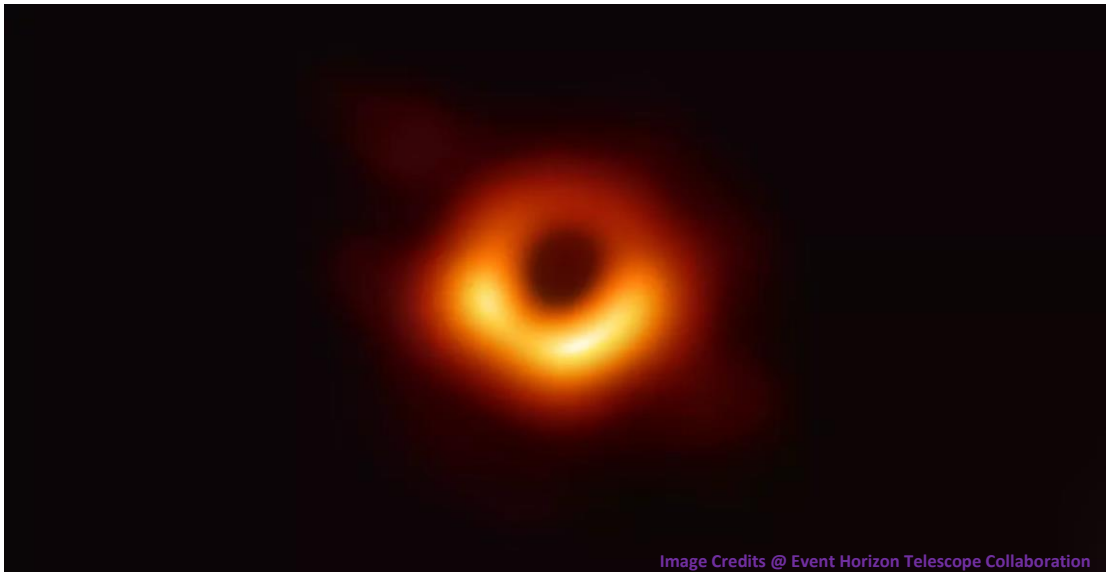
7th
IAPT National Student Symposium on Physics

3–5 October 2019



Indian Association of Physics Teachers

and

Department of Physics, Panjab University, Chandigarh

Supported by

Department of Science & Technology & Renewable Energy

Chandigarh Administration

NATIONAL STUDENT SYMPOSIUM ON PHYSICS

Twenty-first century is the knowledge century. The innovations are supreme. To foster a culture of innovation and creativity among the young students, IAPT has instituted the annual National Student Symposium on Physics to provide a national forum to young students to present their new ideas and innovative work at an early stage, which will lead to their growth as creative and original researchers.

MESSAGE

Having been associated with undergraduate research via the National Initiative on Undergraduate Science (NIUS) and even earlier, I have a deep love and a sense of commitment to it. Some forty undergraduate students have worked with me on various projects, all publishing in peer reviewed journals of international reputation. One establishes a lifelong bond with the next generation. Few joys can match this. The student's first paper is like first love. She/He will never forget it - will be telling her/his students, children and grandchildren about this. NSSP provides a platform and a chance to a student, probably for the first time, to make a contribution, howsoever small, to general pool of human knowledge. As organisers of NSSP, please feel very proud about what you are doing. As participants, feel blessed to be a part of this academic endeavour.

Vijay A. Singh
President, IAPT

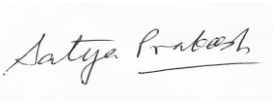
MESSAGE

The Indian Association of Physics Teachers (IAPT) established in 1984 is deeply concerned about the state of science teaching in the country. It is often said that the standard of science education is declining rapidly and some thing must be done to remedy the situation. The IAPT is committed for the quality of physics teaching, Therefore it was decided to motivate the young graduate (UG) and post graduate (PG) students to do science though interaction with learned teachers, scientists and among themselves. To achieve this goal IAPT decided to hold the "National Student Physics Symposium on Physics" (IAPT NSSP) each year.

The first IAPT NSSP was organized by IAPT in collaboration with Department of Physics, Panjab University Chandigarh on Feb. 25-27 2013 . To our surprise, the students from all over India even from remote rural colleges participated. These students worked very sincerely for three days, presented their project reports, research papers and interacted intensively with learned motivators and among themselves. The new ideas and techniques were identified. The students were encouraged to persuade their new scientific innovations. The proceedings of NSSP was published in "Student Journal of Physics"

The enthusiasm and involvement of young students in the scientific research encouraged us to hold the second IAPT NSSP which was hold here itself in Jan 2014. The response and participation of students was enormous again and the expectations from IAPT were still higher. Believing that IAPT is up to the expectations of the young students, we continued NSSP each year to motivate young physicists. This is 7th IAPT NSSP in series in collaboration with Physics Department, Panjab University, Chandigarh. I, on behalf of IAPT express my sincere thanks to Honorable Vice- Chancellor, University administration and Physics fraternity of Panjab University for their sincere efforts to the continuity NSSP for the young students.

This year again the young UG and PG students are participating from all parts of the country. The learned teachers have very kindly agreed to motivate the students. I welcome them all and express my sincere gratitude to them. I congtrulate the learned members of the organizing committee for their sincere efforts and wish them grand success in all aspects for the 7th NSSP.



Satya Prakash
Convener, NSSP- 7

ABOUT IAPT

A voluntary organization of Physics Teachers (at all levels), Scientists, professionals and other interested in physics (Science) education in the country

Indian Association of Physics Teachers (IAPT) was established in 1984 by dedicated physics teacher and visionary (Late) Dr. D.P. Khandelwal with active support from likeminded features with the aim of upgrading quality of physics teaching at all level in the country. Since then it has grown into a major organisation with about 6000 members spread over throughout the country and abroad, besides annual members, student members and sustaining members. All IAPT work in voluntary, no remuneration is paid to members for any IAPT activity.

The Association operate through its 20 Regional Councils (RCs) grouped into 5 zones. These is a central Executive Council (EC) which controls and coordinates all its activities.Regional Councils also have a similar structure.

Current Activities of IAPT

Publications

Bulletin – a monthly (32 pages) with the record of uninterrupted publication since 1984. Besides reporting IAPT activities it also carries articles on developments in physics and physics education. Free to the members, it also serves as a vehicle of expression and communication amongst them.
Journal of Physics Education – The IAPT has taken over the publication of this quarterly (previously published by UGC) publication since April 2001 (volume 18). Life members of IAPT can get it at concessional rate. It carries research articles on Physics education
Prayas – A quarterly journal carries out articles and research reports by UG/PG students. It also carries invited articles from physicists of repute, now rechristened as *Student Journal of Physics.* This journal is now available only online at https://www.iopb.res.in/~sjp/
Pragami Trang – This bilingual (Gujarati & Partly English), has been started since 2009 by Gujarat RC.
Horizons of Physics – In a book series brought out for physics teachers and students. Each volume contains about 15 review articles written by experts, taking off from the B.Sc. level and leading to the frontiers of the field.

National Standard Examinations

National Standard Examinations are held at 3 levels with the objectives: to enable the student judge him/herself against a national standard; to present correct perspective of physics; to enhance the students-teacher interaction through discussion on the Q-paper. Members or students are identified, duly honoured and awarded medals and token prizes. These examinations constitute the first step towards participation in International Olympiads in respective subjects. The responsibility of selecting and sending the Indian team to the international Olympiads rests with the Homi Bhabha Centre for Sciences Education (HBCSE) with whom IAPT works in close collaboration.

Evaluation of experimental skills

IAPT started this evaluation with NSEP and NGPE, examinations since 1992, essentially to stress the point that no evaluation of a science student is complete without inclusion of an evaluation of experimental skills.

Extra Low-Cost Book (ELCB) programme

Under this programe life members are offered quality physics books at a considerable discount, under arrangement with publishers. The aim is to help teachers build up their personal libraries.

For teachers

NCIEP (National Competition for Innovative Experiments in Physics): This programme is being held since 2003, to encourage Physics Teachers to conceive and set up original innovative experiments in Physics. The Competition is held every year at the venue of The Annual Convention. The high quality of entries shows the usefulness of the programme.

National Competition for Computational Physics (started 2011)

Essay Competition: Gujarat RC of IAPT organizes a National Essay Competition for all teachers for the last few years.

Anveshikas (Experimental Physics Centres)

The first such centre was established at SGM Inter College, Indira Nagar, Kanpur in 2001. It provides a base for generating interest in Experimental Physics in young students. upto +2 level through learning by doing. Facilities exist for conducting Teachers Orientation Programmes for encouraging them to undertake class room teaching through demonstrations. A mobile unit gives demonstrations in schools by prior appointment. Each demonstration session is of about 2-3 hour duration. This programme generates interest is students for Physics and clarifies the basic principles. A number of such centres are now coming up in the country.

NANI: It has been decided to establish a National Anvashika Network of India (NANI) of 100 Anveshikas. Already (2011) nearly 15-20 Anveshika's have come into existence others are in the offering.

Centre for Scientific Culture (CSC): The Centre established at Midnapore CoIlege, Midnapore (WB), provides an year round exclusive facility, of working experiments in Physics. It is also engaged in developing laboratory experiments exercises in physics at school level.

Orientation Programmes/Seminars/Workshops for Teachers

These are organised regularly by Regional Councils in both, theoretical and Experimental Physics. A number of such programmes have been carried out with the support from MHRD, Infosys Foundation and other such agencies.

Conventions

A 3-day National Convention is organised every year, since 1984 on some specific theme.
Papers are presented by members and lectures are delivered by experts in the field. Presentation of innovations in teaching methods, demonstrations and lab experiments is a regular feature in all conventions.

Regional Councils also organise regional conventions at their convenience. Teachers' talent in various aspects of Physics education is identified and rewarded by organizing contests during conventions.

ABOUT DEPARTMENT OF PHYSICS, PU

The Department of Physics was established in 1947, in Govt. College, Hoshiarpur (Punjab). In August 1958, the department was shifted to the present campus. At that time, the department was headed by Prof. B.M. Anand who had worked with Nobel laureate C.F. Powell. The faculty numbered about a dozen and Prof. Anand soon established a high-energy particle physics group (nuclear emulsion) and optical UV spectroscopy group. The experimental nuclear physics group and mass spectrometry section came into existence soon after.

With Prof. H.S. Hans joining the department in the late sixties, the research activities got a major fillip—cyclotron was installed. Three major research groups in nuclear physics, particle physics and solid-sate physics including both theory and experiments were strengthened and mass spectroscopy laboratory was modernised. Since then the department never looked back. It has UGC Special Assistance Programme (SAP) from 1980 to 1988 and College Science Improvement Programme from 1984 to 1991. With the success of the above programs and of research activities in particle physics, nuclear physics and solid-state physics through national and international collaborations, the department became a major research centre amongst Indian universities.

In 1988, the department was accorded the status of Centre of Advanced Study (CAS) by UGC with three major thrust areas, particle physics, nuclear physics and solid-state physics, which is a unique feature in itself. The department is now in CAS forth phase. At present the department has a strength of 29 faculty members, 47 non-teaching/administrative staff, around 120 research students, 15 M.Phil. students, 10 Post-M.Sc. Course in Accelerator Physics students and about 350 graduate and undergraduate students. Our students clear various entrance examinations, like GRE, BARC, TIFR, DRDO, UGC/CSIR test for research and career in teaching, besides entering professional courses, like M.Tech., MCA, etc. About 30 research projects worth eight crore rupees under national/international collaborations are operating in the department.

Besides imparting quality education to the department students, the faculty also teach specialisation subjects, like nano-technology, nuclear medicine and medical physics to name a few.

The department participates in various national and international research initiatives and also hosts various conferences, seminars, meetings etc. of research interest regularly. The department has an 11-inch telescope to encourage/inculcate the scientific temper among public and with particular emphasis on college and school students.

The department houses Indian Association of Physics Teachers (IAPT) office and actively leads in IAPT and Indian Physics Association (IPA) activities.

RUCHI RAM SAHNI – A MULTIFACETED PERSONALITY

Ruchi Ram Sahni (1863-1948) was born barely 14 years after the British annexation of Punjab and lived to see India become independent. His life thus spans a very important period of history. He was the first person from Punjab to make a career in science. He was the first Indian officer in the India Meteorological Department (1885). Moving by choice to teaching, he became the first Indian science professor at Government College Lahore which he served from 1887 till his retirement in 1918. The University instituted Ruchi Ram Sahni Declamation Contest Prize in his honour. He is also India's first nuclear scientist who published two research papers in 1915 and 1917 working in the laboratory of Ernst Rutherford in Manchester where he interacted with Niels Bohr. (Interestingly, in his laboratory work, he was assisted by his son Birbal Sahni, the well-known paleobotanist, who was at the time studying in Cambridge.) He remained a member of Punjab University Senate and of Syndicate for a number of years, till 1921. In 1923, he entered Punjab Legislative Council as a member of the Swaraj Party. Ruchi Ram was a conscientious and inspiring teacher who spent six months learning carpentry for the sake of laboratory work. His instructor in the craft who also doubled as his teacher in art and aesthetics was Bhai Ram Singh, later the celebrated architect of Khalsa College, Amritsar. Having been a student who came up in life through scholarships and help from well-meaning people, he took his mentoring role very seriously. One of his students whom he mentored in various ways was Shanti Swarup Bhatnagar, who was appointed Director of Scientific and Industrial Research in 1940, and who set up a string of national laboratories in independent India. Ruchi Ram, his geologist son Mulk Raj Sahni, Birbal Sahni and Bhatnagar were invited by C. V. Raman to be foundation fellows of Indian Academy of Sciences established in 1934. Coincidentally, the Sahnis' ancestral home town Bhera, now in Sargodha district, Punjab, Pakistan, is also Bhatnagar's birthplace.

