1st
IAPT National Student Symposium on Physics

25–27 February 2013

Indian Association of Physics Teachers

and

Department of Physics, Panjab University, Chandigarh

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.

Professor A.K.Grover
Vice - Chancellor

PANJAB UNIVERSITY
CHANDIGARH, *India* 160 014

Message

It is indeed a matter of immense pleasure that the Department of Physics and the Indian Association of Physics Teachers (IAPT) are jointly organizing the first National Students Symposium on Physics from February 25 to February 27, 2013.

The decision to hold this Symposium for the students of Physics is highly appreciable and I congratulate the faculty for taking the lead in this motivational programme for the young students. I trust that the students will present their original research papers and learned teachers will inspire and educate the students to continue with physics career and to translate new ideas of science in laboratory for the welfare of humanity. I am sure, this will be the teacher – taught confidence building program for creative research to take India ahead in the scientific achievements.

I wish the great success for the symposium and send my blessings to the students.

(Arun K. Grover)

MESSAGE

It is a matter of immense pleasure that Indian Association of Physics Teachers (IAPT) in collaboration with Department of Physics, Panjab University Chandigarh is holding the first IAPT national Students Symposium on Physics (NSSP) on Feb 25-27, 2013 in the Department of Physics, Panjab University, Chandigarh. This is a unique national forum for 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. The mutual interaction among themselves and with learned teachers will further motivate them to peruse their original ideas till the final scientific goal is achieved. IAPT must continue this noble tradition till the dream of Honorable President of India "The Noble Prize in Science under National Flag" is achieved. I wish a grand success to the NSSP and warm regards to physics faculty.

Satya Prakash

(Satya Prakash)
Chairman, NSSP 2013

MESSAGE

The NSSP is a wonderful opportunity for undergraduate and postgraduate physics students in the whole country to present their work. I am proud that many of our students while they are still at the university stage publish papers in journals of repute. I am sure many of those students who will be presenting their work in the symposium will grow to become distinguished physicists of the country. By organizing such a symposium aimed at building up serious interest in physics research in our younger generation the organizers are rendering a great service to the cause of physics in the country.

My hearty greetings to all the participating students and I wish the symposium a resounding success.

H.C. Pradhan
President, IAPT

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.*

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 College, 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.

Acknowledgements

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- Prof. S.D. Mahanti, Michigan State University, USA
- OST Electronics Limited, Chandigarh
- Pyramid Electronics, Parwanoo

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Invited Speakers and Their Talks

S.D. Mahanti

ENERGY & NANOSCIENCE

There are many challenges facing the humanity in the 21st Century. Among them are Energy, Global warming, Climate change, and Poverty. In fact energy plays an important role in the other three. The world power use in 2008 was ~15 TW and is expected to at least double to 30 TW by 2050. Compounding the challenge presented by this projection is the growing need to protect our environment. There is therefore a great current interest in developing "clean" energy sources with high efficiency. Thus we have not only to look at renewable sources of energy but also to increase the efficiency of their energy production. In this talk I will discuss how the current ideas and developments in nano-science and nano-technology are playing important roles in producing novel materials in attacking these difficult problems and challenges.

Sudipta Mukherji

PHASE TRANSITION WITH BLACK HOLES

First order phase transition involving black holes can be qualitatively understood in terms of a simple toy model. Following the work of a first year M.Sc. student of Utkal University, I will review this model in my talk.

