using COMSOL and time domain analysis help us to understand the nature of dispersion and attenuation at each point of thedevice. The results are discussed in the paper.

Abstract ID: ICCTPP - 165

Synthesis and Micro hardness Studies of Polymer Nanocomposites of ZnS with PVK

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Abstract: The synthesis and characterization of ZnS with PVK ((poly) N-Vinylcarbazole) nanocomposites are presented. The different samples with various loding of ZnS in PVK were prepared using chemical method and characterized XRD, SEM, AFM and study their mechanical properties. XRD shows ZnS cubic nanocrystals structure, with particle size approximate 3 to 12 nm. Broadening of line indicates the formation of amorphous compound. The AFM and SEM show bunching of particles in 10 to 100 nm. These three studies XRD, SEM, AFM show increase in particle size, with increasing the ZnS loading in PVK. The microhardness study on pure PVK and ZnS with PVK nanocomposites helps us to understand the modification in properties due to inter- and intra- molecular interactions. It is seen that ZnS with PVK nanocomposites exhibit lower value of microhardness as compare to pure PVK and minimum for highest loading (50% ZnS) of ZnS in PVK.. For each ZnS concentration initially, the microhardness increases with the load and thereafter, beyond certain load, tends to attain a saturation value, where one can say that the samples are fully strain-hardened at this load. The micro hardness may also be correlated with frictional force. The coefficient of friction decreases with increasing load and the frictional force is found to increase linearly with increasing load. Hence, the variation of Vickers hardness number (Hv) with load is curvilinea.

Abstract ID: ICCTPP - 166

Terahertz Wave Propagation Characteristics in Graded Teflon Based Solid-Core Photonic Crystal Fibre

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Abstract: In the past few years, photonic crystal fibre (PCF) in the Terahertz spectrum is drawing significant attention because of its multifaceted applications in high-speed data communication, spectroscopy, sens- ing, etc. The proposed PCF structure is based on a Teflon solid core surrounded by porous cladding. Teflon has been used as a background

material because of its high flexibility and the possibility of mak-ing longer PCFs, which is capable of guiding waves in the THz region. The porous cladding consists of circular air-holes positioned hexagonally whose diameters increase with each subsequent layer keeping the pitch constant thus providing a graded-index profile. The diameters of air holes in each hexagonal layer are 1 mm, 1.2 mm and 1.5 mm respectively, maintaining a constant pitch of 2mm and a perfectly matched layer (PML) thickness of 3mm. We have examined the transmission characteristics of the pro-posed profile in the frequency range of 0.8 THz to 2.5 THz. The modal solution of the profile is solved using the Finite Element Method based on COMSOL Multiphysics version 5.5. Using the graded-index profile, we have obtained a large effective modal area of around 5.6 mm^2 at 1 THz and a low confine-ment loss of 2.25 10^{-4} dB/km at the same frequency. Due to this large effective modal area, we get higher damage threshold and weaker non-linear effects, making it suitable for high power applications.

Abstract ID: ICCTPP - 168

Impact of Hydrostatic pressure and Temperature on the matrixelements of a Cylindrical Quantum Wire

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Abstract: Photonic Crystal Fiber (PCF) also called as a micro-structured or holey fiber has the ability to confine and guide light with propagation characteristics not possible in conventional optical fibers. An index-guiding solid-core (SC) PCF formed by hexagonal lattice of air holes (radius r=0.3a, where 'a' is the lattice constant) arranged in silicon background is realized. The SC- PCF is designed by creating a hexagonal defect in the 13 × 13 Photonic crystal matrix. By varying the radii of the air holes from 0.1a to 0.5a, the characteristic electromagnetic modes of the Terahertz (THz) fiber are found through eigenmode analysis and the fundamental Transverse Electric (TE) polarized mode of the designed PCF. T he effective mode area of the SC-PCF decreases as the radius of the air holes is increased. At 1 THz, the confinement loss of the proposed fiber is in the order of 10^{-23} dB/m and transmittance efficiency of above 96% has been achieved. As 5-G technology is emerging, THz wave propagation is essential and we believe that the designed hexagonal lattice solid-core PCF will be useful for the evolution of THz communication systems and sensing devices.

Abstract ID: ICCTPP - 171

Identification of Microplastics Using a Custom Built Micro-Raman Spectrometer

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Abstract: Microplastics are plastic particles less than 5 mm in size but larger than 0.1 µm. Widespread microplastic pollution in water, aquatic and terrestrial environment is raising huge concerns globally due to its detrimental impacts upon living beings. This urge for the necessity of a sensitive analytical tool, which can facilitate reliable identification of microplastics. Micro- Raman spectroscopy enables molecular level structural analysis of samples with high spatial resolution, and thus highly preferable for the identification of microplastics in water samples. Besides being a non-destructive technique enabling fast analysis, this technique requires minimal/no sample preparation. The present work demonstrates the utility of a custom built Micro-Raman spectroscopic set up for the discrimination of various microplastics in water. Micro- Raman analysis have been found efficacious in the identification of Polystyrene (PS), Polyethylene terephthalate (PET), High Density Poly ethylene (HDPE), Low Density Poly ethylene (LDPE) etc. The Micro-Raman spectral data have been capable enough for the discrimination of high-density polyethylene (HDPE, > 0.940 g/cm^3) and low-density polyethylene (LDPE, < 0.930 g/cm^3) microplastics, especially due to the variations in the C-H stretching vibrations (2825 -2970 cm^{-1}). The ratio of intensities of asymmetric CH_2 stretching mode (2879 cm^{-1}) and the symmetric CH_2 stretching mode (2847 cm^{-1}) are found to be higher for HDPE with respect to LDPE. Moreover, intensity variations were also observed for the antisymmetric and symmetric C-C stretching bands present at 1059 cm^{-1} and 1126 cm^{-1} respectively. The band at 1167 cm^{-1} arising from CH vibration have also shown an intensity enhancementin HDPE samples.

Abstract ID: ICCTPP - 175

A Theoretical analysis of Milk adulteration/contamination detection in camel, buffalo and cow milk using SPR Technique

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Abstract: In this paper author have targeted to detect various kinds of adulteration/contamination in camel, cow and buffalo milk using surface plasmon resonance (SPR) technique. SPR technique have numerous features like its label free technique, provide real time analysis and able to detect very minute change in sample's physical condition from its ideal condition. The change in sample physical condition change can estimate using change in refractive index. The adulteration in milk does for financial benefits but they are highly dangerous for health especially for children and

pregnant women. Some more contamination added knowingly as a preservative but they affect the purity of milk so that their detection is essential. In this paper author have targeted to detect mainly urea, melamine, Salmonella and coconut oil in milk by using a Kretschmann configuration based SPR sensor. The sensor consists of high refractive index prism (ZnSe) as a dielectric substrate, gold (Au) nanolayer, Graphene monolayer and heterostructure of Blue P/MoS_2. Major performance parameters like sensitivity, Figure of Merit (FoM), Detection accuracy and limit of detection also calculated for each case to validate the result of proposed sensor. The performance of sensor is done in visible region in theoretical way using analytical software MATLAB.

Abstract ID: ICCTPP - 179

Microstrip Patch Antenna As A Paper Moisture Sensor

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Abstract: This paper reports the use of non-destructive, microstrip patch antenna as paper moisture sensor. Microstrip patch antenna having resonant frequency of 2.4GHz is simulated and fabricated on copper clad type FR4 (ε_r= 4.4) having thickness of 1.6mm. Patch dimension are 27mm × 30mm and substrate dimension is 63mm × 60mm. The microstrip transmission line is used to provide excitation for the antenna. The fabricated antenna, when tested on vector network analyzer shows resonant frequency at 2.38 GHz S11=-19.38dB and impedance =49Ω. Change in frequency as a function of moisture content in the paper is measured using Vector Network Analyzer by placing wet paper on the patch antenna. Moisture content in the paper was found out by taking wet weight and dry weight of the paper. A model of the wet paper is suggested mainly based on water–dry paper interaction, also considering parameters like thickness and surface roughness, to explain trends of the sensitivity curves.

Paper samples of 13 different types, with different GSM values and thicknesses, having dimensions same as that of the substrate were tested. From the results it is observed that as the moisture content in the paper increases the frequency decreases. The change in frequency with respect to the moisture content is seen to have quadratic relation with moisture. The variations in the frequency are fitted in the form of equations. The estimated $\%M_{wet}$ shows an error of ±0-4% in the estimated value as compared to the actual value. The response of sensor is almost linear with respect to the references but the coefficients depend non-linearly with the paper dimension.

Abstract ID: ICCTPP – 182

Investigations Towards the Measurement of Displacement using Lateral Shearing Interferometry and Fourier Fringe Analysis Technique

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Abstract: In the present communication we report the measurement of small displacement of reflecting surface (plane mirror) using wedge plate lateral shearing interferometry. With the help of simple mathematical analysis correlation between difference phase and the displacement of the specimen is undertaken. Fourier based fringe analysis technique is used for determination of difference phase. Theoretical and experimental investigations are carried out to check the sensitivity of the technique. The detailed discussion regarding sources of errors and uncertainty analysis is also incorporated and the expanded uncertainty is found to be ±0.00236mm. The technique is simple and can be used in industry environment.

Abstract ID: ICCTPP – 184

Tailoring Of Poly(N-Methyl Pyrrole) Thin Film Surface With Au-Nanoparticles For Selective Sensing Of H_2S

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Abstract: We have demonstrated a highly selective H_2S sensor fabricated out of Au-nanoparticles decorated Poly (N-Methyl Pyrrole) thin film. Electrochemical process parameters were initially optimized for uniform deposition of Poly (N-Methyl Pyrrole) on planar platinum substrate. Single step chronopotentiometric deposition resulted in a uniform and adhesive polymeric matrix which served as the basic sensing platform. To inculcate selectivity to the synthesized sensor backbone, the polymeric surface was tailored with Au nanoparticles via cyclic voltammetry. Scanning Electron Microscopy (SEM), Energy Dispersive X-Ray Analysis (EDAX) and FTIR spectroscopy were carried out to investigate

morphological and structural aspects of the sensory material. The semiconductive regime of operation of the sensor was revealed by V-I characterization. Comparative investigations clearly indicated inclusion of Au nanoparticles resulted in better sensing behaviour than pristine polymeric matrix. Most interesting results were obtained on validating the sensor under independent atmospheres of NH_3, NO_2, SO_2, and H_2S where the sensor reflected fingerprinting of H_2S. Successful detection of H_2S with commendable response and recovery behaviour was possible down to concentration of 05 ppm. The overall sensing behaviour of the nanoparticles tailored polymeric matrix could open up opportunities for complex sensing platforms like e-noses.

Abstract ID: ICCTPP - 185

Thermal Properties of Nano-silica Added Concrete

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Abstract: As energy costs are rising, the utilization of thermal insulating materials during construction has assumed paramount significance. The response of different building components to changes in external temperature depends on the material's thermal properties. The investigation connected to concrete material thermal properties is an essential factor when concrete is used for constructing green buildings. The consequence of nano-silica addition on the concrete's thermal properties is explored, and results are shown in this paper. The experimental results reveal that compressive strength increases and density reduce for nano-silica added concrete. The investigation indicates that thermal conductivity and thermal diffusivity decrease for concrete, whereas specific heat increases with a rise in nano-silica content. Also, a mathematical model was developed for the calculation of thermal conductivity.