Ruchi Ram was in addition a social and religious reformer, science popularizer, text book writer, and author and after retirement an active follower of Mahatma Gandhi. Product of a liberal composite culture, he learnt Urdu and Gurmukhi besides physics and chemistry and came to appreciate the intrinsic beauty of the Persian language. As Kapurthala Alexandra Scholar at Oriental College, Lahore he delivered lectures on science in Urdu to its students, and even translated a book on conservation of energy from English into Urdu. It is a separate matter that the translation could not be published because of lack of funds.

He was an enthusiastic advocate of Punjabi (and regional languages in general) 'as a vehicle of scientific ideas'. He gave public lectures in Punjabi in Lahore, other towns and even remote villages. All his lectures were 'illustrated with easy experiments, often with simple apparatus which any one could make for himself'. His own estimate was that he gave about 500 popular lectures in all under the auspices of the rather short-lived Punjab Science Institute which he co-founded in 1885. In conjunction with the Institute he set up a workshop as business venture for repairing old instruments and making new ones. A great votary of employment-oriented technical education, he played an important role in the movement that maintained that 'if Hindu and Sikh youth were provided with suitable means of instruction in technical subjects, many fresh openings could be made for them and the present pressure on agriculture and the services largely diminished'. As a result, Victoria Diamond Jubilee Hindu Technical Institute was set up in Lahore in 1897 and Ruchi Ram given the honour of delivering the inaugural address. The Institute was headed by the famous poet-scientist Puran Singh during 1904 -1906. Having experienced both opulence and poverty in his childhood, Ruchi Ram was very keen to promote science as a producer of wealth. In 1934, as the President of Northern India Chemical Manufacturers' Association, he strongly objected to 'the economic resources of the province' being 'mortgaged beforehand to a foreign concern [Imperial Chemical Industries]', and wanted 'the interests of indigenous chemical industries' to be protected. A life-long adherent of the Brahmo Samaj principles, he held all religions in high esteem. In or after 1945 he wrote Struggle for Reform in Sikh Shrines, which was later edited by Dr Ganda Singh and published by the Shiromani Gurdwara Prabhandak Committee (SGPC). With his characteristic thoroughness, he

preserved all the press communiqués on the subject which SGPC had issued from time to time and subsequently presented a complete set to SGPC whose own collection had gaps. Ruchi Ram Sahni belonged to the first generation of University students in Punjab who were 'practically without any guidance from our elders'. Very conscientiously he set out to remedy this deficiency for the coming generations of students. On a personal level, he sought knowledge and strove to live in accordance with it. As member of the society, he strove even harder to apply his intellect, learning, analytical skills and organizational abilities for the benefit of his countrymen. It is in this context that he continues to be relevant today. Ruchi Ram Sahni (1863-1948) was born barely 14 years after the British annexation of Punjab and lived to see India become independent. His life thus spans a very important period of history. He was the first person from Punjab to make a career in science. He was the first Indian officer in the India Meteorological Department (1885). Moving by choice to teaching, he became the first Indian science professor at Government College Lahore which he served from 1887 till his retirement in 1918. The University instituted Ruchi Ram Sahni Declamation Contest Prize in his honour. He is also India's first nuclear scientist who published two research papers in 1915 and 1917 working in the laboratory of Ernst Rutherford in Manchester where he interacted with Niels Bohr. (Interestingly, in his laboratory work, he was assisted by his son Birbal Sahni, the well-known paleobotanist, who was at the time studying in Cambridge.) He remained a member of Punjab University Senate and of Syndicate for a number of years, till 1921. In 1923, he entered Punjab Legislative Council as a member of the Swaraj Party.

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ACKNOWLEDGEMENTS

We sincerely acknowledge financial support for the 7th IAPT National Student Symposium on Physics from the following agencies/individuals:

- Indian Association of Physics Teachers
- Department of Physics, Panjab University, Chandigarh
- Department of Science & Technology & Renewable Energy, Chandigarh Administration
- Pyramid Electronics, Parwanoo

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- B.C. Chaudhary
- M.S. Marwaha
- A.K. Taneja
- P.N. Pandit
- Rama Arora
- Vivek Kumar
- Sheojee Singh

INVITED SPEAKERS

Name	Affiliation	Title of Talk
Prof. A.K. Grover	PEC Chandigarh	Higher Education and Research in Science, Technology and Agriculture in India: Their beginnings and evolution
Prof. Arvind	IISER, Mohali	Newton's laws and Pseudo Forces: Universality of laws of Physics
Prof. Baljinder Singh	Nuclear Medicine, PGIMER, Chandigarh	
Mr. M.S. Marwaha		Experimental Demonstrations
Prof. Prasanta K. Panigrahi	IISER, Kolkata	Quantum Technology : Dawn of a Quantum Era
Prof. Sandeep Sahijpal	Panjab University, Chandigarh	Space Sciences and Technology: Where do we stand?
Dr. Vikram Sagar	Panjab University, Chandigarhq	Overview – Plasma Physics and its Application

ABSTRACTS OF INVITED TALKS

Prof. A.K. Grover
Emeritus Professor and DAE Raja Ramanna Fellow,
Punjab Engineering College (Deemed to be University), Chandigarh

Title of Talk: Higher Education and Research in Science, Technology and Agriculture in India: Their beginnings and evolution

Abstract: I shall present a comprehension connecting the following dots : (i) British East India Company (EIC) extracts rights to collect taxes in Bengal and Bihar and British Parliament steps in to oversee governance by EIC of territories under its control (Regulating act of 1773) ; (ii) Renewal of Charter of EIC by the parliament in London every twenty years progressively enhances demands on EIC to spend on the education of natives in India. Madarasa Aliya and Sanskrit College commence in Calcutta and Benares, respectively (both regular universities today); (iii) Renewal of Charter in 1813 calls for setting aside Rupees. one lakh to encourage native languages/literature as well as to promote science and technical education in English. Ram Mohan Roy et al. set up Hindu College in 1817 (Presidency College University Kolkata today); (iv) English Education Act (1835) brought in after renewal in 1833. English declared as the language in the Courts; (v) Sir Charles Wood's despatch of 1854 arrives after the renewal in 1853, it results in regulation of education from School to University (much like the New Education Policy of 2019 being debated currently in India). Three affiliating Universities set up at Calcutta, Madras and Bombay in 1857; (vi) Indian Universities Act (1904) brought in to govern the then five universities in India (the first three plus the next two at Lahore and Allahabad). Universities asked to appoint teachers who would engage in research in addition to teaching, and create University Departments; (vii) Establishment of School of Physical Sciences by legendary Vice Chancellor of Calcutta University Mathematician Justice Sir Asutosh Mukherjee around the legendary C V Raman (who left civil service job in 1917 to accept Palit Professorship in Physics), and initiation of Honours School System at Panjab University, Lahore (1919); (viii) Agriculture Research College started (1905) near Samastipur in Bihar via a donation from Mr.Henry Phipps of USA (Pusa) and Lyallpur Agriculture College started in a new canal city in Punjab, named after Mr. James B Lyall, the Financial commissioner and the first VC of PU; (ix) Dr. S S Bhatnagar as the first Director of CSIR (1942), first Indian Secretary, HE in independent India , first Chair UGC (1953) and Secretary, AEC; (x) Dr. Homi Bhabha as founder of TIFR (1945) and India's Atomic Energy Programme (1947); (xi) creation of AICTE (1945) and conception of plan for IITs after WWII (1946); (xii) role of Megh Nad Saha and P C Mahalanobis in long term plans for development of India; (xiii) contributions of B P Pal as DG, ICAR and green revolution in India.

*Vice Chancellor, PU (2012-2018)

Prof. Arvind
IISER, Mohali
Title of Talk: Newton's laws and Pseudo Forces: Universality of laws of Physics

Prof. Baljinder Singh
PGIMER, Chandigarh
Title of Talk: TBA

Mr. M.S. Marwaha
Title of Talk: Experimental Demonstrations

Prof. Prasanta K. Panigrahi
Indian Institute of Science Education and Research, Kolkata
Title of Talk: Quantum Technology: Dawn of a Quantum Era
Abstract: We describe the emergence of quantum computation and the basic physical principles underlying them. In recent times quantum computers are available for individuals anywhere in the world to carry out their research works. We briefly narrate the historic path for the emergence of quantum technology, both as a field of research and practical use. Only knowledge of matrices are required to understand and use quantum computers.

Prof. Sandeep Sahijpal
Panjab University, Chandigarh
Title of Talk: Space Sciences and Technology: Where do we stand?

Dr. Vikram Sagar
Panjab University, Chandigarh
Title of Talk: Overview- Plasma Physics and its Application
Abstract: Plasma is often described as fourth state of matter along with solid, liquid and gases. In the cosmos, it forms 99% of the visible universe—including stars, the interstellar medium and jets of material from various astrophysical objects. Plasma can be defined as a quasi-neutral gas consisting of positively and negatively charged particles (usually ions and electrons) which exhibit collective behavior. This collective behavior of the plasma particles emerges from their dynamics under the applied and self generated electro-magnetic fields. Thus, the presence of unbound charged particles constituting plasma results in a behavior distinct from the neutral gases. Therefore, from the point of view of pure science, the subject of plasma physics offers an abundance of riches as it is at the intersection of electrodynamics, continuum physics, kinetic theory and nonlinear physics. It has diverse applications in areas of both science and technology. Some of the prominent applications of plasma physics includes: chip etching, TV screens, torches, propulsion, fusion (through magnetic or inertial confinement), astrophysics and space physics, and laser physics.

LIST OF PARTICIPANTS

S.No.	Applicant's Name	Gender	Applicant's Institution
1	Shivam Yadav	M	Acharya Narendra Dev College,University of Delhi
2	Sahil Parvez	M	Aligarh Muslim University
3	MD FUL HOSSAIN SK	M	Aligarh Muslim University
4	Chaithanya	F	Alva's Degree College,Moodbidri
5	Nisha PK	F	Alva's Degree College,Moodbidri
6	Chandra Prakash	M	Central University of Haryana
7	Shivam Kumar Singh	M	Central University of Haryana
8	Mohit Kumar	M	Department of Physics, Akal University, Talwandi Sabo
9	Shweta Soni	F	Ewing Christian College, Allahabad
10	Om Sarveshwarpati Tripathi	M	Ewing Christian College, Allahabad
11	Tulika Singh	F	Ewing Christian College, Allahabad
12	Gayathri R.	F	Govt. Arts College, Udumalped
13	Jeevanandham K.	M	Govt. Arts College, Udumalped
14	Indhrapriyadarshini A.	F	Govt. Arts College, Udumalped
15	Lavanya V.	F	Govt. Arts College, Udumalped
16	Nimarpreet Kaur	F	Guru Nanak College for girls, Sri Muktsar Sahib
17	Simranpreet Kaur	F	Guru Nanak Dev University,Amritsar
18	Danish Furekh Dar	M	Guru Nanak Dev University,Amritsar
19	Rishabh Nakra	M	Guru Nanak Dev University,Amritsar
20	Saloni	F	Guru Nanak Dev University,Amritsar
21	Ayushi Sengar	F	IEHE,Bhopal
22	Shikha Patel	F	IEHE,Bhopal
23	Mini Rajput	F	IEHE,Bhopal
24	Sachchitanand Dwivedi	M	IEHE,Bhopal
25	Sidharth Gupta	M	IISER-Kolkata
26	Sunita Tarei	F	IIT Mandi
27	Kamaldeep Dalal	M	IIT Roorkee
28	Jagdish Sharma	M	IIT Roorkee
29	Sahil Shah	M	IIT Roorkee
30	Mudit Bhasin	M	Invertis University, Barielly
31	Sandeep Kumar	M	Invertis University, Barielly
32	Abhishek Singh Tomar	M	Invertis University, Barielly
33	Nitish Chandra Shukla	M	Invertis University, Barielly
34	Premsundar T.	M	Kanchi Maminivar Centre for Post Graduate Studies
35	Nisha Dhull	F	Kurukshetra University
36	Savneet Kaur	F	Lovely Professional University
37	Chinmay Shahi	M	Matsya University, Alwar
38	Ashutosh Kumar	M	MJPRU, Vardhaman
39	Ritik Kumar Bansal	M	MJPRU, Vardhaman
40	Shiva Rajput	M	MJPRU, Vardhaman
41	Harishchand Nishad	M	National Centre for Nanoscience and Nanotechnology, University of Mumbai
42	Sunil Yadav	M	National Centre for Nanoscience and Nanotechnology, University of Mumbai
43	Akshay Upendra Parab	M	National Centre for Nanoscience and Nanotechnology, University of Mumbai