Prof. Arun K. Grover

RARE EARTHS BASED SPIN FERROMAGNETS WITH NET-ZERO MAGNETISATION FOR NICHE APPLICATIONS

Prof. L Satpathy

HOW TO LEARN/TEACH NEWTON'S LAWS OF MOTION

Sandeep Sahijpal

THE ORIGIN AND EVOLUTION OF OUR UNIVERSE

Ajit Mohan Srivastav

List of Oral Presentations

S.No.	Author	Title
O-1	Nandita Chaturvedi	The Dynamics Of Falling Paper
O-2	Tabish Shilbi	Quantum key distribution
O-3	Nisha Narasinha Kelkar	A laser based low cost technique to measure cell size
O-4	Chiranjit Mitra and [1]Bapun Kumar Giri, P.K. Panigrahi, A.N. Sekar Iyengar	
O-5	S. Anil Purohit	Construction of optical bench to calculate and verify optical parameters
O-6	PTS College Science, Surat	Aurora borealis
O-7	Chimnay Manoj Kolhatkar	Automatic street light control system
O-8	Sanmoy Mondal	Understanding the trajectory of an electron under the influence of magnetic field using bohmian machinery
O-9	S. Hui, Dr.B. R Sekhar	Valence band study of poly crystalline silver sample using ultraviolet photoelectron spectroscopy
O-10	Kartika N. Nimje	Influence of static magnetic field on the growth of plants
O-11	Nishant Gupta	Is universe really baryon asymmetric?
O-12	Monu Sharma and Varun Sharma	Rogue waves
O-13	Abhinna Kumar Behera, A. N. Sekar Iyengar, Prasanta K. Panigrahi	Correlation and periodicity in a bouncing ball motion through wavelets

List of Poster Presentations

S.No	Authors	Title
P-1	Amanjot Kaushal, Kanupriya and P. S..Tarsikka	Temperature dependent electrical conductivity of guava juice during ohmic heating
P-2	Honey Arora, Ramandeep Kaur and parveen Bala	Formation of planetary systems: a study reviewing formation and evolution
P-3	Saba Hasan Ansari and Dr. .R.V. Dabhade	Estimation of age of cluster m67
P-4	Sherry Chhabra	Determination of magnetic field strength of white dwarfs using spectroscopic data
P-5	Supriya Suhas Date	Comparative study of acoustics of auditorium and temple
P-6	Nitika Goyal, Monika Karday and Rajeev Kumar	Cp violation at kek b-fectory
P-7	Sourav Jain	Cosmic ray setup using plastic scintillator detector for testing efficiency of resistive plate
P-8	Neha Goyal and Parveen Bala	'iter'as future source of energy
P-9	Chetan Thakur	Prediction of variable stars as binary star in comparison with the binary star algol
P-10	Asmita Bhandare and Firoza Sutaria	Study of transiting exoplanets wasp-12 b and hat-p-7 b
P-11	Anirban Ch Narayan Chowdhury	Amplification of small signals using weak measurements
P-12	Akhileshwar Mishra, Sachin Pandey, Jewel Aggarwal, Abhishek Pandey, Sarim Ali, Vishakha Kashyap, Anshul Aggarwal, Ankur, Meenal Gupta, Akansha Kapoor, Ajay Arora, Priti Sehgal, Divya Haridas, K. Sreenivas	Design and development of a low cost computerized laser raman spectrometer and reducing the noise in the signal by fuzzy logic
P-13	Ruchi Srivastava, Vanita Srivastava, Rudrani Bhardwaj	Eco friendly physics
P-14	Honey Arora, Ramandeep Kaur and Parveen Bala	A study about three common forms of plasma
P-15	PTS College Science, Surat	Magnetohydrodynamics theory
P-16	Dnyanesh Tikhe And Mayur Arsade	Relativistic approach and de broglie hypothesis
P-17	Vijayakumar Gidad,, Karibasaiah Devaramane And Mithun	Motion

P-18	Ramanpreet Singh	Permanent magnet- the super batteries
P-19	Vishal Goyal	Improving efficiency of building air conditioners using people counting sensors
P-20	Nitisha Sharma and Anurag Seth	
P-21	Anjali, Neha, Maninderjeet kaur	Negative index meta materials
P-22	Richa and Kavita	Force sensors and its applications

Oral Presentations

A LASER BASED LOW COST TE THE DYNAMICS OF FALLING PAPER

Nandita Chaturvedi
St. Stephen's College, University Enclave, Delhi

Abstract: We discuss how a mathematical model based on three simple forces; gravity, lift and drag, captures the complex behavior of falling paper. While work of this kind has been done before [1], we make the model more realistic by introducing a new drag model. We also subject the model to experiment verification. Estimates for the values of frictional coefficients for the paper-air system are determined through an indirect experiment using scaling and geometry arguments. We find that for the frictional coefficients determined, the model provides a sound quantitative for the description of the path of a falling paper. Finally, we make predictions for the behaviour of the paper in different fluids by varying drag coefficients.