Abstract ID: ICCTPP - 189

Security and Cost Optimization inLaser Based Fencing Solutions

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Abstract: This paper focuses on improving the security and cost effectiveness of laser-based fencing solution by implementing a secure optical transmission via laser amongst the fence nodes. To achieve a secure transmission, an encryption methodology is proposed which mitigates the threats posed by spoofing and bending of the laser beam used. The paper further illustrates how it also helps in achieving reduction in number of communication equipment required in a fencing setup.

Abstract ID: ICCTPP – 190

Interaction Between Cold atmospheric Plasma Jet and water contaminated with Pseudomonas aeroginosa bacteria for Decontamination Purpose

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Abstract: Water has the ability to incubate pathogenic microorganisms such as viruses, funguses and bacteria, the use of such water is dangerous and threatening for humans and the other forms of life. Obliged by the importance of water purification and cleansing, the recent researches focus on finding effective, eco-friendly and low-coast technologies among which are plasma based methods. Our technique is based on the use of a plasma jet that is extracted remotely from its power source using a floating copper wire inside a plastic tube. This plasma jet is generated using a gas mixture of argon and oxygen for the sake of producing reactive oxygen species in the solution, when submerged safely under water to perform a treatment in the suspension volume. For this study, the treated water samples consist of a 4 ml of distillated water in which is added 1 µl of broth containing Pseudomonas aeroginosa, which are Gram-negative facultative anaerobic bacteria that can present extreme threat to the human body and may lead to death.

Our study reports both effects of treatment time and the introduced ratio of oxygen flow rate compared to the fixed argon flow rate. Results illustrate that full water decontamination can be obtained after about 12 minutes of treatment using 1.5 slpm of argon gas flow in addition to 2.5±0.2% of oxygen. Moreover, increasing the oxygen flow rate is found to induce a threshold value from where the bacterial activity was able to restore back.

Abstract ID: ICCTPP – 194

Dielectric And Complex Impedance Spectroscopic Studies Of Microwave Synthesized Cupric Oxide Nanoparticles

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Abstract: Hexamethylene tetramine (HMT) capped CuO nanoparticles were synthesized by microwave assisted technique. X-ray diffraction analysis confirms the formation of monoclinic single phase of the synthesized particles. The nature of ligand bonding and an estimate of the ligand molecules on the surface of CuO particles were obtained from Fourier Transform Infrared spectroscopy and Thermogravimetric analysis, respectively. Dielectric measurements were performed with a temperature variation of 10 to 325 K. Frequency variation of the dielectric constant was performed over 126 kHz to 949 kHz range. Broad relaxation peaks, reduction of dielectric constant with size and the presence of anomalies at slight variance to the magnetic transitions observed in bulk material, show signatures of the impact of ligand. Impedance spectroscopic (IS) analysis shows the room temperature impedance to be dominated by grain boundaries. Impedance Spectroscopy (IS) analysis reveals core-shell type of behaviour with conducting grains and insulating grain boundaries. A schematic is proposed with the grain consisting of ligand capped CuO clusters.

Abstract ID: ICCTPP - 195

High-Pressure Equations of State and Elastic Properties of the *hcp*-Iron

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Abstract: In the present study, the pressure dependence of the elastic properties of *hcp*-iron has been carried out. For this purpose, we have used a new equation of state based on Eulerian finite theory based on *n*-th power of edge length by compression. Using new formulated equations of state, the bulk modulus and its pressure derivative have computed at different pressure. The obtained results from the proposed equation of state (EOS) show the better agreement with available experimental data. Thus, the new expressions are capable to predict the elastic properties of *hcp*-iron under high-pressure conditions.

Abstract ID: ICCTPP - 196

Determination of L X ray Satellite Lines For molybdenum(mo) and Molybdenum Trioxide(moo_3) By wavelength Dispersion X ray Flouroscence WD-XRF

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Abstract: X Ray flouroscence (XRF) is significant method on chemical profile analysis of various materials. In earlier times it is only confined to qualitative and quantitative analysis. In this wavelength dispersive X Ray flouroscence (WDXRF) used to measure the atomic structure of various Molybdenumcompounds. The study of relative intensity ratios of various satellite peaks of Molybdenum (MO) and Molybdenum trioxide (MOO) compounds which is associated with their atomic spectral structures. The intensity ratios will give the validity of Hatree-slater model of different compounds. In this paper verify the intensity ratios of the theoritical energies are compared with experimental values.

Abstract no: ICCPP-203

Williamson-Hall and Size-strain plot based micro-structural analysis and evaluation of elastic properties of Dy^{3+} substituted Co-Zn nano-spinels

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Abstract: Polycrystalline Co-Zn nanoferrites doped with rare earth Dy^{3+} ions having general chemical formula $Co_{0.9}Zn_{0.2}Dy_xFe_{1.9-x}O_4$ (x = 0.0, 0.015, 0.03, 0.045 and 0.06) were synthesized via sol-gel auto-combustion route. Powder X-ray diffraction (XRD), scanning electron microscopy (SEM) and Fourier transform Infrared Spectra (FTIR) were performed to investigate the structural, microstructral, surface morphology and elastic properties. Well indexed XRD patterns confirm the phase purity and cubic spinel structure of the samples. Fractional doping of Dy^{3+} ions shifts the Bragg's lines slightly towards the lower angles which in turn increases the lattice lengths from 8.3795 Å to 8.3834 Å. The strain induced in the crystal lattice was estimated by using Williamson-Hall and Size – Strain Plot methods. Both methods confirm that the tensile type strain was induced in the crystal lattice and increases with the substitution of Dy^{3+} ions. Surface morphology of the samples was studied

by using SEM images which reveals that the grains are almost spherical in nature and the size obtained is analogues with XRD results. FTIR spectra shows the existence of two main absorption bands within the wave number range 388 – 586 cm^{-1} which confirm the characteristics of spinel ferrites. Elastic properties such as Stiffness constant, Young's Modulus, Bulk Modulus, Rigidity modulus and Debye temperature (Θ_D) were estimated by using FTIR data. Elastic moduli and Debye temperature increases with the substitution of Dy^{3+} ions which are interpreted on the basis of interatomic bonding.

Abstract ID: ICCTPP - 204

Detection Of Vitiligo Using Optical Sensor Based On 2-D Photonic Crystals

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Abstract: This structure proposes the creation of the optical biosensor that can be used to detect vitiligo caused to pigment loss. For accomplishing this, a pair of 2D photonic crystal structures, such as the K3 and K7 resonators, are examined. The study of both resonator structures is succeeded using (FDTD) Finite Difference Time Domain. The Lumerical simulation tool is used to modelthese structures in the Finite Difference Time Domain (FDTD). The following optical properties of different pigmentation in human skin are investigated, and the refractive indexes information are entered into Lumerical (FDTD) to find variations in the refractive indexes of several pigments that produce vitiligo.

Abstract ID: ICCTPP - 205

Analysis of road divider for impact testing and material selection

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Abstract: Road divider is one of the most important things which needs to be worked on because many times vehicle are hit on the road divider which results in serious injury or death of the person because generally road divider are made from concrete, and concrete does not have impact force reducing capacity. On the other side Composite materials like Bamboo based polymer composite, Foamed PVC based composite and Jute fiber reinforced composite have a higher impact force absorbing capacity. The primary objective for this research is to develop or selecta material that is suitable to absorb the impact of the car and do not transfer any forces back into the car, which will further avoid or reduce the overall impact of the injury of the passengers.

Abstract ID: ICCTPP - 209

Nickel Ferrite Nanofluid Functionalized TaperedMicrofiber Based Magnetometer

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Abstract: Considering the promising utility of devices operating for high magnetic fields in noninvasive medical diagnostic applications such as magnetic resonance imaging, a microfiber-based magnetometer operating for a large dynamic range actuated via $NiFe_2O_4$ ferrite fluid is presented and proposed for the first time in this paper. $NiFe_2O_4$ nanoparticles with an average diameter of 37 nm (estimated using Debye–Scherer's formula) employed in the manufacturing ofmagnetometer is synthesized domestically in the laboratory using sol-gel method. Structural (morphological), optical, and magnetic properties of these nanoparticles are investigated through different scientific techniques. Optimized lower concentration (2%) of the nanofluid is used in thesurrounding environment of fiber interferometer for the measurement of an extensive range of magnetic field up to ~ 600 mT. The sensor delivers a maximum sensitivity of 18 pm/mT for such a wide range of magnetic field. The operational range of the reported sensing device can be increased even further by employing a finer tunable voltage source. The hysteresis loop of the MNPs was obtained using a vibrating sample magnetometer (VSM) at room temperature under the external field 1000 mT as shown in Fig. 1. The sample exhibit hysteresis behavior in the M-H curve indicative of ferrimagnetism in nickel ferrite MNPs.

Abstract ID: ICCTPP - 212

Vector Magnetic Field Sensing at Tiny Angles Through a Nanofluid Functionalized Ultrathin Taper Interferometer

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Abstract: Aiming at the requirement of high precision and long-life in tasks of mechanical and navigation industries, a highly sensitive and compact, in magnetorheological fluid film suspended nonadiabatic biconical tapered optical fiber interferometer-based vector magnetometer has been proposed and demonstrated in the manuscript.

The reported magnetometer keeps the ability to detect the magnetic field intensity and its direction in 3D space concurrently. The sensing mechanism counts on the magnetism-regulatable effective index amendment of exciting asymmetric cladding modes in a nonadiabatic biconical tapered fiber interferometer. Based on the azimuth-dependent anisotropic distribution of nanoparticles in the nearby environment of the fiber-optic sensing arm, the propounded magnetometer is found able to detect the tiny vector vicissitudes happening in the magnetic field due to the minor angular changes of -2° to +2° in its directions with the corresponding sensitivities of ~ 16.4 pm/mT, ~ ±14.6 pm/mT, and ~ ±11.7 pm/mT, respectively over a larger span of 0 – 567 mT.

Abstract ID: ICCTPP - 217

A Recent Development Of Luminescence properties Of Yb^{3+} Doped MetalHalide Perovskite Nanocrystals For Photonic Applications: A Review

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Abstract: Yb^{3+} doped metal halide perovskites nanocrystals are due to their high carrier mobility, unusually long carrier diffusion lengths, and acceptable optical bandgaps have attracted a lot of attention as innovative materials for solar applications in recent years. Furthermore, Yb^{3+} doped metal halide perovskites have a wide range of applications due to their excellent properties in a variety of fields, including light-emitting diodes, lasers, X-ray detectors,memory devices, and more. The luminescence properties of Yb^{3+} doped different metal halide perovskite materials are presented here, along with their distinctive qualities, to explain why these materials are so interesting for a wide range of applications. Following an overview of the synthesis procedures used to create halide perovskite films, current breakthroughs in halide perovskite applications outside of photovoltaics are discussed. The obstacles that must be solved for a variety of applications are explained, and recommendations are made.

Abstract ID: ICCTPP - 218

Optical, Compositional and Electrical Properties of Transparent MgO ThinFilm for ReRAM Devices

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Abstract: The bipolar switching phenomenon is observed in the MgO-based memory cell having a metal- oxide-metal (W/MgO/Cu) structure. The MgO thin film offers a high transmittance of about 88% for visible light, which is measured by UV-Visible spectroscopy. An optical bandgap of 4.2 eV is estimated from Tauc's plot calculation from the absorption spectra of MgO thin film. In addition, the XPS scan on the O 1s and Mg 2p peaks reveals the types of chemical elements in the RF sputtered MgO thin film. The Mg 2p peak at 49.36 eV suggests the oxidization of Mg, and two peaks at 529.5 eV and 531.6 eV in the O 1s core level indicate the presence of lattice and non- lattice oxygen, respectively. Non-lattice oxygen is responsible for the resistive switching in oxide thin films, confirmed by electrical characterization. The I-V characteristic from the electrical measurement shows the SET and RESET transitions at 5 V and –5 V, respectively. Moreover, the experimental results provide information about ohmic conduction in low and high resistive states. This work proposes MgO as a promising material for applications in next-generation non-volatile data storage applications.