S.No.	Applicant's Name	Gender	Applicant's Institution
44	Pravin Prakash Hirave	M	National Centre for Nanoscience and Nanotechnology, University of Mumbai
45	Priyanka Roy Chowdhury	F	NIT Durgapur
46	Sameer Menaria	M	Parishkar International College
47	Ravi Raturi	M	Pt. L.M.S. Govt. P.G. College, Rishikesh
48	Sapna Prajapati	F	Pt. L.M.S. Govt. P.G. College, Rishikesh
49	Niyanta Garkoti	F	Pt. L.M.S. Govt. P.G. College, Rishikesh
50	Charanjeet Kaur	F	Punjab Agricultural University, Ludhiana
51	Minnie Murria	F	Punjab Agricultural University, Ludhiana
52	Ramanpreet Kaur	F	Punjab Agricultural University, Ludhiana
53	Amanpreet Kaur	F	Punjab Agricultural University, Ludhiana
54	Inderpreet Kaur	F	Punjab Agricultural University, Ludhiana
55	Parhanpreet Kaur	F	Punjab Agricultural University, Ludhiana
56	Srishti Sharma	F	R. K. Talreja College, Ulhasnagar
57	Pranjal Rawat	M	S.G.R.R. PG College, Dehradun
58	Vasani ChiragKumar RameshKumar	M	Shree Swaminarayan Naimisharanya College of Science, Bhavnagar
59	Pandya Prartha Bipinbhai	F	Shree Swaminarayan Naimisharanya College of Science, Bhavnagar
60	Raninga Twinkle Pankajkumar	F	Shree Swaminarayan Naimisharanya College of Science, Bhavnagar
61	Anshul	F	SLIET, Longowal
62	Dharshan S	M	Sri Ramakrishns Missionn Vidyalaya College of Arts and Sciences (Autonomous), Coimbatore-20, Tamil Nadu
63	Kirubakaran R	M	Sri Ramakrishns Missionn Vidyalaya College of Arts and Sciences (Autonomous), Coimbatore-20, Tamil Nadu
64	Harnoor Aulakh	F	St. Bede's College, Shimla
65	Saloni Kanwar	F	St. Bede's College, Shimla
66	Aditi Sharma	F	St. Bede's College, Shimla
67	Puneet Garg	M	St. Stephen's College
68	Ponda Hiral Jayeshbhai	F	St. Xavier's College, Ahemedabad
69	Dahima Yash Dhirsinh	M	St. Xavier's College, Ahemedabad
70	Mansi P. Sonaiya	F	St. Xavier's College, Ahemedabad
71	Pratyay A. Chattopadhyay	M	St. Xavier's College, Ahemedabad
72	Amit Saha	M	St. Xavier's College,Ranchi
73	Swati	F	St. Xavier's College,Ranchi
74	Praveen Kumar Yadav	M	Thapar Institute of Engineering and Technology
75	Mansi Sharma	F	Department of Physics, Panjab University, Chandigarh
76	Priyal	F	Department of Physics, Panjab University, Chandigarh
77	Ishika Goel	F	Department of Physics, Panjab University, Chandigarh
78	Ishi	F	Department of Physics, Panjab University, Chandigarh
79	Priyanka Verma	F	Department of Physics, Panjab University, Chandigarh
80	Sejal	F	Department of Physics, Panjab University, Chandigarh
81	Sherbaj Thind	M	Department of Physics, Panjab University, Chandigarh
82	Rupinder Singh	M	Department of Physics, Panjab University, Chandigarh
83	Rupinder Kaur	F	Department of Physics, Panjab University, Chandigarh
84	Shubham Singla	M	Department of Physics, Panjab University, Chandigarh
85	Ashish Rai	M	Department of Physics, Panjab University, Chandigarh
86	Bhavneet Kaur	F	Department of Physics, Panjab University, Chandigarh

S.No.	Applicant's Name	Gender	Applicant's Institution
87	Agamleen Singh	M	Department of Physics, Panjab University, Chandigarh
88	Navjot Singh	M	Department of Physics, Panjab University, Chandigarh
89	Amandeep Kaur	F	Department of Physics, Panjab University, Chandigarh
90	Payal	F	Department of Physics, Panjab University, Chandigarh
91	Madhu Sudan	M	Department of Physics, Panjab University, Chandigarh
92	Sayoree Purakayastha	F	Department of Physics, Panjab University, Chandigarh
93	Kanika Sharma	F	Department of Physics, Panjab University, Chandigarh
94	Srishty	F	Department of Physics, Panjab University, Chandigarh
95	Radhika Jindal	F	Department of Physics, Panjab University, Chandigarh
96	Jatin Singh	M	Department of Physics, Panjab University, Chandigarh
97	Jasmeen Kaur	F	Department of Physics, Panjab University, Chandigarh
98	Molly Sharma	F	Department of Physics, Panjab University, Chandigarh
99	Rupinder Kaur	F	Department of Physics, Panjab University, Chandigarh
100	Bhawana Devi	F	Department of Physics, Panjab University, Chandigarh
101	Hansika	F	Department of Physics, Panjab University, Chandigarh
102	Payal	F	Department of Physics, Panjab University, Chandigarh
103	Simran	F	Department of Physics, Panjab University, Chandigarh
104	Falak Manhas	F	Department of Physics, Panjab University, Chandigarh
105	Vega Mahajan	F	Department of Physics, Panjab University, Chandigarh
106	Khushman Kaur	F	Department of Physics, Panjab University, Chandigarh
107	Limcy	F	Department of Physics, Panjab University, Chandigarh
108	Ritika Charak	F	Department of Physics, Panjab University, Chandigarh
109	Shivam Kataria	M	Department of Physics, Panjab University, Chandigarh
110	Sabhyata	F	Department of Physics, Panjab University, Chandigarh
111	Himanshu Bansal	M	Department of Physics, Panjab University, Chandigarh
112	Harsimran Singh s/o Sukhwinder Singh	M	Department of Physics, Panjab University, Chandigarh
113	Harsimran Singh s/o Jaspal Singh	M	Department of Physics, Panjab University, Chandigarh
114	Shubham Bangalia	M	Department of Physics, Panjab University, Chandigarh
115	Diya Bansal	F	Department of Physics, Panjab University, Chandigarh
116	Surbhi Sharma	F	Department of Physics, Panjab University, Chandigarh
117	Disha Yadav	F	Department of Physics, Panjab University, Chandigarh
118	Kritika Lakhotia	F	Department of Physics, Panjab University, Chandigarh
119	Siarti	F	Department of Physics, Panjab University, Chandigarh
120	Twinkle	F	Department of Physics, Panjab University, Chandigarh
121	Ridhima Goyal	F	Department of Physics, Panjab University, Chandigarh
122	Divya Jyoti	F	Eotvos Lorand Univrsity, Budapest (Hungary)
123	Sheenam	F	Department of Physics, Panjab University, Chandigarh
124	Neha	F	Department of Physics, Panjab University, Chandigarh
125	Bhavya*	F	Department of Physics, Panjab University, Chandigarh
126	Ashish Kumar Rajayan*	M	UIET, Panjab University, Chandigarh
127	Samadhan Dashrath Kamble*	M	DES Fergusson College, Pune
128	Sivarangan P*	M	Kongunadu Arts and Science College, Coimbatore -29

* registration process is incomplete

LIST OF ORAL PRESENTATIONS

ID	Applicant's Name	Applicant's Institution	Title of Presentation
O01	Sahil Parvez	Aligarh Muslim University	Designing a Fast Charging Battery to improve its charging speed
O02	Amit Saha	St. Xavier's College,Ranchi	GRAVITATIONAL WAVES AND LIGO DETECTORS
O03	Harishchand Nishad	National Centre for Nanoscience and Nanotechnology, University of Mumbai	HIGH PERFORMANCE SUPER CAPACITOR BASED ON wo3 NANO PLATES
O04	Pratyay A. Chattopadhyay	St. Xavier's College, Ahemedabad	EFFECT OF SIZE AND SHAPE ON THE MELTING POINT AND VOLUME THERMAL EXPANSION IN NANO-GERMANIUM
O05	Ravi Raturi	Pt. L.M.S. Govt. P.G. College, Rishikesh	TO STUDY RADIOACTIVE DECAY BY SIMULATING PLOYHEDRAL DICE IN PYTHON PROGRAMMING LANGUAGE
O06	MD FUL HOSSAIN SK	Aligarh Muslim University	THEORETICAL DETERMINATION OF THE TRIANGULAR NEUTRINO OSCILLATIONS PARAMETERS: A NEW APPROACH
O07	Niyanta Garkoti	Pt. L.M.S. Govt. P.G. College, Rishikesh	CORRELATION OF STRUCTURAL PROPERTIES WITH THERMODYNAMIC PROPERTIES FOR MULTI-ELEMENT AB5-TYPE HYDROGEN STORAGE ALLOY
O08	Sunil Yadav	National Centre for Nanoscience and Nanotechnology, University of Mumbai	GOLD NANOPARTICLE (AUNPS) CONJUGATE FOR TARGETED DRUG DELIVERY
O09	Sameer Menaria	Parishkar International College	EXPERIMENTAL WORKING MODEL TO DEMONSTRATE RELATION BETWEEN HEIGHT OF INCLINED PLANE AND RADIUS OF CURVED END
O10	Harnoor Aulakh	St. Bede's College, Shimla	INCORPORATING PHYSICS IN AGRITECH
O11	Saloni Kanwar	St. Bede's College, Shimla	MODIFIED CLIMBING DEVICE
O12	Aditi Sharma	St. Bede's College, Shimla	CLEAN FUEL ENERGY IN THE SHIPS
O13	Akshay Upendra Parab	National Centre for Nanoscience and Nanotechnology, University of Mumbai	CHEMICAL GROWTH OF DIVERSE MORPHOLOGIES OF ZNO NANOSTRUCTURES AND THEIR CNT BASED COMPOSITES FOR THE PHOTODEGRADATION OF METHYL ORANGE DYE MOLECULE
O14	Ponda Hiral Jayeshbhai	St. Xavier's College, Ahemedabad	COMPARATIVE ANALYSIS OF PARTICULATE MATTER

ID	Applicant's Name	Applicant's Institution	Title of Presentation
O15	Srishti Sharma	R. K. Talreja College, Ulhasnagar	INTRODUCTION TO COSMIC ORIGIN AND INFLATION THEORY
O16	Praveen Kumar Yadav	Thapar Institute of Engineering and Technology	HEAVY ION COLLISIONS AT LOW ENERGIES
O17	Dahima Yash Dhirsinh	St. Xavier's College, Ahemedabad	CHARACTERIZATION OF AEROSOL RADIATIVE FORCING OVER URBAN ENVIRONMENT OF WESTERN INDIA
O18	Puneet Garg	St. Stephen's College	STUDY OF ELLIPTICALLY POLARISED LIGHT BY TOTAL INTERNAL REFLECTION
O19	Divya Jyoti	Eotvos Lorand Univrsity, Budapest (Hungary)	BOSE-EINSTEIN CORRELATION FUNCTIONS FOR KAONS

* registration process is incomplete

LIST OF POSTER PRESENTATIONS

ID	Applicant's Name	Applicant's Institution	Title of Presentation
P01	Abhishek Singh Tomar	Invertis University, Barielly	“LIGHT” - THE MYSTERY
P02	Mansi P. Sonaiya	St. Xavier's College, Ahemedabad	A STUDY ON THE EFFECT OF SERIES RESISTANCE AND ABSORBER LAYER THICKNESS ON THE SOLAR CELL STRUCTURE BY USING SCAPS SIMULATION
P03	Danish Furekh Dar	Guru Nanak Dev University,Amritsar	AN INTRODUCTION TO EPR-PARADOX AND BELL'S INEQUALITY
P04	Simranpreet Kaur	Guru Nanak Dev University,Amritsar	BLACK BODY FRICTION FORCES: MEANING AND THEIR IMPLICATIONS
P05	Sunita Tarei	IIT Mandi	CALIBRATION OF METAL FOIL BOLOMETER
P06	Inderpreet Kaur	Punjab Agricultural University, Ludhiana	CARBON BASED NANOMATERIALS: SYNTHESIS, CHARACTERISATION AND APPLICATION IN WATER PURIFICATION
P07	Premsundar T.	Kanchi Maminivar Centre for Post Graduate Studies	COUPLED NONLINEAR ORDINARY DIFFERENTIAL EQUATIONS WITH TOPOLOGICAL MANEUVERING
P08	Savneet Kaur	Lovely Professional University	DEPOSITION OF COPPER DOPED TIN OXIDE THIN FILMS FOR GAS SENSING APPLICATIONS
P09	Charanjeet Kaur	Punjab Agricultural University, Ludhiana	DETERMINATION OF WATER CONTENT OF SAL WOOD USING GAMMA RADIATION
P10	Parhanpreet Kaur	Punjab Agricultural University, Ludhiana	EFFECT OF TEMPERATURE ON ULTRASONIC VELOCITY IN ADULTERATED MUSTARD OIL
P11	Sapna Prajapati	Pt. L.M.S. Govt. P.G. College, Rishikesh	EFFECTS OF STRUCTURAL PROPERTIES ON HYDROGEN STORAGE CAPACITY OF MULTI-ELEMENT AB5-TYPE HYDROGEN STORAGE ALLOY
P12	Priyanka Roy Chowdhury	NIT Durgapur	ESTIMATION OF GRAVITATIONAL WAVE PARAMETERS WITHOUT USING TENSOR ALGEBRA
P13	Sidharth Gupta	IISER-Kolkata	FERMAT’S PRINCIPLE: THE LINK BETWEEN RAY OPTICS AND WAVE OPTICS
P14	Pranjal Rawat	S.G.R.R. PG College, Dehradun	FINITE DIFFERENCE TIME DOMAIN BASED NUMERICAL STUDY OF DIELECTRIC AND LOSSY MATERIALS WITH CONTINUOUS VARIATION OF PERMITTIVITY AND CONDUCTIVITY TO ABSORB RADAR PULSES
P15	Shweta Soni	Ewing Christian College, Allahabad	FOURIER TRANSFORM IN NATURE
P16	Minnie Murria	Punjab Agricultural University, Ludhiana	FREQUENCY DEPENDENT CAPACITANCE–VOLTAGE CHARACTERISTICS OF POLYMER CAPPED SEMICONDUCTING NANOCOMPOSITE
P17	Shivam Kumar Singh	Central University of Haryana	Hall Measurements of AlGaN/GaN HEMT structure on SiC substrate by MOCVD
	Anshul	SLIET, Longowal	
P18	Pravin Prakash Hirave	National Centre for Nanoscience and Nanotechnology, University of Mumbai	Hydrothermal Growth of Nb doped WO3 Nanorods for Super Capacitor Application