QUANTUM KEY DISTRIBUTION

Tabish Shilbi
S.G.T.B Khalsa College, Delhi University, Delhi

Abstract: We study a Quantum Key Distribution for a 3-particle system and then generalize it to a n-particle system. In this protocol, we take a 2-dimensional system of particles in an entangled state so that we can share a common key for firstly 3 different parties and then between n different parties. Then we also study some of the eavesdropping techniques used b**y** Eve and the advantages of our systemover some of those techniques.

A LASER BASED LOW COST TECHNIQUE TO MEASURE CELL SIZE

Nisha Narasinha Kelkar
R.E.Society's R.P. Gogate College of Arts & Science and R.V. Jogalekar College of Commerce, Ratnagiri, Mumbai

Abstract: It has been observed that periodic structure of plant cells effectively acts as a diffraction grating. The grating element of such system is obtained optically by shining the plant cells particularly in Onion peel by LASER. The measurement of diffraction pattern results into accurate determination of the columnar width of the periodic plant cell structure. This paper attempts to report an interdisciplinary approach to gauge the size variation in plant cell using diffraction. Keywords: Diffraction, plant cell, Laser.

CONSTRUCTION OF OPTICAL BENCH TO CALCULATE AND VERIFY OPTICAL PARAMETERS

S. Anil Purohit
G.J. College, Ratnagiri, Maharashtra

Abstract: The project concerns about making a single device that will fulfill the need of doing all experiments from Optics. Using the optical bench conventional optical bench we cannot perform all the experiments of optics, as the surface is not used there for experimentation. So I made the bench capable of using the surface so the surface related experiments can be performed more easily than conventional optical bench. This optical

bench is cost efficient (1/10th) cost of conventional optical bench. Also the use of LASER makes it a perfect and precise instrument. The probability and handiness are the key factors of this design of optical bench.

NONLINEAR DYNAMICS IN ARGON GLOW DISCHARGE PLASMA

[1]Chiranjit Mitra and [1]Bapun Kumar Giri, [1]P.K. Panigrahi, [3]A.N. Sekar Iyengar
[1]Department of Physical Sciences, IISEER
[3] Plasma Physics Division, SINP Kolkata

Abstract: Plasma is a typical nonlinear system with a large number of degrees of freedom. The present work investigates the nonlinear dynamics in argon glow discharge plasma from the perspective of Fourier and Wavelet based methods. The generalized Hurst exponent was obtained from Wavelet Based Multi Fractal Detrended Fluctuation Analysis (WBMFDFA), Multi Fractal Detrended Fluctuation Analysis (MFDFA), Continuous Wavelet Transform (CWT), power spectrum and Fourier analysis. We have shown periodic behavior in non-stationary time series of the discharge of potential fluctuations of plasma discharge. By analyzing several signals generated by the argon dc discharge plasma we show that the WBMFDFA can reliably determine the multi-fractal scaling behavior of time series.

AURORA BOREALIS

PTS College Science, Surat

ATOMIC STREET LIGHT CONTROL SYSTEM

Chimnay Manoj Kolhatkar
R. B. Kulkarni, Junior College of Science, Ratnagiri, Maharashtra

Abstract: Present manually operated street lights are not switched properly even after the sunrise and also not switcher on after the sunset. In sunny and rainy days, ON time and OFF time differ significantly which is one of the major disadvantage of using timer circuits.
Automatic street light control system is a simple, very useful and powerful concept, which uses transistor as a switch to ON and OFF the street light automatically. By using this system manual work is removed. It automatically switches light ON when the sunlight goes below the visible intensity and automatically switches light OFF when the sunlight goes above the visibility intensity. This is done by a Light Dependent Resistor (LDR) which senses the intensity of light. Automatic streetlights need no manual operation of switching ON and OFF. The system itself detects whether there is need for the light or not. When darkness rises to a certain value then automatically streetlight is switched ON and when there is other source of light, the street light gets OFF. The extent of darkness at which the street lights to ne switched on/off can also be changed using the potentiometer provided in the circuit.