Abstract ID: ICCTPP - 220

Indium Antimonide Based Terahertz Plasmonic Ring Resonator Filter

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Abstract: Plasmonics is one of the attractive fields in which the electromagnetic response of the metallic and semiconductor systems. Different kinds of devices and sensors are being explored due to thehigh tunability of the optical response by varying the geometry of the structured surface of subwavelength dimensions. Ring resonators are well explored in the microwave, visible, and IR frequencies. Focusing and confining the electromagnetic waves to the subwavelength dimensionis the most interesting feature observed in these systems. This paper proposes a tunable filter composed of a semiconductor-insulator-semiconductor (SIS) waveguide with a ring resonator at THz frequency. The two-dimensional study of the proposed structure has been done using the finite element method. It is observed that the device can be used for filtering THz frequency within the range of 0.3 THz to 1 THz by varying the structural parameters. The simulated structure is a promising candidate for an integrated optical circuit and terahertz devices as a filter. The results of the simulations will be discussed in detail.

Abstract ID: ICCTPP - 223

Optical band-gap evolution and local structural change in $Ge_2Sb_2Te_5$ phase change material

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Abstract: Amalgamation of unique features of chalcogenide-based phase change material has led to its utilization in optical storage (CD, DVD, and BD) and electronic storage (Non-volatile Memory) applications. Such material undergoes a quick but reversible switching between amorphous and conductive states. We investigated the amorphous to crystalline phase transition in $Ge_2Sb_2Te_5$ (GST) phase change material using XRD technique and the systematic variation in the optical band-gap (E_g) and structural disorder ($B^{1/2}$) employing UV-Vis-NIR spectroscopy. Amorphous phase (As-deposited) is observed to have $E_g$value of 0.708 eV while crystalline phase (200) shows 0.442 eV. Thus, decrement in E_g upon phase transition signifies the semiconducting nature of both phases. Also, a variation in $B^{1/2}$ slope of 13.4 % is noted around the crystallization temperature (150), depicting the reduction in structural disorder, and hence structural ordering in the material forming the cubic phase.

The change in the optical band-gap and local structural disorder upon crystallization occurs due to alternation in the atomic bonding configurations, which is explored using X-ray Photoelectron Spectroscopy (XPS). The findings reveal Ge-Te (at ~1218.35 eV binding energy) and Sb-Te (~528.8 eV) bonds in the amorphous phases. However, their bond lengths increase (hence binding energy reduces) as the annealing temperature rises, demonstrating phase switching occur as crystallization temperature is reached. Insight into the optical band-gap, local structural disorder and atomic arrangement govern many vital features of phase change material, such as fast crystallization speed, better thermal stability, high endurance, and large resistance contrast which provide the path for non-volatile memory and nanophotonic applications

Abstract ID: ICCTPP - 224

Study of structural and spectroscopic characterization ofco-doped ZnS Nanoparticles capped with L-Arginine

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Abstract: The aim of the present study was to prepare ZnS nanoparticles co-doped with Li^+-Cs^+, were synthesized using a chemical co-precipitation method. The ZnS-(Li^+-Cs^+) nanoparticle's were capped with L-Arginine and reduced using sodium sulphide. The main advantage of this method is to synthesized semiconductor nanomaterial with wide band gap and nanoparticles are chemically stable over a long time. The as prepared nanoparticles were characterized by X-Ray Diffraction technique for phase analysis of the sample. Particle size is found in the range of 2 to 4 nm calculated by Debye Scherer method. XRD confirms the evolution of stable cubic zinc blend phase of ZnS nanoparticles. The strong interaction between the capping agent L-arginine, Zn and S is revealed from the Fourier Transform Infrared (FTIR) spectrum.

Abstract ID: ICCTPP - 225

Co-dopant (Li^+ - Cs^+) Concentration Dependant OpticalResponses of CdS Nanoparticles

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Abstract: Here we present the synthesis of CdS nanoparticle co-doped with Li^+ and Cs^+ using L- Arginine as a capping agent is reported. The nanoparticles were prepared by adopting the chemical route method. The as prepared nanoparticles were characterized for studying their optical responses. The UV visible absorption spectroscopy showed a strong blue shift in the absorption wavelength from 430 nm, 400 nm and 370 nm as the doping concentration increases which is attributed to the quantum confinement effect. Photoluminescence spectra show a shift in the emission peak towards longer wavelength side with increase in the doping concentration. The prepared co- doped CdS nanoparticles can form a new class of luminescent materials.

Abstract ID: ICCTPP - 226

Design Of Optically Controlled Frequency Encoded Feynman Gate Using Micro Ring Resonator (MRR)

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Abstract: Micro Ring Resonator (MRR) is a successful micro-device with the help of which different types of optical logic gates, logic processors, arithmetic units, etc. can be designed and integrated easily into the modern high-speed communication network. In this article, at first, the author has explained the switching mechanism of MRR with MATLAB simulations and then proposed a technique for designing an optically controlled frequency encoded Reversible Feynman gate (controlled-NOT gate) using MRRs. The switching mechanism of MRR is reliable and the switching speed of MRR is very fast. In the proposed scheme, an optical pump beam is used to change the resonance condition of MRR. The logic processors using Reversible Logic gates are more acceptable due to their data recovery capability and low power consumption. The proposed optical circuit of Feynman gate is also testified with the MATLAB simulation results. The simulation results enhance the reliability of the proposed scheme. The proposed all-optical Feynman gate will be very useful for designing different types of all-optical logic units like parity generator, parity checker, comparator, error detectioncircuit, etc. To fulfil the demand for an ultra-high-speed all-optical communication network, the development of high speed optical logic processors is the primary requirement and thereforethe proposed scheme will be very helpful.

Abstract ID: ICCTPP - 227

A review on the development of Na^+ ion conducting solid electrolytes for Batteries

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Abstract: Rechargeable Electrochemical batteries attracted the focus of scientific community, Lithium- ion battery (LIB) has considered as one typical rechargeable electrochemical battery. It has the ability to store chemical energy and convert it into electrical energy with high efficiency. But the lithium ion batteries (LIB) available only with a liquid electrolyte, which causes a short circuit and thermal runaway in case of leakage in battery. With the exceptional reliability, safety and stability of solid-state Electrolyte materials considered as the most promising candidates for the commercially available

liquid electrolyte. Solid state electrolytes investigated so far are basically based on F^- , Ag^+ , Cu^+ , Na^+ and Li^+ . Among these materials, Na^+ ion conducting solid electrolytes offer good prospects in high energy density batteries and other electrochemical applications due to their light weight and most electropositive nature. This article provides a comprehensive overview of recent advances in Na^+ ion conducting solid electrolytes materials. This Na^+ ion conducting solid electrolytes points a bright future to all solid-state batteries which can be fully utilized to power all electric Devices and large-scale grid support. Hence, they are quite promising for technological applications

Abstract ID: ICCTPP - 228

Spectroscopic properties of Rb- and Cu-isoelectronic ions for astrophysical interest

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Abstract: In this work, we present high-accuracy spectroscopy data of line strengths, transition probabilities and oscillator strengths for the allowed transitions among nS1/2, nP1/2,3/2 and n'D3/2,5/2 states with n=5 to 10 and n'=4 to 10 of the Rb- isoelectronic Zr (Zr IV) and Nb (Nb V) ions along with n'F5/2,7/2 states with n=4 to 6 and n'=4,5 of the Cu-isoelectronic as (As V), Se (Se VI) and Br (Br VII) ions. They can serve to analyze various astrophysical phenomena undergoing inside the heavenly bodies containing these Rb- and Cu-isoelectronic species. Due to unavailability of precise observations and spectroscopic analysis for the atomic properties of these ions, their accurate estimations are of immense interest. The literature data, that are available exist only for a few selected low-lying transitions, have large discrepancies and cannot be used reliably for the above purpose. After accounting for electron interactions through random phase approximation, Brückner orbitals, structural radiations and normalizations of wave functions in the relativistic many-body methods, we have evaluated the electric dipole amplitudes precisely for Rb-isoelectronic Zr and Nb ions, however, for Cu-isoelectronic ions, we have implemented our highly precise relativistic all-order method for the computation of these wave functions. Combining these values with the observed wavelengths, the above transition properties and lifetimes of a number of excited states of these ions are determined and hence, the comparison of this data is carried out against available literature for the further validation of our work.

Abstract ID: ICCTPP - 229

Exploring the possibility of Molecular Solar Thermal Energy Storage System using Kirkwood Buff Integrals

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Abstract: Norbornadiene is important for organic and polymer synthesis. Encouraging technological applications of Norbornadiene and its mixtures have also been found in the last few years for solar energy storage. Kirkwood Buff Integrals (KBI's) play a significant role in understanding and characterizing interactions in liquid systems. This work contains evaluation of the Kirkwood-Buff Integrals and structure factors of mixtures from existing thermodynamic data of Binary Liquid Mixtures of Norbornadiene with Benzene, Cyclohexane, Decane, and Carbon Tetrachloride. Studying the integrals will provide the necessary data for improving predictive techniques for the right composition for which the system will behave efficiently. The theory presented in this paper deals with a novel method for calculation of the KB Integrals for binary solutions.

Abstract ID: ICCTPP - 234

Effect of cation distribution on structural and mechanical properties of Y^{3+} substituted Co-Zn spinel ferrites nanoparticles

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Abstract: Yttrium (Y^{3+}) substituted Co-Zn spinel ferrite nanoparticles with compositional formula $Co_{0.9}Zn_{0.2}Y_xFe_{1.9-x}O_4$ (x = 0.0, 0.015, 0.030, 0.045, 0.06) were synthesized by using sol-gel auto-ignition route. The structural and mechanical properties of Co-Zn ferrites were tailored by the replacement of Fe^{3+} ions by Y^{3+} ions. Rietveld refined X-ray diffraction patterns of all the samples confirm the cubic spinel structure. Lattice parameter increases

with the substitution of Y^{3+} ions which may be due to the difference in ionic radii. The crystallite size obtained from XRD analysis is found in the nanometer range of 16.8 – 24.7 nm.Distribution of cations over tetrahedral – A and octahedral – B sites have been studied by using X-ray diffraction data and it is found that Y^{3+} ions prefers the octahedral – B site. Infrared spectra of all the samples were recorded in the wave number range of 300 cm^{-1} to800 cm^{-1} which shows splitting of the two fundamental absorption bands. Two absorption bands (n_1 and n_2) observed in the range 380 – 610 cm^{-1} are belongs to tetrahedral – A and octahedral – B interstitial sites. The force constants (K_O and K_t) and corresponding elastic parameters were determined by using IR data. The stiffness constant (C_{11}), Young's modulus (E), rigidity modulus (G), bulk modulus (B) and Debye temperature (q_D) were found increases with the addition of Y^{3+} ions.