ID	Applicant's Name	Applicant's Institution	Title of Presentation
P19	Chandra Prakash	Central University of Haryana	HYPOTHETICAL EXPLANATION OF ORBITAL MOTION OF CELESTIAL BODIES USING FLUID MECHANICS
P20	Sahil Shah	IIT Roorkee	PEROVSKITE SOLAR CELLS IN THE PATHWAY OF LAB TO INDUSTRY
P21	Mudit Bhasin Sandeep Kumar	Invertis University, Barielly	LINE FOLLOWING ROBOT (LFR)
P22	Jagdish Sharma	IIT Roorkee	PEROVSKITE SINGLE CRYSTAL FABRICATION AND STUDYING ITS CHARACTERISTIC PROPERTIES
P23	Nimarpreet Kaur	Guru Nanak College for girls, Sri Muktsar Sahib	REPLICATING MORPHOLOGY OF CICADA WING
P24	Kamaldeep Dalal	IIT Roorkee	SPIN VALVEEFFECT BASED DEVICES FOR MAGNETIC SENSORS AND READ HEADS FOR HARD DRIVES
P25	Rishabh Nakra	Guru Nanak Dev University,Amritsar	STUDYING THE NATURE OF GALAXIES IN ARP CATALOGUE
P26	Tulika Singh	Ewing Christian College, Allahabad	ELECTROLUMINESCENCE AND ITS APPLICATIONS
P27	Shubham Bangalia Diya Bansal	Department of Physics, Panjab University, Chandigarh	WALKERS: VISUALISING QUANTUM PHENOMENA ON MACROSCOPIC SCALE
P28	Falak Manhas Vega Mahajan Surbhi Sharma	Department of Physics, Panjab University, Chandigarh	THE FIRST IMAGE OF BLACK HOLE
P29	Agamleen Singh	Department of Physics, Panjab University, Chandigarh	STUDY OF LIGHT POLLUTION WITH VARIOUS STREET LAMPS
P30	Vasani ChiragKumar RameshKumar Pandya Prartha Bipinbhai Raninga Twinkle Pankajkumar	Shree Swaminarayan Naimisharanya College of Science, Bhavnagar	THE GREEN DRAINAGE APPROACH
P31	Ramanpreet Kaur	Punjab Agricultural University, Ludhiana	TRANSMISSION STUDY AND ESTIMATION OF WATER CONTENT IN MAIZE (Zea mays L.) CROP USING BETA RADIATION
P32	Om Sarveshwarpati Tripathi	Ewing Christian College, Allahabad	UNIT IF A WAVE FUNCTION AND ORIGIN OF GENERALIZED FIELD
P33	Amanpreet Kaur	Punjab Agricultural University, Ludhiana	κ-DEFORMED KANIADAKIS DISTRIBUTION
P34	Sabhyata	Department of Physics, Panjab University, Chandigarh	ARRIVING AT E=hν : AN INSIGHT INTO THE ORIGIN OF PLANCK'S RADIATION FORMULA
P35	Siarti	Department of	SPACE DEBRIS - THE RISING CONCERN OF ERA

ID	Applicant's Name	Applicant's Institution	Title of Presentation
	Twinkle	Physics, Panjab University, Chandigarh	
P36	Ritika Charak Shivam Kataria Ridhima Goyal	Department of Physics, Panjab University, Chandigarh	BRACHISTOCHRONE PROBLEM
P37	Jatin Singh Jasmeen Kaur Molly Sharma	Department of Physics, Panjab University, Chandigarh	CAN SOLAR WINDS POWER EARTH?
P38	Himanshu Bansal Harsimran Singh s/o Sukhwinder Singh Harsimran Singh s/o Jaspal Singh	Department of Physics, Panjab University, Chandigarh	COSMIC MICROWAVE BACKGROUND
P39	Mansi Sharma	Department of Physics, Panjab University, Chandigarh	DARK MATTER
P40	Priyanka Verma Sejal Sherbaj Thind	Department of Physics, Panjab University, Chandigarh	SPACE TIME FABRIC AND GRAVITATIONAL WAVES
P41	Shubham Singla Ashish Rai Bhavneet Kaur	Department of Physics, Panjab University, Chandigarh	STEERING PHOTONS AND PARTICLES TO CURE CANCER
P42	Rupinder Singh	Department of Physics, Panjab University, Chandigarh	ELECTRONIC MOSQUITO REPELLENT
P43	Madhu Sudan	Department of Physics, Panjab University, Chandigarh	Fusion for Society
P44	Rupinder Kaur	Department of Physics, Panjab University, Chandigarh	INDIA’s FIRST PROBE TO LUNAR SOUTH POLE: CHANDRAYAAN-2
P45	Amandeep Kaur Payal	Department of Physics, Panjab University, Chandigarh	MICRO- ELECTRO-MECHANICAL SYSTEM
P46	Rupinder Kaur Bhawana Devi Hansika Payal	Department of Physics, Panjab University, Chandigarh	WORLD SCIENCE SCENARIO IN 2070s
P47	Khushman Kaur Sheenam Neha Limcy	Department of Physics, Panjab University, Chandigarh	BARCODE SCANNERS

ID	Applicant's Name	Applicant's Institution	Title of Presentation
P48	Priyal	Department of Physics, Panjab University, Chandigarh	E – WASTE MANAGEMENT
	Ishika Goel		
	Ishi		
	Bhavya*		
P49	Ashish Kumar Rajayan*	UIET, Panjab University, Chandigarh	DESIGNING TECHNOLOGIESBASED ON ELECTRIC FUELS: A COMMENT
P50	Samadhan Dashrath Kamble*	DES Fergusson College, Pune	STUDY OF LASER PLASMA INDUCED SHOCK WAVES USING INTENSIFIED-CCD BASED TIME RESOLVED 'SHADOWGRAPH IMAGING TECHNIQUE'

* registration process is incomplete

ABSTRACTS OF ORAL PRESENTATIONS

O-1: DESIGNING A FAST CHARGING BATTERY TO IMPROVE ITS CHARGING SPEED

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Abstract: A battery is a capacitive device that can hold charge. The first practical battery was Daniel's cell. The batteries used to day have come along way through .Now a day we use the lithium ion batteries. For the purpose of fast charging these batteries are overloaded with voltage cross which they are charged. In this process the life expectancy of the batteries goes down. From the Daniel's Leclanche's cell to the lithium ion batteries, we have traversed very long path in this race of perfecting our battery storage and us ability. Then came the era of the Nanotechnology where the Graphene batteries is said to bring the revolution in the battery world. It is said to increase the capacity by 45% and increase the charging speed by 5 times. Throughout the path there have been different designs that have increased the battery life and speed of charging. Now in this manuscript I would be briefing how the design of the batteries if can be modified to increase the charging speed. Here the technique used is that of increasing the surface to volume ratio of the electrode-electrolyte interaction and this would in turn increase the number of electrons directly in contact with the electrolyte and hence increasing the charging speed .In this the surface of contact of different designs will be discussed and how it has the probability of increasing the surface area of contact and charging speed by many folds.

O-2: GRAVITATIONAL WAVES AND LIGO DETECTORS

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Abstract: The gravitational wave opens a new window to the universe which will reveal the phenomena and physics that was never expected. It marks the beginning of the era to see the universe in an entirely different way. With the aim of detecting gravitational waves by laser interferometry, LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY (LIGO) was set up. It is the largest observatory on our planet to detect any cosmic event and it is a marvel of precision engineering.

O-3: HIGH PERFORMANCE SUPER CAPACITOR BASED ON WO_3 NANO PLATES

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Abstract: Electrical energy storage is a major concern of 21st century. The plenty of methods have been explored to store the energy into battery, super capacitor etc. The development of electrode materials is highly demanded to increase the energy density and power density as well as cyclic life. Herein we report the synthesis of WO_3nanoplate by wet chemical method, one of the simple, low temperatures and cost-effective method. Further the characterization of materials was performed with XRD, FT-IR, SEM and UV-Visible spectroscopy. XRD analysis provides the information about crystal structure and its temperature dependence. We have observed that the synthesis parameters are very crucial that has direct influence on the structure formation as well as band gap. The SEM shows the formation of two dimensional nanoplates morphology. Further the electrochemical investigation of WO_3naoplates exhibits the specific capacitance of 227.27 F/g with high energy density of 9.55 Wh kg^{-1}. It has also very high stability 90.20 % even after 3000th cycle. Thus, the WO_3 materials have great potential to use in super capacitor devices.

O-4: EFFECT OF SIZE AND SHAPE ON THE MELTING POINT AND VOLUME THERMAL EXPANSION IN NANO-GERMANIUM

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Abstract: Germanium is a semiconductor with very vivid applications in the field of nanoscience and other lines of physics. With having known information about the bulk characteristics of germanium, an effort to investigate the characteristics of germanium when it is in nanoscale has been made. In the present work effect of size and shape dependence on the melting point, volume thermal expansion of nano-germanium has been studied. The theoretical predictions follow the general trend executed by other materials when in nanoscale.

O-5: TO STUDY RADIOACTIVE DECAY BY SIMULATING PLOYHEDRAL DICE IN PYTHON PROGRAMMING LANGUAGE

Ravi Raturi [1] and Sumita Srivastava
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Abstract: The dice experiment is a simple experiment to introduce concept of radioactive decay. But due to limited number of faces in a usual dice (six faces) and limited number of initial dices undergone for experiment, error is observed in such experiments. By using Python programming language, one can simulate a polyhedral dice with arbitrary large number of faces and also one can have a large arbitrary number of initial polyhedral dices without any limitation. Radioactive decay process has been simulated using Python programming. The effects of number of faces and number of initial dice on experimental results have been studied. The number of faces on polyhedral dice has been correlated with radioactive decay constant. One real example of Francium has also been studied and the observed data has been compared with the real data. An excellent match has been observed between them.

O-6: THEORETICAL DETERMINATION OF THE TRIANGULAR NEUTRINO OSCILLATIONS PARAMETERS: A NEW APPROACH

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Abstract: In this paper we have discussed a theoretical approach to find out some of the parameters of neutrino oscillations. We have assumed that twice of the sum of the three neutrino mixing angles is 180 degree; in other words twice of the three mixing angles constitute a triangle. We have constructed one such triangle with proper scale factor such that among the three sides, two are independent mass squared differences. This may solve the Octant problem of neutrino oscillations, suggest one more mass hierarchy pattern, provide support to CP violation in lepton sector, predict the neutrino mass hierarchy parameter correctly, and present an alternative method to measure other neutrino oscillations parameters when the two mixing angles and one mass squared difference are known.

O-7: CORRELATION OF STRUCTURAL PROPERTIES WITH THERMODYNAMIC PROPERTIES FOR MULTI-ELEMENT AB_5-TYPE HYDROGEN STORAGE ALLOY

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Abstract: Wide applications of hydrogen storage alloy have resulted in synthesis of multi-element alloy. Substitution in the parent alloy changes the property of newly synthesized alloy. Important thermodynamic properties of hydrogen storage alloys are heat of formation of hydride and plateau pressure. These properties are measured through experiment. In present study, structural properties of hydrogen storage alloy have been correlated with these thermodynamic properties, so that a prediction of heat of formation and plateau pressure can be made without synthesizing the actual alloy.

O-8: GOLD NANOPARTICLE (AUNPS) CONJUGATE FOR TARGETED DRUG DELIVERY

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Abstract: Targeted drug delivery is very important criteria for the PDT treatment in cancer therapy. But to make the PDT drugs specific to the cancer cells is really a challenge. In present study, we synthesized Gold (Au) nanoparticle conjugate with BODIPY based salicylaldimine Schiff base which could be useful for the targeted delivery in the cancer cell. Salicylaldimine Schiff bases represent an important class of hetero-polydentate ligands capable of forming mono-, bi-, and poly nuclear complexes with transition and non-transition metals. We developed an easy synthesis of BODIPY based salicylaldimine Schiff base and its corresponding boron complexes was synthesized and characterized with different spectroscopic methods and X-ray crystallography. Their detailed photo physical properties were evaluated and compared. The Schiff bases were sensitive towards acid and thus could be useful for accurate quantitative measurements of pH. Then, the interaction of the Schiff bases with the Gold nanoparticles (AuNPs) was investigated by UV-Vis and fluorescence spectroscopy. The dye-AuNP conjugate was non fluorescent which upon reaction with H^+ gives bright green fluorescence, thus the OFF-ON fluorescence change would be useful to measure accurate pH in *in vitro* and *in vivo* conditions. The use of this dye-AuNP conjugate for the diagnosis and targeted therapy of the cancer cells will be discussed in details.