UNDERSTANDING THE TRAJECTORY OF AN ELECTRON UNDER THE INFLUENCE OF MAGNETIC FIELD USING BOHMIAN MACHINERY

Sanmoy Mondal
IISER, Kolkata

Abstract: Wave function of a freely propagating electron can be denoted as a Gaussian wave packet naturally spreads with time in all three dimensions. Exploiting the machinery of

the Bohmian model of quantum mechanics, one can show that even after a small time away from its initial state the system of electron under a magnetic field is a diverging system. Also I would like to discuss a possible protocol to test bohmian trajectory experimentally.

VALENCE BAND STUDY OF POLY CRYSTALLINE SILVER SAMPLE USING ULTRAVIOLET PHOTOELECTRON SPECTROSCOPY

S. Hui[1], Dr.B. R Sekhar[2]
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Abstract: The following paper outlines the techniques and requirements of Ultraviolet Photoelectron Spectroscopy (UPS). The different vacuum condition and instrumentation are also studied extensively. UPS is utilized to study the valence band of polycrystalline Silver (Ag) sample and Fermi edge is obtained experimentally. The experimentally obtained data matches theoretically to a good extent.

INFLUENCE OF STATIC MAGNETIC FIELD ON THE GROWTH OF PLANTS

Kartika N. Nimje
Somalwar Junior College, Nikalas, Nagpur, Maharashtra

Abstract: Over many years, numerous experiments on the effects of magnetic field on plant growth have been performed with seedlings of different plant species placed in static and alternating magnetic fields. In both cases the magnetic exposure disclosed the stimulatory influence on the growth (parameters such as germination rate, growth rate and yield of the plant) of plants. Similar results were found in higher areas of study such as significant enhancement of the fresh tissue mass, assimilatory pigments level as well the chlorophyll ratio, average nucleic acids level, increase of the average plants length (exception: the dry substance mass accumulation). Also it was found that the difference in growth rate between treated and control plants decreased after the field was removed. The removal of the magnetic field also weakened the plant stem, suggesting the role of magnetism in supplying plants with energy.

IS UNIVERSE REALLY BARYON ASYMMETRIC?

Nishant Gupta
Dayalbagh Educational Institute, Agra

Abstract: Over the years theoretical physicists have tried to explain the origin of baryon asymmetry but the topic of baryon asymmetry still remain mysterious to all of us. I have attempted to explain that what we call baryon asymmetry may as well be the matter dominant region of our observable universe, with antimatter dominant region residing beyond our future visibility limit having no interaction with the former.

ROGUE WAVES

Monu Sharma and Varun Sharma
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Abstract: Rogue waves are the large-amplitude waves appearing suddenly on the sea surface without any prior warning(Waves that appear from nowhere and disappear without a trace). The marine folklore contains many colourful names like “freak”, “giant”, “monster”, “killer”, “holes in the sea”, “walls of water”, “three sisters” for such phenomenon. These waves appear, sometimes alone as a giant crest (Walls of Water), or preceded/succeeded by deep troughs (Holes in The Sea), or as several successive high waves (Three Sisters).
What confirms the significance of the *sea wave dynamics* is that, though large waves are usually expected to appear during rough sea state, *rogue waves are observed at calm sea conditions as well.* This phenomenon has found potential applications in various other branches of physics (e.g. nonlinear optics, plasma and super-conductivity, geophysics),that is why the words “Freak Waves” and “Rogue Waves” that came from marine folklore are now intensively used in these disciplines as well. A great progress is achieved in the understanding the physical mechanisms of the rogue wave phenomenon during the last fifteen years and this presentation contains the review of these physical mechanisms of rogue waves.

CORRELATION AND PERIODICITY IN A BOUNCING BALL MOTION THROUGH WAVELETS

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Abstract: The dynamics of bouncing ball is analyzed through wavelet transform. Multiscalte analysis on the time series of bouncing ball reveals clear signature of nonlinearity. The scale dependent variable window size aptly seize bith the transient and non-stationary periodic behavior quite well. Importantly, the multifractal parameter, the generalized Hurst exponent obtained by Wavelet Based Multifractal Detrended Fluctuation Analysis (WBMFDFA), Multifractal Detrended Fluctuation Analysis (MFDFA), continuous wavelet transform (CWT) and power spectrum fourier analysis of the chaotic motion of the bouncing ball, shows interesting results in the field of non-smooth dynamics. The optional time-frequency localization of the continuum morelet wavelet is found to delimit the scale dependent Periodic Modulation efficiently; where as the discrete Daubechies (DB) basis set has been applied effectively for detrending the temporal behavior to reveal the multifractal behavior underlying the dynamics. We relate our wavelet based MFDFA method to the standard partition function-based multifractal formalism as well as power spectrum fourier analysis of the non-stationary time series, and prove that each approach is equivalent for stationary signals.