Abstract ID: ICCTPP – 236

Review on Enhancement of Stability and Efficiency of Perovskite Solar Cell

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Abstract: As rapid progress in a power conversion efficiency (PCE) to reach 25%, emerging thin film solar cell technology, organic–inorganic hybrid perovskite solar cells have aroused many concerns with several desired properties for photovoltaic applications, including large absorption coefficients, excellent carrier mobility, long charge carrier diffusion lengths, low-cost, and unbelievable progress. The high efficiency in combination with the low cost of materials and processes are the main points of this cell over commercial silicon or other organic and inorganic solar cells. This review summarizes the fundamentals behind the optoelectronic properties of perovskite materials, as well as the important approaches to fabricating high-efficiency perovskite solar cells. Also, the degradation mechanisms for unstable perovskite materials and their corresponding solar cells are discussed. The strategies for enhancing the stability of perovskite materials and perovskite solar cells are also summarized with interface engineering between the hole transport layer and the perovskite active layer and interface modification between the electron transport layer and the perovskite layer. Finally, an outlook and perspective are provided into the future development of PSC architecture engineering.

Abstract ID: ICCTPP - 239

Impact of Scintillation Effect on Clear Weather and Fog Conditions usingMDM-WDM Modulation Technique

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Abstract: The 5th generation optical wireless communication technologies have unique features of higher data rate, scalability in bandwidth, license free spectrum, cost effectiveness, easy deployabilty and secured transmission. The role of free space optical (FSO) communication becomes important as the applications of next generation technologies are evolving in almost every sector. In this work, the performance of the terrestrial FSO MDM-WDM link has been investigated through a DP-QPSK modulation scheme at a data rate of 1000 Gbps. The link attenuation has been analyzed with the help of Gamma- Gamma and Lognormal scintillation models for clear weather and varied fog conditions. The link performance has been evaluated through SNR and received optical power for a varying distance of up-to 20 Km.

Abstract ID: ICCTPP – 241

Surface Electric Charge Decay Behavior of Polypropylene Films Treated by Atmospheric airDielectric Barrier Discharge

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Abstract: Atmospheric air dielectric barrier discharge (DBD) is one of the most effective physical techniques for the cold plasma source. It is usually applied to modify the surface properties of polymers and has been in many fields such as ozone production, depollution, and surface sterilization. This modification leads to the improvement of the wetting properties and adhesion and the change of surface roughness as well as other important technological features. In this study, we focused our attention on the influence of DBD plasma on the surface electric charge behavior of polypropylene (PP) thin films. The effect of DBD plasma has been studied as a function of treatment time for two values of applied discharge voltages 7 kV and 13 kV. In our experiments, the DBD plasma is generated using an AC high voltage. After being exposed to DBD plasma treatment, the samples were charged for 5 seconds in ambient air using a negative triode corona electrode system. The surface characterization of the untreated and treated PP films by DBD plasma is performed using surface electric charge decay measurements. For identical charging conditions, the surface electric charge decay behavior of the PP is greatly influenced bythe DBD plasma exposure time and the applied discharge voltages. We can notice that the surfaceelectric potential dissipation is faster for a discharge voltage of 13 kV than 7 kV. This is due to the fact that the DBD is more energetic at higher voltage levels which means that the surface treatment is more efficient.

Abstract ID: ICCTPP - 245

Linear SV Plots Analysis In Steady State And Transient State To Explore Fluorescence Quenching Of Coumarin Derivative By Aniline

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Abstract: The Steady state methods are used to study fluorescence quenching of heterocyclic compound namely 3-Hydroxy-3-[2-oxo-2-(3-oxo-3H-benzo[f]chromen-2-yl)-ethyl]-1,3-dihydro-indol-2- one [3HBCD] in Toluene (nonpolar) and Butanol (polar protic) only with a view to understand the role of diffusion in the quenching mechanism. Time resolved method is used in Toluene a nonpolar solvent to further support the theory of material diffusion. Aniline is used as quencher to carry out the quenching studies. In both steady and transient state linear SV plots are observedwith intercept ≈ 1. Correlation in the activation energy in both study state and transient state (Ea and E'a) suggests efficient quenching. Also calculated values probability of quenching per encounter p (or p') and the activation energies suggests that the quenching reaction is predominantly controlled by material diffusion. This study help engineer the structure of new family of coumarin drugs with selective sensitivity which is of utmost importance in the field of chemistry and pharmaceutical industry.

Abstract ID: ICCTPP – 246

Lane and Pedestrian Detection System for an Autonomous Vehicle Using Python

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Abstract: Programmed detection of the pedestrian, lane in a scene is significant in self-driving and autonomous navigation This report presents a computer vision CV based calculation, algorithm for pedestrians and lane detection in structured and unstructured scenes, where lanes change essentially in colour, surface, and shape and are not shown by any painted markers. In the above technique, a lane appearance model is developed adaptively from an example video, which is recognized autonomously from the picture

disappearing point. This report additionally presents a quick and powerful disappearing point assessment strategy dependent on the color tensor and prevailing directions of shading edge pixels. The proposed lane and pedestrian detection strategy is assessed on another benchmark dataset that contains pictures and videos from differentscenarios with various kinds of plain paths. Experimental outcomes are introduced which exhibit its productivity and robustness in correlation with a few existing techniques.

Abstract ID: ICCTPP - 247

Uni-directional (001) Pressure effect on Optical gain Spectra of InAs/GaAsSb Quantum well Heterostructure

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Abstract: In this article an attempt has been made to determine the uni-directional (001-direction) pressure effect on the optical gain spectra and corresponding emission wavelength of a designed type-II nano- scale heterostructure based on GaAsSb-InAs material system. As a trial, the range of pressure applied was kept as 1-3 GPa. On introducing the uni-directional (001-direction) pressure (in the range of 1 GPa to 3 GPa) on the GaAsSb-InAs QW heterostructure, the optical gain is reduced significantly from 3050 /cm to 1150 /cm, while the transition wavelength shows the red shift.

Abstract ID: ICCTPP - 248

Mixed Organic Halide Perovskite Energy Harvester For Solar Cells

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Abstract: For many years, researchers have been interested in studying organic-inorganic hybrid perovskites because of their optical, electrical, and magnetic properties, as well as their structural tunability and processability. This work is focused on the synthesis, optical and structural characterization of mixed halide perovskites, methyl ammonium copper chloride ($(MA_2)CuCl_4$), and phenylethyl ammonium copper chloride ($(PEA_2)CuCl_4$). methylammonium lead iodide has numerous applications, especially in solar cells and photovoltaic systems. But Lead is less stable and highly toxic thus harmful to the environment. Due to stability and environmental concerns, lead iodide has been replaced with copper chloride. The fact that phenylethyl ammonium copper chloride material exhibits both ferroelectric and ferromagnetic properties has piqued scientists' curiosity. methylammonium chloride is hygroscopic, so it is unstable. To increase the stability of the material the organic part can be replaced with higher-order functional groups. Phenylethyl chloride is found to be thermally stable and has more moisture resistance ability compared to methyl ammonium chloride. When it comes to efficiency, methyl ammonium chloride is known to have higher performance than phenylethyl chloride, particularly in the field of solar cell perovskites. To make the material more stable and highly efficient, methyl ammonium copper chloride and phenylethyl ammonium copper chloride were mixed in a 1:1 ratio. This work is just a basic foundation for the development of perovskite material for future applications which is environmentally friendly, stable, efficient, and has long-term practical importance.

Abstract ID: ICCTPP - 253

Some Essential Elements of a New Approach to Quantum Physics

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Abstract: We are in the process of developing a completely new approach to understanding and explaining quantum physics. The overall guiding themes in this research program are: (a) to be able to explain the conceptual roots from which the postulates of quantum mechanics come about, and, in order to accomplish this goal, (b) to develop a theory of the physical "mechanisms" which must underlie the mathematically formulated framework of the mainstream QM. In building this new approach, we pay careful attention to developing a new ontology, especially, the question of the kind of quantum mechanical objects there must exist in nature. We then identify causal relations among these objects, and on this basis, we also develop certain simple thought

experiments and computational models which illustrate the interactions that occur among these quantum mechanical objects. Though these models remain simple, we strive to identify those conceptual and quantitative principles which may be of a more general theoretical relevance. We believe that, in the course of this development, we have found a proper solution to the well known Measurement Problem, too. Our solution relies, *inter alia*, on: a certain non-linearity in the interacting complex-valued fields; a fresh look at the particulars of the actual detectors and the measurement processes; and certain qualitative ideas pertaining to multi-scaling. The aforementioned non-linearity arises very naturally in our approach; it does not involve any extra or hidden variables. With such a non-linearity, it is possible to explain, in principle, the "irreversible" nature of the measurement events too. However, as of today, the theory is limited to only a non-relativistic treatment. The proposed paper is the very first paper on this new approach. It shall touch upon some of the most basic and essential elements of this new approach.

Abstract ID: ICCTPP - 257

The influence of electrodes thicknesses on thecharacteristics of a helium plasma jet

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Abstract. In this study four plasma jet reactors (PJR) that produce an atmospheric pressure plasmajet (APPJ) were designed to investigate the effect of electrodes thickness and their placement on the characteristic of the plasma jet (jet length and electrical characteristics), the electrodes used are two outer disc-like copper plats with a diameter of 15 mm placed around a quartz tube with aninner diameter(ID) of 5mm, the whole assembly is then placed inside an epoxy resin cylinder, twoelectrode sizes were used, one 3mm thick and the other 1mm thick, each PJR uses one combination of the electrodes, the high voltage generator used provide a sin-wave signal supplying a voltage varying between 13kVp-p and 17kVp-p at a resonance frequency of 5.5kHz , the working gas in this study was helium. measurements of the plasma jet length were taken for different applied voltages and also different gas flow rates in order to establish the best performing PJR (long plasma plume and intense plasma) and also to determine the best working conditions for each PJR, electrical characteristics such as discharge current and power consumption were also measured/calculated to further advance our understanding of the influence of the electrodes geometry on the plasma jet.

Abstract ID: ICCTPP - 260

Structural properties of Co doped NiO nanoparticles and its Pseudocapacitive behavior

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Abstract: In recent years, energy crisis is an issue overlook by the world, due to atmospheric pollution and exhaustion of fossil fuels. Green energy resources like solar energy and storage of energy are replacement to them. One of the most promising energy storage device is super capacitors. Its have genuine characteristics like fast charge discharge rate, high power density and long life cycle. Co(0.1,0.2,0.3,0.4%) doped NiO nanoparticles were synthesized by different concentrations using sol-gel method. XRD spectra reveal the presence of NiO. In Co doped samples, the crystallite size reduced with the increase in amount of Co. FTIR spectra indicates the presence of functional group elements. SEM image reveals the agglomerated clusters of nanoparticles; EDX spectra reveals the nonstoichiometric nature of NiO. CV curves indicates the pseudocapacitive behavior of NiO nanoparticles. The maximum value of specific capacitance was achieved as 293 F/g for 0.3% Co doped NiO samples. Co doped NiO nanoparticles are the effective electrodematerial for super capacitors.

Abstract ID: ICCTPP - 261

Study of Chromatic Dispersion in Single-Mode Optical Fiber

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Abstract: In the optical communication system, optical fibers are used to transmit information in a long-haul communication system at a very high speed. However, attenuation causes loss in signal transmission. Chromatic dispersion is an ultimate limiting factor for attenuation in high-speed long-distance communication. The chromatic dispersion causes a broadening of the incident pulse while traversing along the fiber length. This broadening reduces the information-carrying capacity of the transmitted signal. Chromatic dispersion is caused by material and waveguide dispersion. We used COMSOL Multiphysics to evaluate chromatic dispersion for the different refractive indexes of silica glass by varying wavelengths from 1300 nm to 1600 nm. We have modelled a 2D optical fiber using the Electromagnetic Wave, Frequency Domain. The effective mode index was computed using Mode Analysis and total dispersion is calculated theoretically. The computed values of chromatic dispersion are within 7% of theoretical values.