O-9: EXPERIMENTAL WORKING MODEL TO DEMONSTRATE RELATION BETWEEN HEIGHT OF INCLINED PLANE AND RADIUS OF CURVED END

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Abstract: In this experimental demonstration, such arrangements are made to verify that when the body is allowed to roll down from height of inclined plane less than 5/2 times of radius of curved end, then the body will not be able to loop the curve. As soon as the body is allowed to roll down from height of inclined plane more or equal to 5/2 times of radius of curved end, it successfully loop the curve. In this demonstration, it is established that for looping the curve, the height of inclined plane should be 5/2 times of radius of curved end.

O-10: INCORPORATING PHYSICS IN AGRITECH

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Abstract: With the changing face of technology comes the modernization in society leading to a developed nation. But the main concern is about what we will leave behind for next generation. The high rate of consumption of natural resources by mankind is resulting in their decrease day by day. With all evens, come some odds. This technology driven world is effecting the 'Mother Nature' and hence its constituents too. Polluted air and water, depleting ozone layer, unhealthy and poisonous crop production are the major effected areas. If we keep on growing infected crops, then with the time this infection can increase to such an extent that we won't be able to control it. To avoid such situation, we need to make sure that the parent plant is free from infection. 'Electron microscope' is one such device which is used to detect infections in crops and also to check if the parent plant is fit to be grown in certain conditions or not. CPRI is an institute dedicated primarily to provide good quality potatoes making use of 'electron microscope', also this device can be used for other crops too. Here, I present a case study on "Working of electron microscope and how it is helping in agritech for betterment of quality of food and crops". This advancement in physics and its real life applications will lead to healthy crop production and a healthy society.

O-11: MODIFIED CLIMBING DEVICE

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Abstract: Deciding between alternatives is a critical element of flexible behavior. As we know humans are the evolution of monkeys but even then there are some particular things which have not been possible for humans to do, so I came up with this idea of modifying simple climbing device. As monkeys have stronger arm muscles they can climb up mountains easily but humans have stronger leg muscles. So, I modified the simple climbing device in such a manner that it can help humans climb mountains more easily without putting any extra efforts. This device can help humans climb horizontally and vertically without putting in any extra physical work. This device can be very handy for our soldiers and also for people who love mountaineering.

O-12: CLEAN FUEL ENERGY IN THE SHIPS

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Abstract: It is proven that when we do something practically results come out better and understanding becomes clearer. If we modify an old system into new it will turn out to be a new innovation. I got this idea when I was watching a Hollywood movie named open water: adrift. It made me realize that how much pollution yachts produce and how time consuming they are. So, I came up with this idea of clean fuel energy for ships that will be generated by rotation of turbines. It will produce efficient energy and even fuel storage will be easy as there will be no worries of fuel and no pollution would be produced.

O-13: CHEMICAL GROWTH OF DIVERSE MORPHOLOGIES OF ZNO NANOSTRUCTURES AND THEIR CNT BASED COMPOSITES FOR THE PHOTODEGRADATION OF METHYL ORANGE DYE MOLECULE

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Abstract: ZnO nanostructures with diverse morphologies were synthesized by using simple wet chemical route of synthesis by varying their parameters like pH, solvent, amount of precursor etc. The as synthesized ZnO and ZnO – CNT composites were characterized structurally, optically and morphologically by using X- Ray diffraction, UV – Visible spectroscopy, Photoluminescence spectroscopy (PL), Scanning electron microscopy (SEM). The effect of Morphological changes and incorporation of CNT, studies have been carried out on Methyl Orange dye. The results state that the as formed ZnO, ZnO – CNT spherical morphology has a faster rate of degradation as compared to petal and hexagonal plates which was considered to be due to the increased level of defects and large surface area of the nanostructures formed. Hence it can be stated that morphology and composite formation lead to changes in the rate of degradation. Hence ZnO with different morphologies were formed and successfully tested against MO dye.

O-14: COMPARATIVE ANALYSIS OF PARTICULATE MATTER

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Abstract: This study focuses on the comparative analysis of Particulate Matters (PM) – PM10 and PM2.5 between Ahmedabad (AMD) and Gandhinagar (GND) city in Gujarat for the year 2016 -2018. Seasonally and annually analysis in order to understand the trend and sources of pollution within the city. Further ratio analysis is also performed to identify contribution of finer and coarser mode aerosol. The results show that industrial areas are the most contributing followed by commercial and traffic junctions in both cities. PM 2.5/10 ratio is highest during the monsoon as larger super micron particles get removed fast during monsoon than submicron particles due to washout effect. While in summer, it is lowest due to increase in temperature and moderate wind speed. However, the ratio of PM 1/2.5 is highest during winter, owing to the fact that the combustion of heating appliances such as boilers, stoves closed and open fire places emits more finer particles.

O-15: INTRODUCTION TO COSMIC ORIGIN AND INFLATION THEORY

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Abstract: Cosmology is a branch of astronomy which deals with the origin, evolution, large scale structures & dynamics and the eventual fate of the universe. In this paper, I intend to briefly discuss the different models of cosmic origin and why the Big Bang model ultimately prevails. However, the Big Bang model also has certain drawbacks such as the horizon problem, flatness problem and the exotic relics problem, more popularly known as the magnetic monopole problem. These peculiarities can be explained by the inflation theory and its various models, which I shall highlight in this presentation.

O-16: HEAVY ION COLLISIONS AT LOW ENERGIES

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Abstract: This is an exciting time for nuclear research, especially in heavy ion collision. I'll be providing a brief intro of the fundamental atomic models, and going from up there explain about Liquid drop model, Shell model, Collective model and Nilsson model. I'll be discussing the role of angular momentum, entrance channels, deformations and orientations and fusion hindrance. I'll be discussing about dynamical cluster-decay model (DCM) and its advantage over other statistical models. Also, I'll provide with the experimental and theoretical developments of heavy ions reactions and the need to study heavy ions collision (investigation of Nuclear structure, its Stability, Fusion reactions, Elastic and inelastic collisions, etc.)

O-17: CHARACTERIZATION OF AEROSOL RADIATIVE FORCING OVER URBAN ENVIRONMENT OF WESTERN INDIA

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Abstract: An analysis of Radiative Forcing (RF) has been attempted over Ahmedabad region using the Aerosol Optical Depth(AOD) data measured during Winter and Summer 2017 campaigns. In-situ and satellite AOD data collected over Ahmedabad city is used as an input in the SBDART Radiative Transfer Model. The radiative forcing is calculated using the fluxes available from the model output and the results show that the satellite-derived RF and ground-derived RF shows nearly a perfect correlation of 0.92 and 0.82 for Top Of the Atmosphere(TOA) RF and Aerosol Atmospheric RF(Atm) for Winter 2017, respectively; whereas, it shows a very good correlation of 0.79, 0.89, 0.84 for Surface, TOA and Atm radiative forcing for Summer 2017, respectively. These values of correlations demonstrate the validity of our present work. This study is our first attempt to generate satellite radiative transfer products which will be useful in future.

O-18: STUDY OF ELLIPTICALLY POLARISED LIGHT BY TOTAL INTERNAL REFLECTION

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Abstract: A plane polarised light has been converted into an elliptically polarised light by total internal reflection in a glass prism. This has been studied with a spectrometer and two polaroids. The phase difference introduced between the perpendicular and horizontal components of light introduced by total internal reflection has been measured and eccentricity of the ellipse is determined.

O-19: BOSE-EINSTEIN CORRELATION FUNCTIONS FOR KAONS

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Abstract: Correlation functions give statistically correlated results present among spatially or temporally separated random variables. Bose-Einstein correlation function (CF) measurement enables the study of properties of emerging particles and helps to better understand the hydrodynamics of the collision centers in high energy particle collisions. Data analysis results of kaons produced in $\sqrt{S_{NN}}$ = 200 GeV Au+Au collisions during 2010 run period at RHIC, Brookhaven National Laboratory, New York, are presented in this paper. We have plotted CF for kaons detected at PHENIX detector subsystem for a given range of average transverse momentum (P_T) of the particle pair. The obtained plots resemble Levy-type density distribution functions. By making use of Levy-source analysis method, fit parameters were obtained and particle source function is interpreted.

ABSTRACTS OF ORAL PRESENTATIONS

P-1: "LIGHT" - THE MYSTERY

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Abstract: Humans have always been interested to know what light is. In the early days, a light beam was thought to consist of particles. Later, the phenomena of interference and diffraction were demonstrated which could be explained only by assuming a wave model of light. Much later, it was shown that phenomena such as the photoelectric effect and the Compton Effect could be explained only if we assume a particle model of light. Now, as we know, the values of the mass and charge of electrons, protons, alpha particles, etc., are known to a tremendous degree of accuracy approximately one part in a billion! Their velocities can also be changed by the application of electric and magnetic fields. Thus, we usually tend to visualize them as tiny particles. However, they also exhibit diffraction and other effects which can be explained only if we assume them to be waves. Thus, the answers to the questions such as "What is an electron" or "What is light?" are very difficult. Indeed electrons, protons, neutrons, photons, alpha particles, etc., are neither particles nor waves. The modern quantum theory describes them in a very abstract way which cannot be connected with everyday experience.

P-2: A STUDY ON THE EFFECT OF SERIES RESISTANCE AND ABSORBER LAYER THICKNESS ON THE SOLAR CELL STRUCTURE BY USING SCAPS SIMULATION

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Abstract: Quaternary semiconductor, Cu2ZnSnS4, with a kesterite mineral structure namely the CZTS is a material for meeting the requirements for low cost and eco-friendly thin film solar cells, as none of the elements are scarce in the earth crust and the constituents are non-toxic. The SCAPS simulation program has been utilized to explore the output performance of the traditional Al:ZnO/CdS/CZTS/Mo solar cell. The variation in the overall series resistance of the cell and its effect on the cell performance has been studied. Series resistance plays an important role in the cell performance and on the fill factor of the cell. Further the absorber layer thickness of the CZTS material has been varied in order to study the effect on the cell performance. With respect to the cell performance of the cells, other parameters are also been studied.

P-3: AN INTRODUCTION TO EPR-PARADOX AND BELL'S INEQUALITY

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Abstract: I present a work which i did in IISER-Mohali on Quantum Foundation with Prof. Arvind. The poster will start with Einstein–Podolsky–Rosen paradox where we will show that the basic idea was about the nature of reality and incompleteness of quantum theory. And which can be completed by introducing Hidden variables. But the interpretation of Einstein was strongly opposed by another great quantum physicist, Niels Bohr, because of the violation of his complementarity principle. Finally we deduced Bell's Inequality with a simple example and proved that hidden variable violate these inequalities, forcing us to renounce the Einstein's local realistic world vision.

P-4: BLACK BODY FRICTION FORCES: MEANING AND THEIR IMPLICATIONS

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Abstract: In our universe, number of different forces are in action, ranging from the microscopic world to macroscopic world. One among these forces are the little known black body friction forces. The accurate measurement of these forces acting on atoms due to their interaction with black body radiations is significantly important in atom interferometry, nanomechanics, etc. These affect the working of high precision atom interferometers employed to perform some tests of fundamental physics such as those of the equivalence principle, planned searches for dark matter and dark energy, gravity gradiometry, inertial navigation and even the Casimir force measurements and gravitational wave detection. Moreover, a precise estimation of these forces is also required in order to calculate the exact speed, trajectories, etc. of different spacecrafts and satellites. Right now, I'm working on a project which aims to analyse the effect of these forces on Rubidium atoms. So, in my poster, I aim to explain what exactly these forces are, how these forces can be measured experimentally and theoretically along with focussing on their practical implications.

P-5: CALIBRATION OF METAL FOIL BOLOMETER

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Abstract: Tokamak is the most developed magnetic confinement system and is the basis for the design of future nuclear fusion reactors in order to generate clean and abundant energy. It is an electromagnetic device with different magnetic coils to initiate, confine and control the stability of the plasma. Bolometer is one such diagnostics that is used for the measurement of the radiation energy loss from a tokamak and also determines the purity of the plasma. A metal foil bolometer of 1-cm square and 7-μm-thick of platinum foil has a very high operating reliability. The calibration experiments have been performed and cooling time(τ), heat resistance (Z), heat capacity (C), response (r) are calculated of the bolometer. Also, output powers for 5-100 mW observed.

P-6: CARBON BASED NANOMATERIALS: SYNTHESIS, CHARACTERISATION AND APPLICATION IN WATER PURIFICATION

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Abstract: The presented study focuses on preparation of carbon based nano hybrid which act as an adsorbent for removal of heavy metals from aqueous solution. Four different adsorbent are prepared viz graphene oxide, functionalised multiwalled carbon nano tubes, graphene oxide carbon nano tube hybrid and magnetic graphene oxide. Synthesis of graphene oxide was carried out by modified Hummer's method. Fuctionalisation of multiwalled carbon nanotubes was carried out with the help of refluxing. Magnetic graphene oxide nanoparticles were formed with coprecipitation of iron nanoparticles on the surface of graphene. Graphene oxide mulatiwalled carbon nano tube hybrid (GO- MWCNT) was prepared by providing mechanical shear to functionalised carbon nanotube and graphene oxide powder in acid solution. The structural characterisation of the synthesised nanomaterial was carried using Transmission Electron Microscopy. The TEM images of graphene oxide revealed a rough surface and irregular shape. GO has folded layers due to presence of hydroxyl group. Particles of amorphous carbon embedded in sheets are spherical in shape which also offers surface area for adsorption. TEM micrographs represent the well ordered locally alligned tubes. Formation of functional groups on the surface of nano tubes generates repulsive force which leads to debundling of tubes and thus increases in their surface areas. This can be exploited for process of adsorption. TEM micrographs of GO-MWCNT provide us evidence of the formation of GO-MWCNT hybrid. The micrographs reveal the Vander wall forces of interaction between CNTS and GO sheets. This results in formation of hybrid. TEM images of MGO showed that Fe_3O_4 nanoparticles were fully coated on the surface of GO.