Poster Presentations

TEMPERATURE DEPENDENT ELECTRICAL CONDUTIVITY OF GUAVA JUICE DURING OHMIC HEATING

Amanjot Kaushal, Kanupriya and P.S. Tarsikka
Department of Mathematics, Statics and Physics, Punjab Agricultural University, Ludhiana

Abstract: Ohmic heating is an advanced food processing technique in which heat is generated internally within the food by the passage of alternating electrical current. Conventional heating process essentially consists of heat-transfer mechanisms of conduction, convection and radiation. But this leads to loss of product quality and low energy efficiency. To overcome these problems an alternative technology was developed which utilizes the inherent electrical resistance of the food material known as ohmic heating. Ohmic heating has been derived from Ohm's law. The advantages of ohmic heating are the rapid, uniform volumetric heating, high energy conversion efficiency. The important parameter in ohmic heating of liquid food product is its electrical conductivity behavior. For the study of ohmic heating an ohmic heater is designed of known dimensions. Guava juice is studied for ohmic heating treatment. Guava juice is rich in vitamic C which helps to fight against any infection and improves the immune system. Although several studies have been performed on the ohmic heating rates of liquid food, data on concentration is limited. In this study, Guava juice having 20-50% soluble solid is ohmically heated by applying three different voltage gradients (6.0, 10, 13.5 V/cm). Measurements were made in the temperature heating, leads to the determination of electrical conductivities at various temperature range from 20-80^{o}C. The instantaneous values of current and voltage are recorded during ohmic heating, leads to the determination of electrical conductivities at various temperatures. The dependence of electrical conductivities on temperature, voltage gradient and concentration has also been studied. It was observed that the electrical conductivity of guava juice is significantly affected by temperature and concentration. The changes in viscosity and total soluble solids have also been observed with ohmic heating. Temperature time and electrical conductivities temperature graphs have been plotted. The electrical conductivity shows a linear dependence upon the temperature.

FORMATION OF PLANETARY SYSTEMS: A STUDY REVIEWING FORMATION AND EVOLUTION

Honey Arora, Ramandeep Kaur and Parveen Bala
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Abstract: Many hypothesis and theories have been given so far to explain the formation of planetary system. The first proposed being the nebular hypothesis which was first proposed in 1734 by Emanuel Swedenborg, Immanuel Kant, and Pierre-Simon Laplace. Over the course of the 20th century, this model came to be challenged by a number of theorists who proposed numerous models in an attempt to replace it, like gas drag theory, gravitational instability model and core accretion theory to name a few. However, none of these attempts were successful and it was not until the 1970's with Soviet astronomer Victor Safronov that the modern (and widely accepted) Solar Nebular Disk Model (SNDM) came into being. Recent model to this study has been given which is named as 'sequential accretion model', suggested in 2012 (ref). These provide us insight into how we reached

where we are today and help to answer certain questions about formation of our own solar system too via a scientific explanation. The theory which describes the formation of the solar system in particular is the condensation theory. In this poster review of developments in our understanding of the formation and evolution of planets is presented along with the ongoing work in this field. Reference: Fortier, Y. Alibert, F. Carron, W. Benz, K.-M. Dittkrist Planet formation models: the interplay with the planetesimal disc. arXiv:1210.4009[astro-ph.EP]

ESTIMATION OF AGE OF CLUSTER M67

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Abstract: Photometry is a technique of astronomy concerned with measuring the flux, or intensity of an astronomical object's electromagnetic radiation. When using a CCD camera to conduct photometry there are a number of possible ways to extract a photometric measurement (e.g. the magnitude of a star) from the raw CCD image. The simplest technique, of aperture photometry is performed by using the software IRAF on individual stars by adding up the pixel counts within a circle centered on the object and subtracting of an average sky count. However the photometry in a very crowded field, such as a globular cluster, where the profiles of stars overlap significantly is achieved by using the software MIDAS. It gives an advantage of getting the magnitude of maximum stars in a cluster at once. Photometry is applied to study the open cluster m67. The two main purposes of this study were to compare the color- magnitude diagram using photometric techniques with the standard one and to determine the age of the cluster and meanwhile compare different techniques involved in finding the age. Since each technique has got its degree of uncertainty, sometimes the uncertainty even lead to a result that depict the age of the cluster greater than the age of universe. Thus, the challenge is to prevent such mystification and hence conclude an appropriate result by using any convenient techniques.