Abstract ID: ICCTPP - 262

Study on the electrochemical characteristics of composite polymer electrolytes based on(PVDC-AN) copolymer

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Abstract: A new composite polymer electrolyte (CPE) based on P(VDC-AN) copolymer, $LiBF_4$ as salt and $BaTiO_3$ as nano filler has been prepared by solution casting technique. Impedance spectra analysis of composite polymer electrolytes have been made to investigate the ionic conductivity by varying the composition of the nano filler $BaTiO_3$. Room temperature ionic conductivity of the composites increases substantially and reaches the maximum value of $5.7x10^{-4}$ Scm^{-1} for P(VDC-AN) (92wt.%)/$LiBF_4$ (8wt.%) & $BaTiO_3$ (90%wt). The structural and the complex formation have been confirmed by X-ray diffraction spectroscopy and FTIR analysis. The surface morphology and surface roughness are studied by AFM. Thermal stability has been investigated from thermogravimetry/differential thermal analysis. Reductions in intensity of the emission peaks in the photoluminescence studies are good in agreement with ionic conductivity. The overall results indicate that the sample prepared with 90wt.% $BaTiO_3$ shows maximum conductivity and exhibit good thermal behavior.

Abstract ID: ICCTPP - 263

Synthesis and characterization of nanocrystalline barium strontium titanate powder by a simple solid state reaction route

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Abstract: In this work, we report the synthesis of small quantity of strontium (Sr) doping in $BaTiO_3$ (BT) to realize $Ba_{1-x}Sr_xTiO_3$ (BST) (x = 0, 1 and 15 wt%) ceramic nanoparticles by a simple solid state reaction route followed by calcination at 1050°C for 7 hours and sintering at 1350°C for 4 hours. The synthesized samples were characterized by X-ray diffraction technique (XRD), Field emission scanning electron microscope (FESEM), Fourier transform infrared spectroscopy (FTIR), and impedance analyzer. Systematic doping of Sr by gradual shift of the peak positions towards higher angle side and tetragonal single phase of BST nanoparticles have been confirmed by XRD for all samples. FE-SEM images show the spherical particle formation having particle size in the range 100 - 125 nm. Impedance analyzer results demonstrate an increase in dielectric constant with increasing filler concentration having

low dielectric loss. The change in dielectric constant with filler concentration could be argued by considering grain size and systematic shift of the peak positions as revealed by FESEM and XRD tools, respectively. The observed results suggest its application in flexible self-powered energy sources, sensors and actuators.

Abstract ID: ICCTPP - 265

A Review on Thin wall tube energy-absorbing structure: crash box

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Abstract: Many researchers have been working on the behavior of crash box structure and its behavior under certain boundary conditions which represent the actual crushing scenario. Automobile safety is a primary concern while designing a whole automobile. Driver safety is equally important as passenger safety. In a severe collision situation, the crash box plays a vital role to absorb maximumenergy. The crash box structure is placed on the frontal side in between the bumper and another main part of an automobile This paper presents a deep study on the mechanism of deformation anddeformational behavior under different boundary conditions. Further, this paper focuses on different geometries and materials and their effect on deformational performance. Nowadays, composite material is being used for the crash box structure and overall results show the fulfillment of the safety requirements. After material and geometry, the next factor is a surface modification (or trigger) of the crash box which affects the energy absorption capacity. So, throughout research focused on crash box structure and its different aspects.

Abstract ID: ICCTPP - 266

Large Magnetic Entropy Change in van der Waals $CrBr_3$ SingleCrystal

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Abstract: Atomically thin intrinsic magnetic van der Waals (vdW) systems open a new platform in nanoelectronics as well as in fundamental physics in recent years. We have investigated magnetic and magnetocaloric properties of $CrBr_3$ single crystal from magnetic measurement. $CrBr_3$, a vdW semiconductor, with out of planemagnetic easy axis shows T_c around 33K. A large magnetic entropy change of 9.3 J/kg-K is observed in $CrBr_3$ for a field change of 7T close to transition temperature.This indicates that $CrBr_3$ can draw significant attention as a magnetic refrigerant forliquefaction of hydrogen in fuel industry.

Abstract ID: ICCTPP - 267

CdSe quantum dots enhancing blue emission of nematic liquid crystals

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Abstract: Herein, we report the enhancement in blue emission of nematic liquid crystals (NLC) doped with CdSe quantum dots (QDs) at room temperature. CdSe QDs were synthesized by a high- temperature wet chemical method. The structural and optical properties of the QDs were studied using X-ray diffraction (XRD) and UV-Visible absorption, photoluminescence (PL) measurement respectively. XRD pattern suggest cubic crystal structure of CdSe QDs without impurity phase formation. The absorption peak of QD is observed at 503 nm and PL emission is at 526 nm which is consistent with literature for small sized CdSe QDs. The QDs size is found to be 2.3 nm calculated by excitonic peak. Furthermore, liquid crystal sample cells were fabricated by rubbed polyimide technique on photo-lithographically patterned indium tin oxide (ITO) coated glass plates. These sample cells were used to carry out further measurements of CdSe QDs doped NLC composite. The polarization states of the QD-based NLC were studied by polarising optical microscopic (POM) images under crossed geometry of polarizer and analyser. The uniform colour distribution throughout the cell indicates uniform cell thickness with a planar alignment of liquid crystal molecules. Moreover, dark, and bright states of POM images are used to analyse the defects in alignment of NLCs. It is worthwhile to note here that, the incorporation of QDs in NLC helps in reducing defects and light leakage centres which further increases the absorption and hence emission of nematic liquid crystals. The significant enhancement in the PL intensity of the NLC of about 60% upon CdSe QDs doping is observed at room temperature which attributed with the increase in molecular alignment of NLC composite. This study leads to the design of new generation display devices.

Abstract ID: ICCTPP - 268

Enhancement in Photoluminescence of Nematic Liquid Crystals doped with $CsPbBr_3$ quantum dots

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Abstract: We report the enhancement in photoluminescence (PL) of nematic liquid crystals (NLC) doped with $CsPbBr_3$ (Perovskite) quantum dots (QDs). QDs play a vital role to enhance the PL intensity, which has been attributed to the increase in the planar alignment of NLC molecules by reducing light leakage centres and intrinsic defects. QDs were synthesized by the hot injection chemical method. The structural properties of QDs were examined by X-ray Diffraction (XRD) and Transmission Electron Microscopic (TEM) measurements. Orthorhombic crystallite structure without secondary phase formation was confirmed from XRD pattern. The particle size was calculated by TEM and found to be 7.3 (± 1.1) nm. The optical properties of QDs were studied by recording UV-Visible absorption and photoluminescence (PL) spectra at room temperature. The absorption spectrum reveals the excitonic peak at 2.45 eV and PL emission is observed at 2.42 eV. The chemically prepared QDs were further used to enhance the emission of NLC. Firstly, liquid crystal sample cells were fabricated by conventional polyimide technique and NLC doped with $CsPbBr_3$ QDs were inserted into the sample cell via the capillary action. The filled sample cells were characterized by polarising optical microscope (POM) images and PL spectra measurements. The dark and bright state images of POM demonstrate the uniform alignment and homogeneous texture of liquid crystal molecules in both (pure NLC cells. The molecular alignment is further improved while the light leakage centres and defects were reduced after doping QDs in the host NLC material. This leads to a significant enhancement in absorption and hence the emission of NLC. We found the enhancement in PL intensity by 11% compared to pure NLC. The improved emission of NLC is attributed to modified molecular alignment in presence of QDs. Results based on present work will help to fabricate QDs based display devices with improved the optical contrast and lower the operating voltage.

Abstract ID: ICCTPP - 272

Tune-out and magic wavelengths for magnetic-sublevel-independent trapping of alkaline-earth ions

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Abstract: Even minuscule interactions between the external fields and atoms can lead to significant systematic errors in high precision measurements involving atom trapping. This demands for scheme to trap atoms at those magic wavelengths (λ_{magic}s) that are independent of vector and tensor components of the interactions of the atoms with the external electric field. A similar technique in this regime involving elliptically polarized light provides a platform to calculate λ_{magic}s that are independent of magnetic sublevels and hyperfine levels of the atomic states involved in the transition. In our present work, we have opted same procedure to report M_J-independent magic wavelengths for the transitions between different $S_{1/2}$ and $D_{3/2,5/2}$ states in Mg^+, Ca^+, Sr^+ and Ba^+ ions. Moreover, we have also provided tune-out wavelengths for all the considered states of these ions along with the comparison of these values with available literature to demonstrate the accuracy of our work. We believe that these results can help in eliminating systematics in numerous high precision measurements involving these alkaline-earth ions.

Abstract ID: ICCTPP - 273

Study of Radiation Power Spectra Using Periodical Dielectric Structures Media withPolarization in 1D Photonic Crystals

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Abstract: In this work we investigated the thermal power radiation spectrum (ρ) of the electromagnetic radiation in 1D photonic periodic structure containing Si and Sio_2 with truncated Sio_2 media with truncation parameter using as an absorbing substrate. The thermal radiation power spectra are determined by means of a theoretical model based on a transfer matrix for both normal and oblique incidence angle together with Kirchhoff's second law. We studied the radiation spectra by considering where indices of layers A and B are assumed to be constant and controllable TE and TM Mode with truncation parameter and incidence angle in the mid, left and right gap frequency corresponding to mid, left and right mid gap temperature.

Abstract ID: ICCTPP - 275

Gallium Arsenide and Gallium Nitride Semiconductors for Power and Optoelectronics Devices Applications

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Abstract: The advancement in technology in semiconductor materials significantly contributed in improvement of human life by bringing breakthrough in fabrication of optoelectronics and power devices which have wide applications in medicine and communication. The Gallium Arsenide (GaAs) and Gallium Nitride (GaN) are versatile materialsfor such applications but with relative merits and demerits.

GaAs transistors are suitable for both narrowband and wideband applications due to very wide operating frequency range (30 MHz to millimetre-wave frequencies as high as 250 GHz). They are highly sensitive, generatevery little internal noise and have power density typically around 1.5 W/mm. But low break down voltage ($5x10^5$V/cm), low output power (5-10W) and inability to withstand higher temperatures are the main limitations.

On the other hand, GaN possess the improved physical and chemical characteristics, with high output power, high operating temperature (1000°C in vacuum), fast heat dissipation, high breakdown voltage ($4x10^6$V/cm), high power density (5-12W/mm), high frequency characteristics and large band gap (3.4eV) which allow significant reduction of devise size. Also high breakdown voltage increases the overall impedance which make it suitable in matching process and enables efficient operation in broad band region.

The present paper critically analyses the GaAs and GaN semiconductors in relation to their significant physical and chemical properties, which make them suitable to make efficient power and optoelectronics devices for applications in communication, space and medicine.

Abstract ID: ICCTPP - 276

Tunable omnidirectional high reflector using 1D Superconducting Photonic Quasi Crystals

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Abstract: The omnidirectional reflection characteristics of the quasiperiodic multilayered structure containing superconducting material is theoretically investigated by the transfer matrix method in the visible frequency range. The constituent heterolayers made of dielectrics (SiO_2) and superconductors ($YaBO_2CuO_7$) are built according to Fibonacci topological structure. The variation of output photonic bandgaps (PBGs) is shown to be

mainly due to the change of the properties of constituent materials and their ordered arrangement. The photonic bandgap was adjusted by the constituent materials properties, temperature of operating superconductor and the sort of regular arrangement of heterolayers. By juxtaposition of quasiperiodic stacks a significant enhancement of all PBGs are achieved allowing to cover the maximum range of visible light spectrum. The omnidirectional band gaps can be enlarged by applying a typical deformation along the proposed photonic sample.This result can usefully for the design of an omnidirectional high reflector in the visible frequency.