P-7: COUPLED NONLINEAR ORDINARY DIFFERENTIAL EQUATIONS WITH TOPOLOGICAL MANEUVERING

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Abstract: Complex networks are important to study behaviour of many natural systems like "social" media (for example Facebook, WhatsApp), epidemic propagation and political movements; to name a few. A mathematical tool to analyse such a complex system is *Graph theory*. Using this mathematical model, networks are broadly classified into three categories namely, Random, Scale-free and "Small-world" networks. In this project I have studied properties of these networks in a quantitative manner using rigorous mathematical techniques and then reproduced the some of the networks in computer simulation by writing a few programs. Further, using those computer programs, robustness of solution a set of coupled nonlinear ordinary differential equations, popularly known as GCCGLE, has been verified, when the underlying network structure changes from one to another (topological maneuvering).

P-8: DEPOSITION OF COPPER DOPED TIN OXIDE THIN FILMS FOR GAS SENSING APPLICATIONS

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Abstract: In this research investigation, copper doped tin oxide thin films were grown on glass substrates by the thermal evaporation method using a vacuum coating system. The optical and structural characteristics of the thin films were determined. Also, the gas sensing properties of the thin films were investigated for their application as gas sensors. The thickness of the samples was determined with the help of an in- built quartz crystal monitor and was kept at 300 nm. Subsequently, the films were annealed at a temperature of 400 ^{o}C for 4 hours in the presence of atmospheric air. The gas sensing studies were carried out, using a two probe set up, for the detection of toxic gases such as H_2S and C_2H_5OH. It has been observed that the sensor signal was very high for H_2S gas but little sensor signal towards ethanol.

P-9: DETERMINATION OF WATER CONTENT OF SAL WOOD USING GAMMA RADIATION

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Abstract: Moisture content of wood is a function of atmospheric conditions. Moisture content varies with temperature and humidity of surrounding air. The variation of moisture content is different for different wood. It affects physical as well a mechanical properties of wood. The present study deals with determination of water content of sal wood from the determination of mass attenuation coefficient using gamma ray transmission using NaI (Tl) scintillation detector and radioactive source 137Cs of energy 0.662MeV. The obtained mass attenuation coefficient for wet state and completely dry state of the wood were used to determine the water content of the selected wood sample. The absolute water content in selected wood sample is 59.3 ± 8.2 %. Further, it was shown that attenuation coefficient increases with decrease in moisture content.

P-10: EFFECT OF TEMPERATURE ON ULTRASONIC VELOCITY IN ADULTERATED MUSTARD OIL

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Abstract: In these days the adulteration in food products is the main problem and needs immediate attention. The adulterants are generally low quality/cost liquids mixed with pure samples. It will be a threat to living beings. There are several methods to detect the adulteration in liquids. Most of the methods are destructive methods. Ultrasonic have been regarded as rapid and non-destructive tool, which has been used to analyse the mustard oil with adulteration of palm oil having different concentrations (100%. 90% and 80%) of mustard oil. The present study deals with the measurements of ultrasonic velocity, viscosity and density at different temperatures in the range (30°-70°C). Ultrasonic velocity and viscosity decreases linearly with temperature. The ultrasonic velocity and viscosity also decreases with the addition of palm oil as impurity. The ultrasonic velocity of 100% mustard oil is 1446m/s and 90% is 1419m/s and for 80% 1404m/s at 300C. The viscosity of 100% mustard oil is 52.87mpascal sec and 90% is 42.70 mpascal sec and for 80% 35.42 mpascal sec at 300C. The density of mustard oil increases with the addition of different concentrations of palm oil. From the measurements of these properties the quantification of concentration of impurity can be calculated.

P-11: EFFECTS OF STRUCTURAL PROPERTIES ON HYDROGEN STORAGE CAPACITY OF MULTI-ELEMENT AB_5-TYPE HYDROGEN STORAGE ALLOY

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Abstract: For harnessing hydrogen as renewable energy source, storage of hydrogen is the key factor. Solid state hydrogen storage is the safest method among all the methods. Hydrogen storage capacity is an important parameter for application point of view. The various substitutions and tailoring in the parent alloy may change the storage capacity for specific application. In present investigation, experimentally observed values of hydrogen storage capacity reported in literature have been correlated with the structural properties of hydrogen storage alloys. Some of the structural properties like lattice parameters, unit cell volume , void size have been noted from reported values in literature, while other structural properties like equivalent radius r_B*, ratio of r_A/r_B* and contraction in A-B bond have been calculated in present study. The effects of these structural properties on multi-element AB_5-type hydrogen storage alloys have been studied in the present work.

P-12: ESTIMATION OF GRAVITATIONAL WAVE PARAMETERS WITHOUT USING TENSOR ALGEBRA

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Abstract: Existence of gravitational waves has already been confirmed by the direct detection of gravitational wave signal by LIGO Hanford and Louisiana detectors (Sept 14, 2015). From the solution of Einstein's equations, theoretical proof of existence of gravitational waves was made almost a century ago. Main difficulty to deal with Einstein's General Theory of Relativity is, as Einstein's equations are nonlinear, tensor calculus is required to solve these equations which is very critical. To overcome this problem, here we use some easy methods to calculate few parameters related four Binary Black Hole (BBH) gravitational wave events. Our work contains calculations and analysis of fundamental parameters associated with gravitational wave events GW150914, GW151226, GW170104 and GW170814. Estimation of mass and angular momentum of final black hole formed by the coalescence of binary black hole system, binary chirp mass, energy and power carried by emitted gravitational waves and peak frequency of the emitted gravitational wave signal due to interaction between two black holes are done here using some simple mathematics. Here Post-Newtonian expansion is used instead of critical mathematical machinery. Estimated numerical value of each parameter using this approximation technique is well agreed with the experimental data taken by LIGO team. Estimated mass of newly formed black hole for the above mentioned four binary coalescence events are 63.1289, 20.485, 48.660 and 54.380 solar mass unit respectively. Value of angular momentum of the remnant black hole in each event we got respectively are 0.660, 0.6108, 0.6384 and 0.6611. This angular momentum is actually the measurement of spin of the black hole. In case of binary chirp mass, our results are 28.09, 8.516, 21.002 and 24.20 in solar mass unit for the events GW150914, GW151226, GW170104 and GW170814 respectively. Radiated energy value during merger phase of the coalescence, we estimated are respectively 3.96, 1.037, 2.70, 3.42 solar mass unit. Estimated radiated power values are 1.04x1049, 7.249x1047, 7.213x1047 and 6.528x1046 in watt unit respectively. Peak frequency values we got are 159.38, 493.30, 207.20 and 185.0 Hz for above mentioned respective four gravitational wave events.

P-13: FERMAT'S PRINCIPLE: THE LINK BETWEEN RAY OPTICS AND WAVE OPTICS

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Abstract: Fermat's principle was a landmark in variational principles of physics as it set the precedent for the principle of least action. Fermat developed his principle on merely geometric and kinematic grounds. Later on, Huygens proposed geometrical proofs for laws of refraction and reflection based on conclusions directly derived from Fermat's law. Here, I present origin of Fermat's principle and its equivalence to Huygens' Principle. Furthermore, formulation of the principle is explained. I also present an insight into the implications that Fermat's principle has, in fundamental laws pertaining to optics and mechanics.

P-14: FINITE DIFFERENCE TIME DOMAIN BASED NUMERICAL STUDY OF DIELECTRIC AND LOSSY MATERIALS WITH CONTINUOUS VARIATION OF PERMITTIVITY AND CONDUCTIVITY TO ABSORB RADAR PULSES

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Abstract: Radar is a detection system that uses electromagnetic waves or radio waves in particular to detect the position, direction and velocity of an object. A radar system consists of a transmitting antenna which radiates radio waves which is reflected or scattered back by the object. An absorbing coating of graded material with continuous variation of permittivity and conductivity can be used to absorb the radio waves before it reaches the object and scattered back to the receiving antenna. Finite Difference Time Domain (FDTD) based numerical study will help to characterize such materials which can be used for Stealth application.

P-15: Fourier Transform in Nature

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Abstract: Fourier transform changes the representation basis of data from one basis to another basis. In contrast, the function is represented in a different way but contains the same information. For example, it is not always easy to calculate velocity of a quantum particle trapped in a potential by using a position basis wave function. So, firstly we make a Fourier transform of particle in reciprocal basis (k-space) and then perform calculations. Similarly, a general time domain signal analysis is very hard to be performed, we do it by making its Fourier transform in frequency domain. This Fourier transform can be performed by using different artificial techniques. Lens, gratings, prism etc and are different examples of Fourier transform in artificial manner. Nature also does Fourier transform in its own way. Rainbow is one of the examples which I am going to present. Light coming from Sun scattered in different directions after interaction with droplets present in atmosphere. The scattering is on the basis of different energy component of sunlight. Each component having different energy will scatter in different directions and therefore we will observe a spectrum.

P-16: FREQUENCY DEPENDENT CAPACITANCE–VOLTAGE CHARACTERISTICS OF POLYMER CAPPED SEMICONDUCTING NANOCOMPOSITE

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Abstract: Semiconducting nanocomposites with polymer fillers have become a subject of intensive research because of their unique size dependent physical and chemical properties. They can be used in various devices such as infrared detectors, lasers, solar cells, etc. In the present study, we have studied the frequency dependent C-V characteristics of PVA (polyvinyl alcohol) capped cadmium selenide (CdSe) nanocomposite at room temperature in the frequency range of 10 KHz to 100 KHz. The semiconducting nanocomposite has shown a decreasing trend in capacitance with increase in frequency at a constant voltage.

P-17: HALL MEASUREMENTS OF ALGAN/GAN HEMT STRUCTURE ON SIC SUBSTRATE BY MOCVD

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Abstract: By using MOCVD (Metal organic Crystal Vapour Deposition) process, we develop AlGaN/GaNHEMT (High Electron Mobility Transistor) structure on SiC substrate. This structure shows a very rapid growth of mobility at low temperature (77K) as compared to room temperature. In this, we use AlGaN/GaN because they are polar in nature, so they have free electrons available due to polarization. Here we develop AlGaN layer over GaN buffer layer on SiC substrate which leads to formation of 2DEG (2-Dimensional Electron Gas) & hence electron get trapped in this 2DEG and will vibrate in 2D only. Due to which it deviates less from its path (i.e. less scattering) and hence mobility increases. After taking Hall Measurement of these samples, we get values of sheet resistance, hall coefficient, mobility and sheet carrier concentration. By analyzing these values, we can say that this is the most promising candidate for high power and high frequency applications. As it has high breakdown field, wide band gap, high saturation velocity, high sheet carrier concentration, high mobility and it can operate in high temperature.

P-18: HYDROTHERMAL GROWTH OF NB DOPED WO_3 NANORODS FOR SUPER CAPACITOR APPLICATION

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Abstract: In 21st century performance of energy storage devices is increasing drastically. There are various types of energy storage devices namely batteries and super capacitor. Super capacitor demand has been increased due to its properties like high power density and cyclic life than batteries. In this work we have synthesized Niobium doped tungsten oxide by using hydrothermal route of synthesis. The synthesized Nb doped wo_3 Nanorods has high surface area to volume ratio, conductivity improvement and large electrochemical sites for redox reactions. The main strategy of tuning molarity of precursor resulted modification in crystalline structure such as monoclinic and orthorhombic structure. In addition, the band gap value has changed from 2.5 eV, 2.44 eV, and 2.29 eV at 0.1M, 0.3M, and 0.5M molarity respectively. However at the same molarity i.e. 0.3M after adding Nb doping solute of 2mM and 5mM shows equivalent band gap of 2.2 eV. The synthesized nanorods have shown high capacitance value 488 Fg-1 by doping Nb than pristine WO3 324 Fg-1. The cyclic stability exhibits capacitance retention up to 83% as compared to pristine WO3 (62%) after 2000 cycles. These results have clearly highlighted the potential of Nb doped WO3 nanorods for super capacitor application.

P-19: HYPOTHETICAL EXPLANATION OF ORBITAL MOTION OF CELESTIAL BODIES USING FLUID MECHANICS

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Abstract: By assuming that the whole universe is infested with some strange fluid. And all the celestial bodies are floating in that fluid. By some real life observations we can use the analogy of fluid mechanics to describe the periodic motion of heavenly objects .According to magnus effect when a body rotates in the fluid then a thin layer of the fluid. Since the axis of rotation of celestial bodies tilted by an angle . So due to this inclination, all the bodies preserve different-different orbital motion. By this analogy we can say that near to the surface of any body, the density of that fluid will be very high so, via this we can explain the bending of light near the surface of heavy body.

P-20: PEROVSKITE SOLAR CELLS IN THE PATHWAY OF LAB TO INDUSTRY

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Abstract: The efficiency of perovskite solar cells rapidly improved from 3.8% in 2009 up to nearly 24.6% in 2019. But PSCs are effective up to labs only. A stable Large area perovskite solar cells is a big step towards commercialization. Various issues for this is still under research like fabrication, stability, environment factor, cost, etc. My poster presents various pinholes and crack-free fabrication methods include spin and blade coating, spray coating, slot-die coating. The first step for fabrication is solution preparation and then after coating the perovskite film, it goes to different annealing processes. In the characterization process most necessary techniques are XRD, FESEM,UV and PL spectroscopy which tells you about your crystal structure, grain size, resolution, etc.