DETERMINATION OF MAGNETIC FIELD STRENGTH OF WHITE DWARFS USING SPECTROSCOPIC DATA

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Abstract: White Dwarfs are extremely interesting objects to observe and analyze, especially the ones that constitute a part of the Cataclysmic Variables. These stars are present in a binary system with a secondary main sequence star, from which they accrete mass via an accretion stream. Some of these cataclysmic variables exhibit extraordinary magnetic fields which cause a distortion in the accretion disk and the infalling matter is directly taken through the poles of the white dwarf following the magnetic field lines. The spectra of such stars exhibit many features such as cyclotron humps, Zeeman wings etc. Here, the spectra of such stars was extracted from the Sloan digital sky survey and then analyzed to determine their magnetic fields by studying the Zeeman split spectral line components arising due to the high magnetic fields while calculating the values for the cyclotron frequency.

COMPARATIVE STUDY OF ACOUSTICS OF AUDITORIUM AND TEMPLE

Supriya Suhas Date
R.E.Society's R.P. Gogate College of Arts & Science and R.V. Jogalekar College of Commerce, Ratnagiri, Maharashtra

Abstract: Now a day's temples and auditoriums are built as per acoustics science with the help of modern technology. But in old era auditoriums, temples were found in dome structure. We have made an attempt to do comparative study of old structures and new structures of auditorium and temple. An auditorium is considered to be good if it has flat frequency response over all audio frequencies. To study the frequency response of auditorium and temple we used frequency generator to produced the signals having frequencies corresponding to notes 'SA', 'PA', and 'NI' of the middle octave. Readings of sound intensity were taken at various positions in the auditorium and temple. The analysis shows that modern auditorium as well as old temples have fairly flat frequency response, which indicates that even the old temple were acoustically good.
Keywords; Acoustics, Dome structure, Auditorium, Temple.

CP VIOLATION AT KEK B-FECTORY

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Abstract: The visible universe is composed of matter particles protons, neutrons and electrons rather than their antimatter partner antiprotons, antineutrons and positrons. If the moon were composed of antimatter, then lunar probes and astronauts would have vanished in a fireball of energy as soon as they touched the lunar surface. The solar wind and cosmic rays do not destroy us, implying that the sun and the Milky Way are also made of matter. The big bang should have produced equal amounts of matter and antimatter if C P –symmetry was preserved. As such there should have been total cancellation of both-protons should have been cancelled with antiprotons, electrons with positrons, neutrons with antineutrons and so on. This would have been resulted in a sea of radiation with no matter. Since this is not the case, after big band physical laws must have acted differently for matter and anti-matter, i.e. violating CP-symmetry. Charge-Parity (CP) violation an obscure effect seen only with certain kind of elementary particles could provide answer. In particle physics, CP violation is the violation of the postulated CP symmetery: the combination of C-symmetry (charge conjugation symmetry) and P-symmetry (parity symmetry). CP symmetry states that the laws of physics should be the same if a particle were interchanged with its antiparticle and then the left and right were swapped. In 1964, Christenson Cronin, Fitch and turley unexpectedly discovered CP violation in the decay of neutral K-mesons. Recently, a new generation of experiments, the Belle experiment at the high energy linear accelerator center (SLAC), USA has observed CP violation using B mesons. Results presented by both experiments in July 2001 successfully established the presence of CP violation in B meson system and subsequently lead to Noble Prize to Cabbibo, Kobayashi and Maskawa in 2008 for their theory of CP violation. The Belle experiment has collected nearly $1ab^{-1}$ data during its 10 years if operation from 1999-2010 and probed many new decays, resonances and particles etc..