Abstract ID: ICCTPP - 277

H-Polarised Electromagnetic Wave Propagation in Chalcogenide-Polymeric Cylindrical Photonic Materials

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Abstract: The present manuscript deals with the H-polarized electromagnetic (EM) wave propagation in a chalcogenide (As_2Se_3)-polymeric (PEI) photonic materials (CPCPM) has been theoretically optimized and analyzed. We have shown numerical findings for the single cylindrical interface and the single cylindrical slab for both chalcogenide (High refractive index) and polymeric (low refractive index) photonic material designed at a low loss wavelength window (632.8 nm) by using the Transfer Matrix Technique (TMT) and Henkel Formalism (HF) in cylindrical coordinates. It is found that there is a Brewster initial radius at which a maximum H-polarised optical transmittance is observed for CPCPM. For fundamental azimuthal mode (m=0), the maximum transmittance is achieved at the polymeric interface compared to the chalcogenide interface. For higher-order H-polarised azimuthal modes, a quick drop in transmittance is recorded below the Brewster radius for both interfaces. For the cylindrical unit slab, it is observed that the optical transmittance with the wavelength for both materials has oscillating and non-oscillating signatures, which shows that the initial radius has a strong effect on the optical transmittance at fixed slab thickness. As the initial radius goes increasing, the oscillatory transmittance gets squizzing. Moreover, optical transmittance is again the oscillatory function of slab thickness for lower modal numbers, and it gets minimal and flat for (m=4). These scientific findings open the way for various applications in the optoelectronic devices and sensors domain.

Abstract ID: ICCTPP - 278

A Review on Phase Change Materials: Development, Types and Applications

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Abstract: Heat-storage materials that can be used to transition from one phase to another are known as phase change materials (PCM). This review article aims to highlight the history, iterations, and future value-adding of PCM in the sciences and engineering industries. This study discusses the many types of phase transition materials, as well as their encapsulations and applications. The study also includes findings from many experiments conducted around the world in order to offer a complete picture of overall advancement in the field of PCM.

Abstract ID: ICCTPP - 280

Simulation of Alq3/Alq3:NTCDA/NPB heterostructure based OLED

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Abstract: In this article an attempt has been made to design the meshing structure of Alq3/Alq3:NTCDA/NPB layers based OLED and to determine the the optical characteristics such as PL (photo luminescence), emission rate, and normal spectral density. The studies of all these parameters suggest that the heterostructure system based OLED is useful for the emission of high intense radiations in the visible region (wavelength region ~500 nm).

Abstract ID: ICCTPP - 282

Interferometric Vibration Sensor

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Abstract: A modified Michelson interferometer is used as a vibration sensor. One of the mirrors is tilted by a small angle about its vertical axis to get straight fringes. These fringes will move according to vibration created by another mirror (vibrating object). The interferometric output was divided into two parts. Two detectors were modulated by passing these two beams through two identical transmission gratings of same spatial frequency of that of interferometric output. By adjusting the spatial position of the gratings, phase quadrature was obtained between these two signals. By processing these two signals directional information of the vibrating object was retrieved. Real time monitoring of amplitude and frequency of vibration along with directional information is obtained.

Abstract ID: ICCTPP - 283

Heating of Collisional Nanocluster Plasma by Beating of Two High Power Laser Beams

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Abstract: This article presents the anomalous heating of collisional nanocluster plasma by beating of two high power laser beams. Nonlinear interaction of two laser beams causes the generation of beat wave with frequency $\omega = \omega 1 - \omega 2$ and wave vector $\vec{k} = \vec{k}1 - \vec{k}2$. This laser beat wave produces the nonlinear ponderomotive force to the electron cloud of nanocluster plasma. Self-consistent space charge wave might be excited the electron plasma wave. An analytic theory is developed for anomalous electron heating rate and evolution of electron temperature in plasma embedded with clusters. The heating rate and electron temperature is found resonant at surface plasmon oscillations. The resonant condition is achieved when the laser beat wave frequency lies near the frequency of surface charge oscillations. The graphical results promises that heating rate can be enhanced and tunned by varying the laser parameters, nanocluster radii and cluster density. Extreme heating rate condition occurs when laser is polarized along the electron plasma wave. One can produce the soft X-ray emission by generalizing this theory via Bremsstrahlung process.

Abstract ID: ICCTPP - 284

Effects of Co-60 Gamma Radiation on the Characteristics of Red, Green and Blue LEDs

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Abstract: Red, Green and Blue LEDs are irradiated by Co-60 gamma radiation at the doses ranging from 1.8 kGy to 172.8 kGy. Effects of these doses on the I-V and Intensity-Power characteristics of RGB LEDs are examined. I-V characteristics shows only marginal variations, however, significant reduction in output intensity is observed at the maximum dose level of 172.8 kGy. We attribute this degradation to radiation induced increase in the minority carrier lifetime, displacement damage and radiation induced defects

Abstract ID: ICCTPP - 288

The Effect of Deposition Cycles on Structural, Morphological, Optical and gas detection properties of Mg doped ZnO thin films

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Abstract: In this article we synthesized of Mg doped ZnO thin films in different number of deposition cycles by using modified SILAR method. XRD data shows the prepared films have ZnO wurtzite hexagonal structure. The crystalline size and crystallinity were found to be increased by increasing the number of deposition cycles. FESEM, showed there are nanoparticles and nanorods in the surface, with random distribution in the case of the sample synthesized with 30 cycles, while the agglomeration of nanoparticles to form maize-like structure and flower-like morphology was predominant in case of sample with 40 cycles. UV-VIS transmittance spectra shows decrease in transmittance by increasing the number of cycles deposition, and the increment of energy band gap by increasing the number of deposition cycles was found. The response of the samples towards of NO_2 gas at 200 0C operating temperature was found to be enhanced in case of the sample prepared at 40 cycles as compare to the sample prepared at 30 cycles.

Abstract ID: ICCTPP - 289

Double Interface Terahertz Surface Plasmons Excitation by Nonlinear Mixing of Two Laser Beams in Different Graphene Coated Structures

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Abstract: The graphene sheet is deposited in two different structures: one on plane substrate and other one on optical fiber. We discussed the result and compared in the two structures. Low loss terahertz surface plasmons are generated and the amplitude falls off exponentially away from the interface of both media; in dielectric also in free space, we found that the phase velocity of surface plasmons decreases with the thickness of graphene sheet. In graphene sheet planer structure, Two laser beams incident obliquely on the plane graphene sheet. These two laser beams exert a ponderomotive force at different frequency on the free electrons of graphene sheet, which excites the nonlinear current. This nonlinear current is a source of THz surface plasmons. In graphene coated optical fiber, THz surface plasmons are excited by nonlinear coupling of two guided modes of laser beam. The process takes place in presence of volume grating by producing surface ripple of suitable wave number. These two schemes will be suitable for making compact terahertz radiation sources. These radiation sources have large number of applications in medical sciences, terahertz sensors, and photonics etc.

Abstract ID: ICCTPP - 290

The interplay of anisotropy and sticking probability for growth patterns of different fractal dimensions with modified Diffusion Limited Aggregation model

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Abstract: Diffusion Limited Aggregation (DLA) is a well-studied model that has led to many diverse applications from river networks to electrodeposition and from biomedical imaging to sring theory. Conventional DLA model involes random walkers originating from the same distance from the seed at the centre o initiate the growth process. Once the walker reaches the site next to an aggregate, it sticks to it. There have been many studies to modify this model to generate variety of growth patterns by introducing anisotropy or sticking probability of the particles to stick to the aggregate. All these different approaches lead to clusters with different fractal dimensions. The fractality of aggregates plays an important role in determining their physical, chemical and biological properties. Even after vast development in modifying DLA to understand origin of the fractality of the cluster, it is still not completely understood. Here, a simple model is proposed to understant contribution of anisotropy and sticking probability to fractality and morphology of the aggreagtes.

Abstract ID: ICCTPP - 291

Physico-chemical properties of compression molded glass fiber reinforced polypropylene polymer composites

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Abstract: This article reports the material properties of short random discontinuous oriented glass fiber reinforced polypropylene composite is studied. The composite was prepared using compression molding process. The mechanical, structural, and thermal properties were observed by using universal testing machine, Fourier transform infrared, X-ray diffraction and differential scanning calorimetry. The FTIR confirms the interaction between polypropylene and glass fibers. Semicrystalline nature is confirmed by XRD. The influence of temperature on viscosity and relaxation times in a material were analyzed using WLF and VTF equations. Mechanical stability is evaluated using stress-strain plots.

Abstract ID: ICCTPP - 292

Numerical Simulations Of Growth Dynamics Of Breath Figures On Phase Change Materials: The effect of Accelerated Coalescence Due To Droplet Motion

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Abstract: We present the growth dynamics of breath figures on phase change materials using numerical simulations. We propose a numerical model which accounts for both growth due to condensation and random motion of droplets on the substrate. We call this model as growth and random motion (GRM) model. Our analysis shows that for dynamics of droplet growth without droplet motion, simulation results are in good agreement with well-established theories of growth laws and self-similarity in surface coverage. We report the emergence of a growth law in the coalescence- dominated regime for the droplets growing simultaneously by condensation and droplet motion. The overall growth of breath figures(BF) exhibits four growth regions, namely, initial $R \sim t\alpha 1$, intermediate or crossover $R \sim t\alpha 2$, coalescence-dominated regime $R \sim t\alpha 3$, and no coalescence regime in late time $R \sim t\alpha 4$, where R and t are the average droplet radius and time, respectively. The power law exponents are $\alpha 1 \approx 1/2$, $\alpha 2 \approx 1.0$, $\alpha 3 \approx 3.0$, and $\alpha 4 \approx 1/3$. Moreover, the surface coverage reaches a maximum value $\varepsilon 2 \approx 0.35$where the third growth regime $t\alpha 3$ starts. We also demonstrate that during the growth dynamics of BF, the random motion amplitude δ and its probability p(R) linked to the power exponent γ of droplet radius R have a specific limiting range within which its effect is more predominant. We have also studied growth dynamics of breath figure for droplet of different contact angle from 70 degree to 150 degree. And also confirmed three growth regime of $\alpha 1$, $\alpha 2$, $\alpha 3$.