P-21: LINE FOLLOWING ROBOT (LFR)

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Abstract: It is known to all that robotics deals with design, construction, operation as well as computer system their control.There are different types of robots like line follower (LFR), android bottrix, mind wave controller robot, gesture control robots. LFR is an autonomous robot which follows either black line in white area. LFR must able to detect particular line and keep following it.For special situation such as cross over where LFR can have more than one path which can be followed, predefined path must be followed by the robot.Space research companies also used LFR to explore the planets. The major applications of LFR are in health care system, in industrial work.

P-22: PEROVSKITE SINGLE CRYSTAL FABRICATION AND STUDYING ITS CHARACTERISTIC PROPERTIES

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Abstract: The organic- inorganic hybrid perovskite $CH_3NH_3PbX_3$ (where X is a halide) have unique optical and electronic properties due to which they have been applied to photovoltaic and optoelectronic applications. They have high light absorptivity, long carrier lifetime, greater charge carrier mobility, easily tunable band gap and balanced electron and hole mobility etc. Devices based on polycrystalline materials are less efficient and reliable due to larger grain size, high trap density and surface defects so to avoid this, single crystal of perovskite are being developed. We are fabricating MAPbI3 single crystal and studying its various characteristic properties using UV, PL etc. to fabricate a device for some industrial applications.

P-23: REPLICATING MORPHOLOGY OF CICADA WING

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Abstract: This study aims at understanding the morphology replication of a Cicada wing surface and generating the super hydrophobic surface in artificial. The morphology of the nano scale protrusions on wing surface will be studied in combination with the Casie-Baxter and Wenzel approximations which will be used to predict the wetting states of the Cicada wings. The super hydrophobicity of the Cicada wing contributes to self cleaning property along with non wet ability of the surface.

P-24: SPIN VALVEEFFECT BASED DEVICES FOR MAGNETIC SENSORS AND READ HEADS FOR HARD DRIVES

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Abstract: Spin valve effect based sensors, which are basically designed for detecting very minute magnetic impulses, are going to enhance the ability to write and store huge amount of data on a very small area on hard disks. This effect is based on the Quantum property of electrons called “Spin”. Spin valve, a Giant-Magneto resistance (GMR) based device, composed of two Ferromagnetic layers with a spacer layer of non-magnetic metal. The direction of magnetization of one of the layers is fixed and the magnetization of the other, usually called free layer, can be changed by application of relatively small magnetic field (20-30 Oersted). The whole detection process is based on the change in resistance felt by Spin Polarized electrons when there is a relative change in the magnetization of layers.

P-25: STUDYING THE NATURE OF GALAXIES IN ARP CATALOGUE

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Abstract: The ARP catalogue of peculiar galaxies is one of the most well-known samples of peculiar galaxies in the local Universe. It was catalogued by Halton Arp in 1966. The atlas of these galaxies was originally published by California Institute of Technology. It consists of 338 images of interacting and tidally distorted galaxies, some of which are spectacular starburst galaxies and others small groups of active galaxies. This catalogue also includes some of the most prominent galaxies in the universe such as the Pinwheel galaxy, Whirlpool galaxy, M87, M77, M90, Tadpole galaxy, Mice galaxies, the Antennae galaxies and the Cigar galaxy among others. Because little was known about the physical processes that give the galaxies their peculiar shape, Arp catalogued them according to their physical appearance. Today, these physical processes are well understood and we can categorize these galaxies in many more ways. In this study we revisit this sample to see what fraction are isolated galaxies, tidally distorted galaxies, merging galaxies, active galactic nuclei, starburst galaxies and multiple nuclei systems. Apart from defining their nature, we will also try to estimate how their nuclear velocity dispersions are changing with nuclear separations and also hunt for possible tidal dwarf galaxies in galactic interactions.

P-26: ELECTROLUMINESCENCE AND ITS APPLICATIONS

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Abstract: Luminescence is an optical response of a material to emit light, resulted from some disturbance. Incandescence is response of heating, chemiluminescence from chemical reactions sonoluminescence from sound disturbance and mechanoluminescence from mechanical action etc. are the different examples. Luminescence resulted from a strong electric field is called electroluminescence , resulted by excited electron hole pair recombination which leads to emission of photon. I wish to present briefly the mechanism behind electroluminescence, application and possible future implementations.

P-27: WALKERS: VISUALISING QUANTUM PHENOMENA ON MACROSCOPIC SCALE

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Abstract: A 'walker' is a hydrodynamic quantum analog to many quantum systems. Droplets on a vibrating fluid bath can be made to bounce in stationary position or made to wander in rectilinear or chaotic trajectories. The behaviour of the droplet depends on the acceleration of the bath surface. Above a critical acceleration, the droplets are prevented from coalescing into the bath due to air layer between the droplets and bath. These droplets seem to 'walk' on the surface. vibrating the silicon oil with droplets in it. These droplets can be used to replicate many strange phenomena of quantum mechanics like double slit experiment, tunnelling etc. Walkers are useful in visualising the Pilot Wave Theory too which states that all particles have a wave associated with them. Here, we present the working and physics behind the walkers and how they mimic quantum systems. We also discuss further applications of walkers.

P-28: THE FIRST IMAGE OF BLACK HOLE

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Abstract: The first ever image of Black hole was unveiled in April 2019. This image was captured by creating a network of telescopes known as Event Horizon Telescope(EHT). The Black hole in the captured image is at the center of M-87 Galaxy, 55 million light years from earth. This image was captured by improving upon a technique that allows for the imaging of far away objects, known as Very Long Baseline Interferometry (VLBI). Each telescope used for the EHT had to be highly synchronised with the others to within a fraction of a millimetre using an atomic clock. Here we are covering the topics related to efforts behind capturing the image, it's significance as well as decoding the captured image of Black hole.

P-29: STUDY OF LIGHT POLLUTION WITH VARIOUS STREET LAMPS

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Abstract: Light pollution in India is a matter of great concern. It has become an all pervasive intrusion into city/town life. There is a large variation in LP level for Indian cities/towns which are related to demographic and socio economic factors with a few exceptions. However there isn't much awareness about the issue. Hence various aspects related to LP should be brought to the notice of common people. The extensive study of LP and its correlation with various factors and subsequently their analysis could be of great use in minimizing the LP and for our present city planning, apart from its academic importance. The LP measurement technique may help in standardizing and improving various street lights being in common use. Inspecting all the effects and causes from the outdoor lightening, it was decided to study the amount of light pollution caused by each type of individual street lights. The study covers 65%-70% of public lighting, taking into consideration that all types of
linear fluorescent fixtures have been replaced by the LEDs from 2010.The amount of light going in the sky from each of these luminaries had to be measured. We designed an experiment with the bulbs along with the casings used to suspend them; the idea was to know the amount of light pollution caused by each of them. The performance of a lighting unit can be shown by diagrams depicting the distribution of illumination. The method used in this experiment is the zonal cavity method or lumen method. Significant conclusions were drawn along with the calculation of Upward Light Ratio along with the special emphasis on the blue spectrum is studied. In addition to this biological aspect of light pollution is also studied.

P-30: THE GREEN DRAINAGE APPROACH

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Abstract: The work depicted herein refers to prevent rain water from mixing it with an ocean by using special Drainage system, which will be parallel to the common drainage system, and it will be divided through area wise. But at last this system will be separated from common drainage system and collect all the water in countryside area of the city. This place will be defined by using the satellite or from the study of structure of the land. Therefore Small River will be formed to store the water. But it won't be connected to the sea. So, by using this simple technique the rain water which we were losing can be saved more. And it will also increase water content in soil. Now, if we build biomass power station in the cities, which will provide good water resources. The best advantage of biomass power plant which is more eco-friendly compared to coal thermal power station. And also we can grow more trees on this small river bank area.

P-31: TRANSMISSION STUDY AND ESTIMATION OF WATER CONTENT IN MAIZE (Zea mays L.) CROP USING BETA RADIATION

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Abstract: Water content affects the crop productivity. In the agricultural field, it is important to detect
the water content in the plant. Beta attenuation technique has been used to estimate the water content in the leaves of maize crop. 204Tl has been used as the radioactive source of beta particles. The result obtained using this technique is approximately same as obtained by direct weighing. Transmission study has also been carried out with strips of fresh and dry leaves of maize crop and it has been found that mass attenuation coefficient of dry leaves more than that of fresh leaves.

P-32: UNIT IF A WAVE FUNCTION AND ORIGIN OF GENERALIZED FIELD

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Abstract: It is always interesting to check units of a wave functions .Indeed **Ψ(x,** t**)*Ψ(x,** t**)**is probability density in some space and normalization requirement implies that it has units of inverse length(inverse volume for 3D representation) if **Ψ(x,** t**)** is in coordinate space. In contrast, if we switch the space to another by some method (e.g.by taking Fourier transform etc.), we see that normalization condition is different and probability density may have some different units (inverse momentum for 1D momentum space representation etc.).I tried to generalize the concept of unit of a wave function and to see its origin, for this purpose its convenient to make some assumptions: (1) State vector is an abstract description of object and wave functions are different representations if it. (2) Elements of field, upon which the state space is formed, can attain all possible units i.e. $[M^aL^bT^c]$ for all(a, b, c).I'll call it GENERALIZED FIELD. (3) Each vector in state space (or space dual to state space) can contain only those elements from field which are having same units. Unit of state vector is same as the unit of entries. (4) Space dual to state space contains all possible linear maps from state space to generalized field and every linear map have some unit which can be decided by seeing the units of state space entry to map and corresponding projection into generalized field. (5) Orthonormality condition will decide the dimensions of orthonormal basis elements of state space. Using these five assumptions I want to explain the origin and generalization of unit concept for wave function and state vectors.

P-33: κ-DEFORMED KANIADAKIS DISTRIBUTION

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Abstract: The κ-deformed statistics based on the κ-entropy given by Kaniadakis [1], a statistical mechanics has been constructed which reduces to the ordinary BG statistical mechanics as the deformation parameter κ approaches to zero. The concept of κ-distribution was also introduced by Lubner [2], which was actually equivalent to the nonextensive q-distribution, but it is different from Kaniadakis. Some new statistics have been put forward to generalise the classical Boltzmann-Gibbs (BG) distribution, such as nonextensive statistics based on Tsallis entropy (q-entropy) [3]. In research studies on plasmas with the κ distribution as well as the κ-like power-law distributions have attracted great interest for their many interesting applications found in the wide fields of space plasma physics and astrophysics, and also for the κ-distribution family that can be studied under the framework of nonextensive statistics and with the aid of the nonextensive kinetic theory, one can determine the expression of the κ-parameter and its physical meaning in the astrophysical and space plasma. The nonextensive statistics depends on the parameter q different from unity and it will recover BG distribution if we take the parameter to be unity; the κ-deformed statistics depends on the parameter κ different from zero and it will recover BG distribution if we take the parameter to be zero.

P-34: ARRIVING AT E=hν : AN INSIGHT INTO THE ORIGIN OF PLANCK'S RADIATION FORMULA

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Abstract: Planck's quantum theory of light to explain the black body radiation spectrum was a landmark in quantum physics. It is often believed to be one of the earliest theories introducing the concept of 'quanta'. It is historically important in context of foundation of quantum mechanics. Here, I present a conceptual framework based on Boltzmann statistics, with least possible mathematics, that led Planck to give Planck's radiation formula. I also discuss the zero- point energy corrections added to the theory later on and their significance in history of quantum mechanics that we study today.

P-35: SPACE DEBRIS - THE RISING CONCERN OF ERA

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Abstract: What's that one thing about the Universe that draws attention of each and every individual? Obviously the creation of Universe, its galaxies, stars, planets. When it comes to planets, how come we not talk about the life supporting planet i.e Earth. In order to gather information regarding this planet, Scientists; from decades; have been launching numerous satellites into its orbit. We already know that when a satellite is launched, its initial structure is quite complex as it consists of number of components like rocket boosters, cryogenic engine, orbiter, lander etc; but as it goes on achieving height and reaches its destination, it is only the orbiter and the lander of satellite that remains, then what happens to the other components that it leaves while moving up? What happens if there is a collision of certain satellites in the space? This is what leads to Space Junk or Space Debris. In other words, Space junk is basically the non-functional, human-made objects, in Earth's orbit. The increasing number of satellites has led to increased space debris in such a way that they have accumulated to create a debris belt which makes many orbits unusable. The conclusion that can be made from this fact is that Space Debris is definitely going to shatter and cause nuisance to our future launches and space expeditions. In order to make these orbits usable and to continue human expedition in space, researches have been done to find its solution. The solution involves firing of focussed pulses of atmospheric gases into the path of targeted debris. This story of not so seriously taken "Space Debris" and its solution is the crux of our poster presentation.

P-36: BRACHISTOCHRONE PROBLEM

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Abstract: The classical problem of variation is the so called brachistochrone problem proposed (and solved) by Bernoulli in 1969. Given two points A and B , find the path along which an object would slide (disregarding any friction) in the shortest time from A to B , if it starts at A in rest and is only accelerated by gravity. This is obviously an optimization problem, after all we want to minimize the travel time, but the minimization takes place over all possible paths from A to B. So, a natural question arises, that what is the path followed by the body moving from A to B such that the ball gets to the bottom in least amount of time. Is it a straight line is it part of an ellipse or just any other curve?