The Al^{3}+ doped modified hexagonal ZnO sensor material: Fabrication, characterization and gas sensing study of CO and LPG gas vapors

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Abstract: The present research deals with gas sensing properties of the fabricated material Al^{3+} modified ZnO. The material was fabricated by using co-precipitation technique. Here, sodium hydroxide was used as precipitating material to precipitate zinc as zinc hydroxide to convert it finally into ZnO. The insitu doping method was adapted to doped aluminum through ZnO lattice. The material was characterized by means of several characterization techniques such as XRD, UV-DRS, FTIR, SEM, EDS and TEM techniques. The X-ray diffraction technique was utilized for structural investigation of the prepared material. From Debye Scherer equation the average particle size was calculated to be 28nm. Scanning electron microscopy was utilized for surface and topographic properties of the prepared material. Additionally, the Al^{3+} doped ZnO was also characterized by UV-DRS to estimate the band gap energy of the prepared material. The FTIR technique was used to confirm the metal-oxide stretching frequencies of Al^{3+} doped ZnO. The hexagonal crystal lattice of the materials was confirmed from TEM analysis. The thick films of the material Al^{3+} doped ZnO were fabricated by screen printing methodology by means of standard photolithographic technique. The prepared thick film sensor of Al^{3+} doped ZnO was utilized to sense some toxic gases such as toluene vapours, LPG, petrol vapors, CO_2 and CO. The material showed considerable response for CO and LPG at 500 ppm gas concentration with 85.20% and 76.23% gas response at 900C and 800C respectively. The other gas sensing characteristics of the materials was also examined for the fabricated Al^{3+} doped ZnO sensor such as response and recovery, reusability, ppm variation and gas response etc. From overall study it was observed that fabricated sensor Al^{3+} doped ZnO is reliable, very active to sense the CO and LPG gas vapors at moderately high temperature and low gas concentration. The gas sensing mechanism of CO and LPG was estimated for the fabricated sensor.

Abstract ID: ICCTPP - 294

Switchable Wavelength Selective Metamaterial Long-Wavelength Infrared Perfect Absorber: A simulation Study

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Abstract: Chalcogenide-based phase change materials hold a great promise for active photonics due to their large change in optical contrast upon phase transition. In this work, we exploit these non-volatility phase change properties and numerically demonstrate a perfect metamaterial absorber with a wavelength tunability for the far-infrared region. A two-dimensional nanostructure structure consisting of a phase change layer ($Ge_2Sb_2Te_5$), dielectric spacer (MgF_2), and a bottom metal layer (TiN) was optimized by the finite-difference time-domain simulation method. A broad absorption, > 75 % with the resonant absorption peak at 10.5 mm was observed when the phase change layer is in the amorphous (disorder) state. The absorption increases to >90% with a red shift in the wavelength of Dl=1.5 mm, when the $Ge_2Sb_2Te_5$ changes to the crystalline (order) state. The strong absorption in the crystalline state is due to the strong interaction of the light at the top $Ge_2Sb_2Te_5$ layer. This wavelength selective perfect absorption could be useful to design many active metamaterials devices for controlling the thermal radiation/ emission/absorption, thermal imaging, thermal scanning camera, and other energy sensing applications.

Abstract ID: ICCTPP - 295

A study of Real-Time Non-invasive Detection Techniques to Identify COVID-19 Infected Person

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Abstract: The whole world is fighting against the ongoing global pandemic situation caused and hampered very badly due to COVID-19. We had witnessed the adverse effect globally, in terms of health, economy, social lifestyle. So, it's an urgent need to find a rapid detection technique/test to avoid the spread of the virus. The most effective and world-wide accepted detection method of COVID-19 is the RT-PCR. But due to its slow detection time and False- negative rates, researchers and scientists are trying different detection methods such as use of GC-MS, E-nose, Electrochemical method, use of nanomaterial-based sensor arrays.

But all the above have limitations in terms of real time sensing, detection time, sample preparation, etc. In order to overcome said drawbacks and to get real-time analysis, we are proposing few models concept for COVID-19 detection based on the reported literature.

As per recent advancement researchers have found presence of VOCs in COVID-19 infected person's breath by GC-MS method. A real time system is very much necessary to detect the VOCs in the Exhaled breath of the COVID-19 infected person to minimize the burden of healthcare system.

In this article we will discuss and propose the probable detection techniques for real time sensing of the VOCs presence in the Exhaled breath of the COVID-19 infected person.

Abstract ID: ICCTPP - 296

Variation in optical properties of Poly vinyl alcohol using zinc halide for UV region applications

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Abstract: Herein we report the optical properties of different amounts zinc halide added poly(vinyl alcohol) polymer composites and characterised for spectral absorbance. The composites shown appreciable optical properties as established by a UV–visible techniques. The composites were analysed by determining different optical parameters such as band tail energy of localised states, energy bandgap, optical susceptibility. The dispersion properties of the polymer composites were studied using single oscillator model.

Abstract ID: ICCTPP - 297

Ternary Polyaniline nanocomposites: A potential candidate for shielding electromagnetic pollution

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Abstract: The electrical and telecommunications sectors have seen increasing technical breakthroughs in recent years. Electromagnetic interference (EMI) is a serious concern for a range of electrical equipment in the vicinity, as these systems efficiency permits them to function properly. Incorporating electrically conductive polymers with carbon nanomaterials has been proven in previous investigations to increase electromagnetic absorption applications by overcoming these restrictions. By integrating polyaniline and F3O4 the electromagnetic absorption was reported to be enhanced. The challenge herein is to synthesize stable conducting and magnetic polymer nanocomposite. Herein efforts have been made to synthesize a stable ternary composite by incorporating and 5% Fe3O4 where 1% graphene oxide is used as a template. By ultrasound assisted method the nanocomposites were observed to be superior in terms of stability, conductivity and magnetism and therefore it can be utilized as a potential candidate for absorbing microwave radiation.

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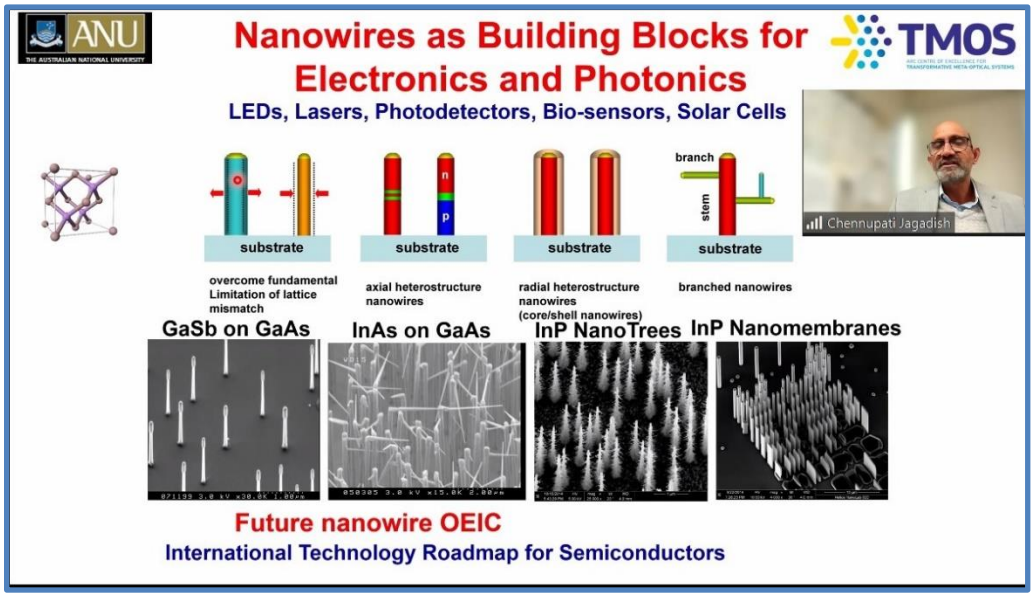

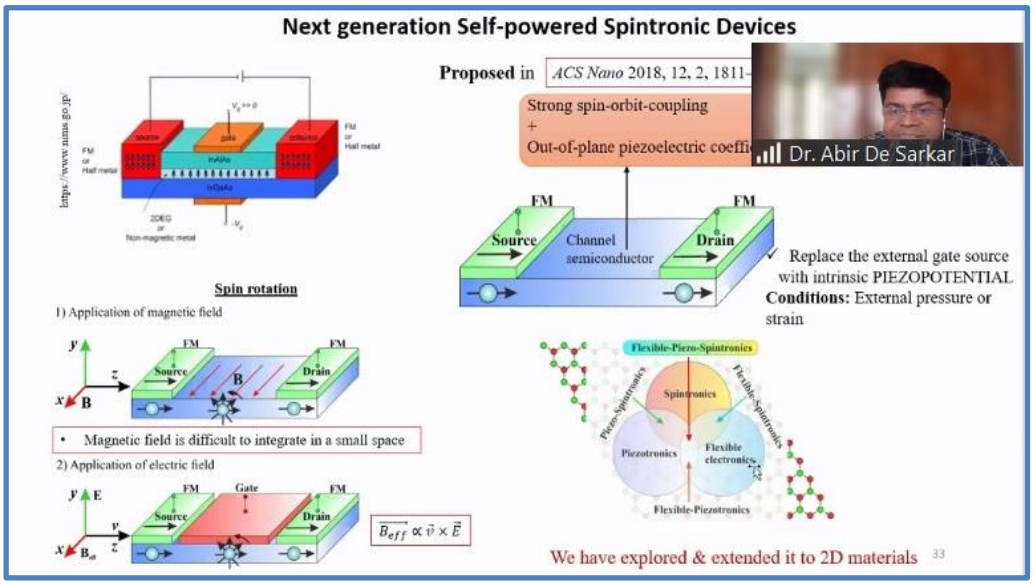

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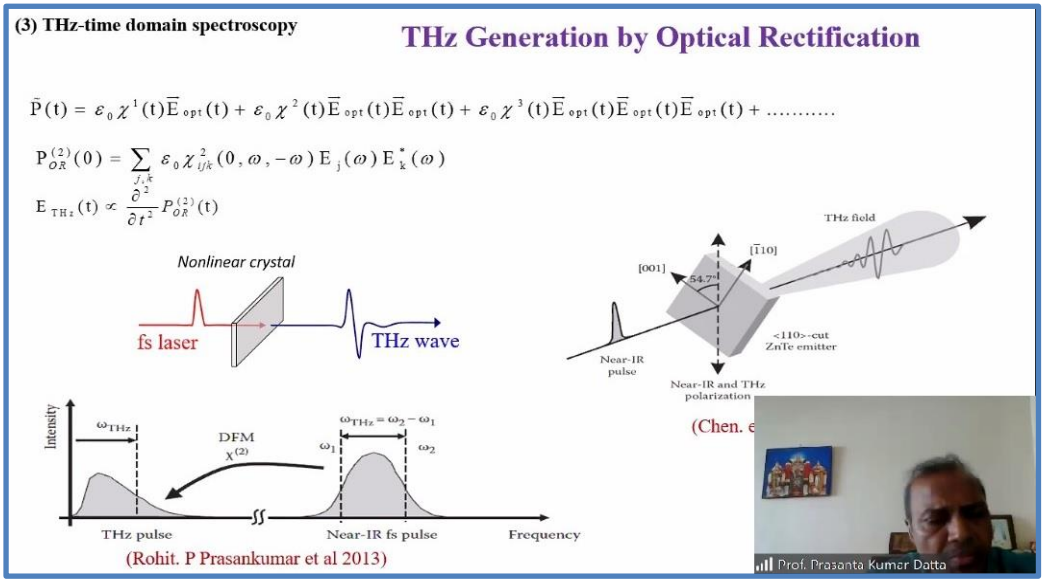

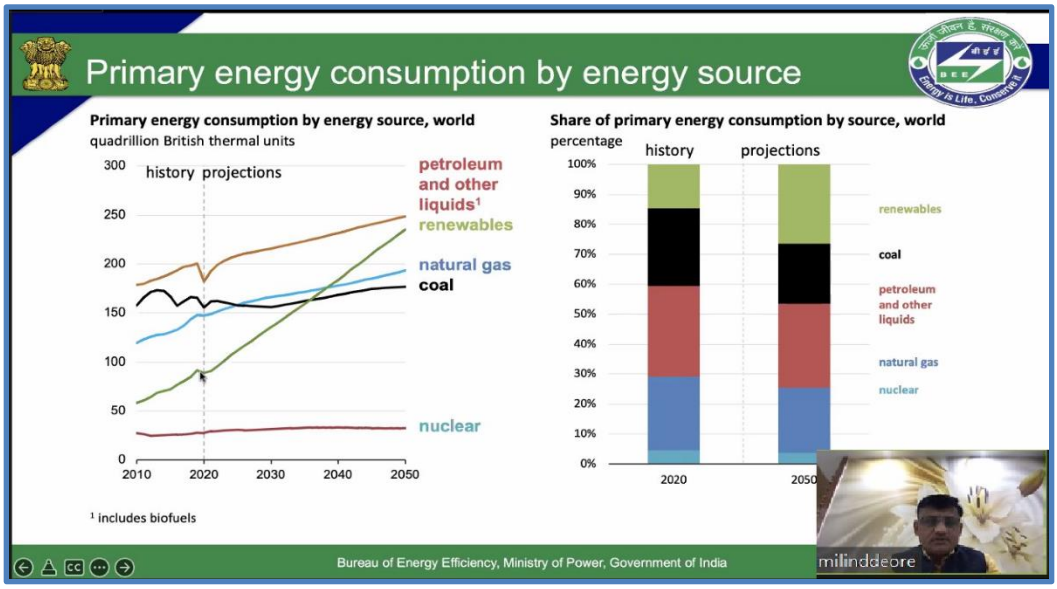

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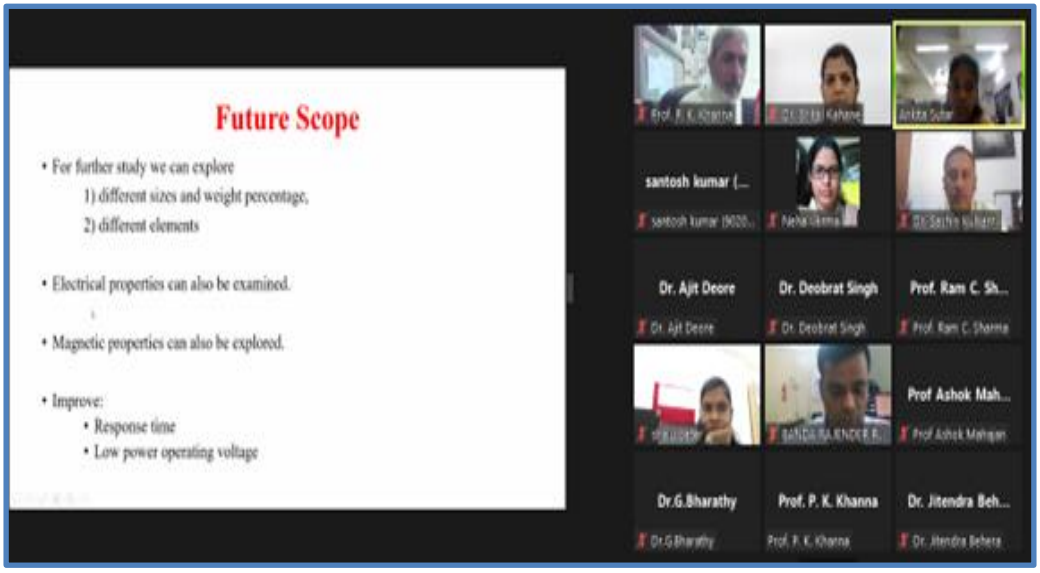

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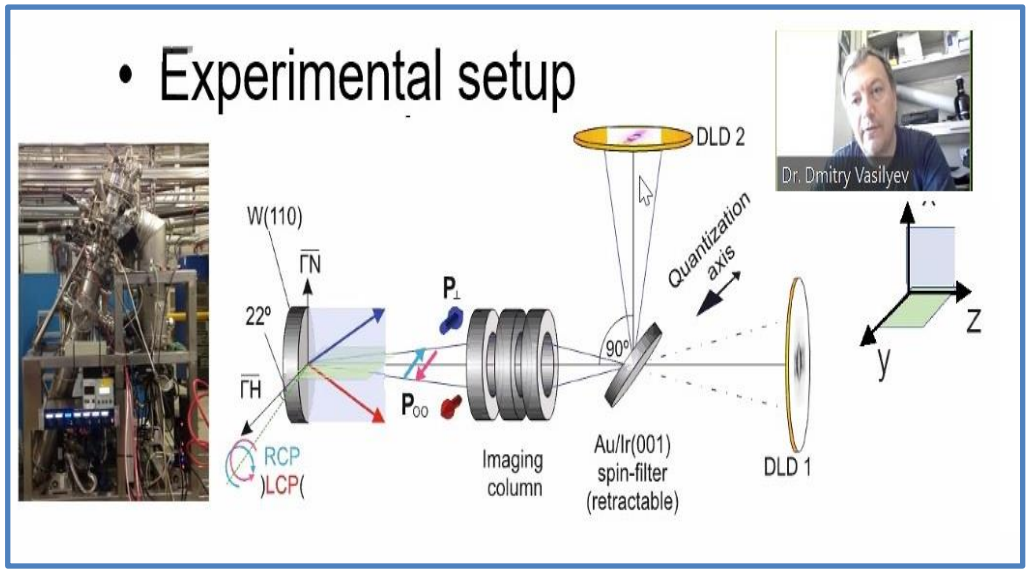

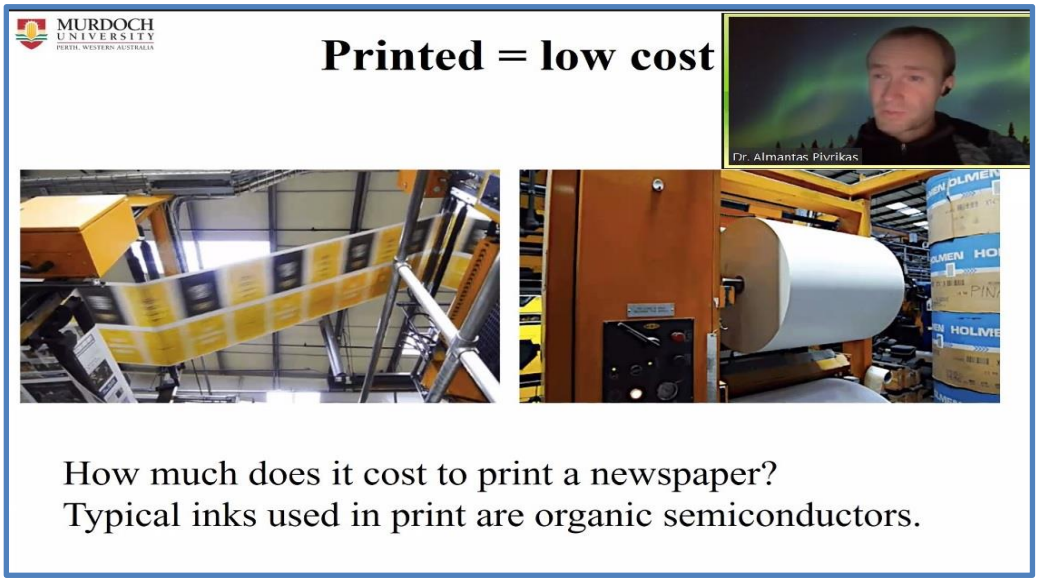

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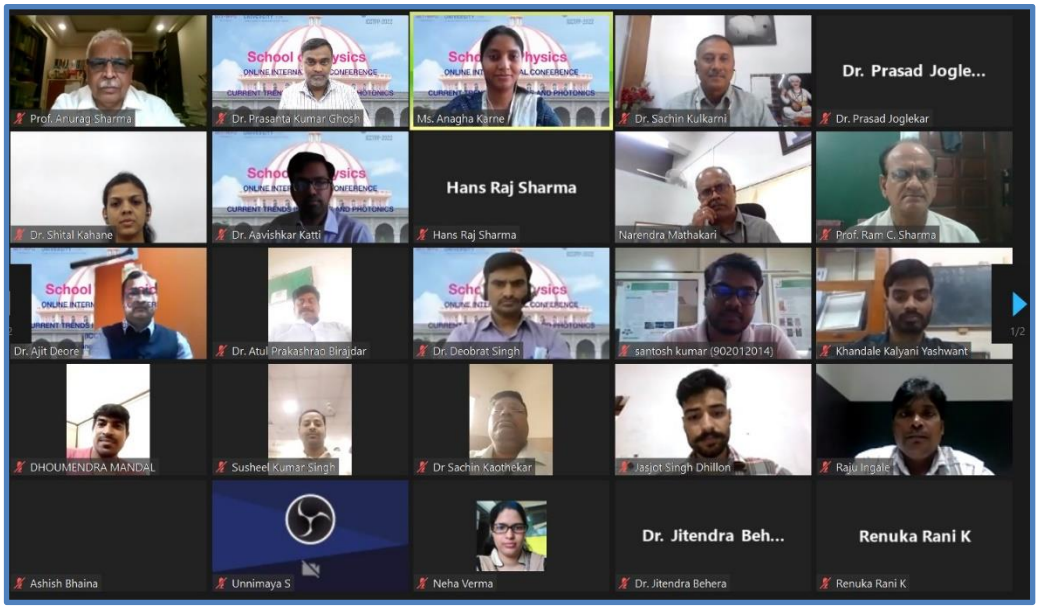

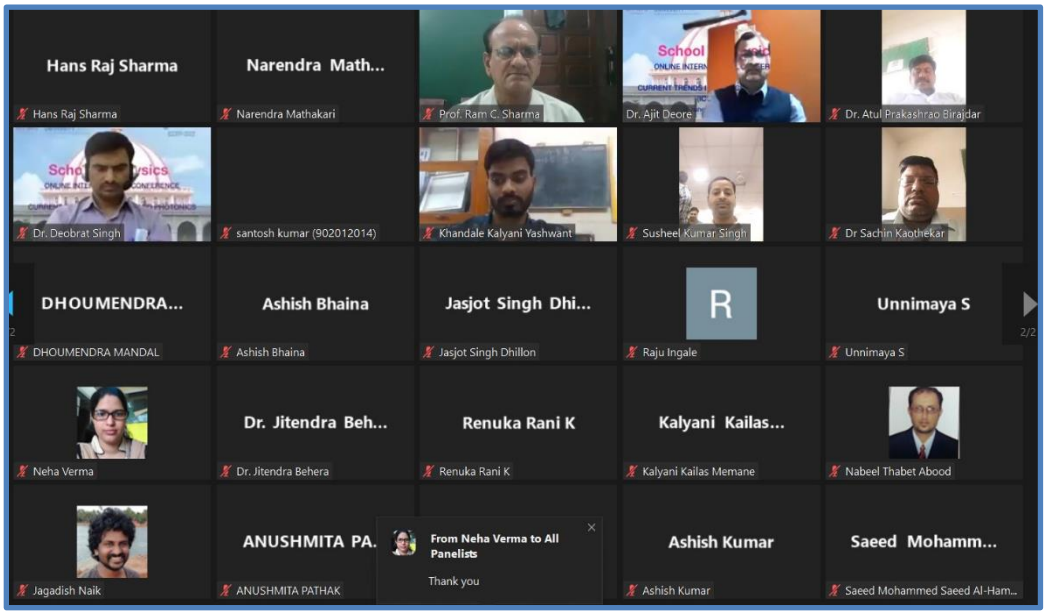

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