P-37: CAN SOLAR WINDS POWER EARTH?

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Abstract: As we strive to find the source of alternative energy, a number of researchers continue to look to what we consider as the ultimate source in renewable energy- the sun. However, creating efficient solar panels on earth is a big challenge. Through this technology, we are not able to utilize the solar energy to the fullest and hence the problem of pollution through burning fossil fuels and their depletion still remains a perpetuating problem. Therefore, some scientists are looking forward to harvest solar energy from the solar winds. The solar wind is a stream of charged particles that heads outwards from the sun's upper atmosphere. They move outwards to Earth and other planets and provide the potential to power the entire Earth. Energy from solar winds if utilized to its maximum has the potential to generate billions of gigawatts of energy. Hence, this renewable source of energy can replace the conventional sources of energy being used today and therefore serve as boon for the future generation.

P-38: COSMIC MICROWAVE BACKGROUND

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Abstract: Our present knowledge about our universe relies mostly on radiations which we receive from space. These radiations range from microwave region to gamma rays. Among these, radiation belonging to microwave region plays a crucial role in our understanding of past of our universe. In Big-Bang cosmology, electromagnetic radiation from early stage universe is called Cosmic Microwave Background. It has been proved as unavoidable evidence of Big-Bang origin of our universe. It also serve as an important tool for studying universe early age expansion. The cosmic microwave background is an emission of uniform, Black Body thermal energy coming from all parts of sky. CMB is typical thermal spectrum at temperature of 2.726 K. Many modern telescopes are dedicated to study thermal spectrum of our universe like plank telescope. CMB is crucial for modern understanding of our universe and its history. From date of its discovery until now CMB has proved to be a useful tool and studies and research related to CMB data validation and precise measurements are going on.

P-39: DARK MATTER

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Abstract: In 1993, F. Zwicky studied galaxies in COMA cluster and noted that rotation velocities were too large for the system to be bound and stable. He suggested that there must be missing mass in the cluster. Today we know that clusters are dominated by dark matter. Mass is not missing but it is dark. Dark matter is the dominant gravitational attractive component but we do not know what it consists of. Baryons lightly sprinkle the universe as they constitute only about 4% of total mass-energy density. Dark energy makes up the bulk of the universe at present epoch, clocking in at 73%, dark matter comprises 23% of the Universe. Dark matter holds baryons together to form galaxies, galaxy groups and galaxy clusters. For detection propose, we must have an understanding of the flux of dark particles through any given detector on earth. Direct search for dark matter particles is among the hardest experiments ever undertaken in science. For astronomical observation, proposed properties of dark matter are electromagnetic neutrality, self-interaction constraints, clumping on small scale etc. Only major non-particle candidate for dark matter is a primordial black hole which would have collapsed directly from highly overdense region of a large universe, the existence of which requires funky physics. Most popular proposed dark matter candidates are:- Weakly interacting massive particles(WIMPS), Axions, Gravitinos, Sterile neutrinos etc. The next-generation detector will certainly use method to discriminate against the background to reduce neutron flux from cosmic-ray induced events even at great depths underground. Dark matter detectors are mainly grouped as Cryogenic detectors such as CDMS, Edelweiss, Cresst; Liquid Noble gas detectors such as ZEPLIN, X MASS, XENON DETECTOR; other types of non- discriminating detectors such as bubble chamber. There are many new estimates for SUSY DM (supersymmetric dark matter) cross-section range. Direct search for Dark matter particles within the supersymmetry model is reaching a critical stage. Next-generation class of detectors is required to either confirm and explore discovery or to confirm the search of the darkness of the universe.

P-40: SPACE TIME FABRIC AND GRAVITATIONAL WAVES

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Abstract: In 20th century, Albert Einstein's theory of Special Relativity suggested about time to be relativistic rather than being absolute. The flow of time for any object depends on speed and gravitational field of that object. Our Universe has a speed limit. Nothing can have speed greater than the speed of light. One experiences time dilation while travelling at a speed close to the speed of light. According to General Theory of Relativity, gravity can bend time. Space and Time are inter-related as Spacetime and cannot exist independently. It is supposed to be a fabric. Any body having some mass can bend this spacetime fabric creating a valley which we call "gravity". More massive the body, more it will bend the spacetime fabric and hence more slow will be the time. This happens in the case of Black Holes. Thus, all the motions and revolutions are due to these spacetime bendings. These motions and revolutions cause changes in the curvature of spacetime which propagate at the speed of light. Therefore, these disturbances produced in the spacetime curvature propagating as waves at the speed of light are called Gravitational Waves.

P-41: STEERING PHOTONS AND PARTICLES TO CURE CANCER

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Abstract: Cancer ranks second among all the diseases in the list of most death-causing diseases in India and the world after cardiovascular disorders. The chance of cancer killing someone can be reduced by developing more sophisticated radiation therapy planning techniques that will spare the healthy tissues. In conventional treatment, we give a square or a rectangular field with very broad margins that ensure the tumor coverage but also irradiate a whole lot of normal tissues unnecessarily. Even with the use of multileaf collimeters, the best we can do is to give radiation in 5×5 mm grid domain which saves a lot of normal tissues, but not precise enough to treat tumors which are in the vicinity of critical radiosensitive organs. Thus, a very important question in hand is how to contain the irradiated area within the tumor margins. I will elaborate upon the future perspective of Intensity Modulated Radiotherapy (IMRT) which uses advanced technology to manipulate photon and proton beams of radiation to conform to the shape of a tumor with faster dose delivery that will increase treatment accuracy by reducing the risk of intrafraction motion (setup errors between multiple radiation fraction) with better tumor tracking techniques.

P-42:ELECTRONIC MOSQUITO REPELLENT

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Abstract: By using the IC555 in A-stable mode, we can generate the frequency around 20kHz to 38kHz Of ultrasonic wave, which can scare away the mosquitos. With this method we can save the Environment from pesticides or another spray Products which are harmful to human, earth and its atmosphere.

P-43: Fusion for Society

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Abstract: Fusion energy is a future of energy generation that would generate electricity by using heat from fusion reactions. Unlike other conventional energy sources like oil, natural gas and coal, fusion energy runs on essentially limitless fuel.In fusion process two lighter nuclei combine to form heavier nucleus and release lot of energy. Fusion reactors are specially designed to harness the energy from fusion process. To achieve environment for fusion to happen we need fuel in a confined structure with very high temperature, pressure and confinement time so that plasma can form to achieve essential Lawson criterion. To achieve present or future energy needs of the world we can't only depend on the conventional sources of energy but we need source which can provide us with limitless energy in future. This poster presentation is based on the fusion energy, how we can achieve the Lawson criterion to achieve fusion, how it would change the future of the world. It also includes the problems which we are currently facing in achieving this process. It also includes the benefits of achieving high plasma confinement time for the space industry, automobile sector, medical sector, food industry and textile industry . Poster also has information about the different R&D labs, specifically information about the the different Tokamaks and International Thermonuclear Energy Reactor (ITER) which are doing research work in fusion field. One section of poster comments on the construction of ITER and why we are using the tungsten for ITER's plasma facing wall instead of other good reflector like stainless steel. And it also discuss about India's contribution towards the fusion technology. Lastly it has information about the advancements are happening in fusion reactors and how society will get benefits from these fusion and plasma technology.

P-44: INDIA's FIRST PROBE TO LUNAR SOUTH POLE: CHANDRAYAAN-2

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Abstract: In Today's Science Era, Astrophysics is doing great work. Different countries in the world including America (NASA), Russia, India (ISRO), China are doing research in this field. On 22nd July 2019, Indian Space Research Organization (ISRO)'s mission "CHANDRAYAAN" comprising an orbiter and a soft lander (Vikram) carrying a rover (Pragyaan) was launched to moon at 2:43pm from SATISH DHAWAN SPACE CENTER on SRIHARIKOTA island. The lander and orbiter got separated on 2nd September. The orbiter evolves into a 100 km altitude circular polar orbit and lander is aimed to land on the surface in high latitude areas near the South pole on September 7. A risky landing is expected because of communication problems in far side of moon and other surface problems. It's primary objective is to demonstrate the ability to soft land on lunar surface & operate a romotic rover on surface. Scientific goals include studies of lunar topography, mineralogy, elemental abundance, the lunar exosphere and signatures of hydroxyl & water ice. As the axial and orbital velocities of moon are almost same, so far side of moon is permanently shadowed and have huge craters that are estimated to hold nearly 100 million tons of water, layer that is untapped source of essential resources. Also it is suitable for future space exploration missions due to its positional and elemental advantages. South pole can offer an undisturbed record of solar's origin as it has been untouched by sunlight for billions of years, Helium-3 bombardments due to solar storms that could provide safer nuclear energy in a fusion reactor as it is not radioactive. Thus, if successful, India will be the 2nd country after China to land on far side of moon.

P-45:MICRO- ELECTRO-MECHANICAL SYSTEM

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Abstract: This idea deals with the emerging field of micro-electromechanical systems, or MEMS. MEMS is a process technology used to create tiny integrated devices or systems that combine mechanical and electrical components. They are fabricated using integrated circuit (IC) batch processing techniques and can range in size from a few micrometers to millimeters. These devices (orsystems) have the ability to sense, control and actuate on the micro scale, and generate effects on the macro scale. The interdisciplinary nature of MEMS utilizes design, engineering and manufacturingexpertise from a wide and diverse range of technical areas including integrated circuit fabrication technology, mechanical engineering, materials science, electrical engineering, electronics and communication engineering, chemistry and chemical engineering, as well as fluid engineering, optics, instrumentation and packaging. Current MEMS devices include accelerometers for airbag sensors, inkjet printer heads, computer disk drive read/write heads, projection display chips, blood pressure sensors, optical switches, microvalves, biosensors and many other products that are all manufactured and shipped in high commercial volumes. MEMS has been identified as one of the most promising technologies for the 21st Century and has the potential to revolutionize both industrial and consumer products by combining silicon based microelectronics with micromachining technology. Its techniques and microsystem based devices have the potential to dramatically effect of all of our lives and the way we live. If semiconductor microfabrication was seen to be the first micromanufacturing revolution, MEMS is the second revolution.

P-46: WORLD SCIENCE SCENARIO IN 2070s

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Abstract: As there are many new developments in science in previous century and many more developments will take place in coming decades. Many technologies will get developed that may be very useful for humankind or maybe equally destructible. Nobody knew the development of various technologies in science will lead us to which world- a world that will be more like a heaven or a world that will be worst than the hell. This is the main focus of our poster to present the comparison of these two worlds.

P-47: BARCODE SCANNERS

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Abstract: Buying things at a grocery store has never been easier or quicker thanks to barcode technology. We have seen the black-and-white zebra stripes on everything from cornflake packets to library books and the laser wands that are used to read them. Barcode is a machine-readable code in the form of numbers and a pattern of parallel lines of varying widths, printed on a commodity. Hence a barcode essentially is a way to encode information in a visual pattern that a machine can read. The combination of black and white bars (elements) represents different text characters which follows a set algorithm for that particular barcode. Applications include product tracking, item identification, time tracking, document management, and general marketing. We'll discuss briefly about the working, applications and the future scope of barcode scanners.

P-48: E – WASTE MANAGEMENT

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Abstract: Rapid economic growth, coupled with urbanisation and growing demand for consumer goods has increased both the conception and the production of e-waste that pose a serious risk to sustainable economic growth. About 2 to 4 million tonnes per annum of e-waste is produced in India, with Maharashtra being the largest producer. Characterisation of these wastes is of paramount importance for developing a cost effective and environmentally sound recycling system. In this presentation, you will see a productive method to utilise e-waste in an effective way.

P-49: DESIGNING TECHNOLOGIESBASED ON ELECTRIC FUELS: A COMMENT

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Abstract: The utilization of natural resources as fuels in larger magnitudes has brought us on a stageto think on their abundances. This has resulted in various factors like depletion of ozone layer, pollution concerns, and melting of ice bodies etc. Therefore we are looking for environmental friendly ways to put steps ahead in the energy sectors. Here we present the concept of emerging electric vehicles along with associated challenges to practice in our country. In addition, this review has information on used machinery, survey on countries progressing on this technology, and related applications.

P-50: STUDY OF LASER PLASMA INDUCED SHOCK WAVES USING INTENSIFIED-CCD BASED TIME RESOLVED 'SHADOWGRAPH IMAGING TECHNIQUE'.

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Abstract: An experimental analysis of the laser produced, plasma induced shock waves in air ambient has been done. The expansion dynamics is explored using Intensified CCD based time resolved shadowgraph imaging technique. When a shock wave propagates in a medium, there is compression at the shock front and a rarefaction at the tail of the shock which causes rapid change in the medium density and hence the refractive-index at the interface between the shock front and the surrounding air medium due to which the probe beam gets deflected and makes the shadowgraph of the evolving shock front. The experiments carried out aim at capturing shock waves by fast cameras (capturing events at the scale of few nanoseconds) and subsequently interpreting the observations to understand the effects of shock wave propagation in the medium. Comparative study of the shock wave expansion at 12 mJ and 58 mJ laser energies is carried out. An attempt has also been made to observe the reflected shock wave by confining the shock wave longitudinally by placing an aluminium plate at ~8 mm separation from the target. Further, the interaction of two laterally colliding shock waves is also studied qualitatively in order to investigate the Mach reflection.\

Keywords: Q-switching, shock waves, ICCD, optical imaging, shadowgraph, Laser produced plasma, plasma expansion, shock-shock interaction, Mach reflection, etc.