COSMIC RAY SETUP USING PLASTIC SCINTILLATOR DETECTOR FOR TESTING EFFICIENCY OF RESISTIVE PLATE

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Abstract: RPC is a parallel plate gas detector employed for the detection of minimum ionization particles and in our case muons. These scintillators detectors were tested for its performance in details. We fabricated scintillator detectors for finding the efficiency of RPC's using cosmic ray muons. The operational performances of RPC's in the two operating modes depending upon the different mixture of gases send into the gas gap of RPC have been studied. Efficiency measurement of a prototype RPC will be presented. Study of efficiency of the prototype RPC using VME hardware and software will be presented.

'ITER'AS FUTURE SOURCE OF ENERGY

Neha Goyal and Parveen Bala
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Abstract: The development of controlled nuclear fusion is a source of high energy. In a fusion reactor, two Hydrogen atoms are brought together to form a helium atom, a stream of neutrons and energy. The theory of nuclear fusion was first developed by Robert Atkinson and Fritz Houterman in 1929. There are several types of nuclear fusion reactions, most of which involve deuterium and tritium which are isotopes of hydrogen. A proton-proton chain reaction is the process by which stars like the sun generates energy. The temperature of fusion reactor has to be about 100 million degrees Kelvin or about six times the temperature of the sun's core. At this temperature, the hydrogen is a plasma, a state of matter in which electrons are stripped from atoms and move about freely. There are plans to construct a new fusion facility at Cadarache in France, called the ITER acronyms of International Thermonuclear Experimental Reactor. It has been finalized as a joint project of the United states, the European Union, Japan, China, Russia and South Korea. ITER is a step between today's studies of fusion energy and future electricity-producing fusion power plants. Fusion has beneficial features which must be demonstrated on ITER and by all future plants to be widely applicable, to be essentially inexhaustible. One of the goals of ITER is to achieve ten times the energy from a fusion reaction than has been achieved. It is designed to develop the technologies necessary for commercial fusion plants that will generate electricity, hopefully by the mid 21^{st} century. In this presentation, an idea of ITER as future of energy has been projected

PREDICTION OF VARIABLE STARS AS BINARY STAR IN COMPARISON WITH THE BINARY STAR ALGOL

Chetan Thakur
Fergusson College Pune

Abstract: Study of binary star systems, through the variability of their combined luminosity, can give us important information about the celestial dynamics of these stars. The objective of this project is to study different variable stars and check whether they are binary star or not. Initially a variable star binary system Algol was studied, and its light curve was obtained after observations over a period of 2 days. This was then used as a reference for studying other variable stars. By doing a comparative study of other unknown variable stars with the

reference star we predict whether the star under study is in a binary system or not. The present work is ongoing at the Inter University Center for Astronomy and Astrophysics (IUCAA, Pune), where we are using Solid State Photometer attached with Celestron 8" Telescope and the task will be accomplished in 2 months. The Presentation includes the comparative study of variable stars by taking Binary star Algol as a reference.

STUDY OF TRANSITING EXOPLANETS WASP-12 B AND HAT-P-7 B

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Abstract: Defocused Photometry is an extremely sensitive method which allows precision photometry with sub-milli magnitude accuracy. We report here on transits of two such systems (WASP-12 b and HAT-P-7 b), both of which are in short period orbits around their hosts. The extrasolar planet WASP-12 b, in orbit around WASP-12 (G0V), is a 1.41 ± 0.10 M_J gas giant with radius 1.79 ± 0.09 R_J. The high effective temperature of the central star (6300 K) and short orbital period (1.09142 days) make WASP-12 b one of the most intensely irradiated extrasolar planets and one of the most well studied ones. The extrasolar planet HAT-P-7 b, in orbit around GSC 03547-01402 (F8V) is a 1.8 ± 0.63 M_J ,1.42 ± 0.144 R_J gas giant which is significantly less dense than Jupiter (0.62 ρ_J). With an orbital period of 2.2047299 ± 4e-05 days, it is found to have a retrograde orbit, raising questions as to the origin and survival of the system. We report on 3 transits taken over a period of 14 months. Our observations reproduce the observed parameters of these two systems but suggest a timing variation.

AMPLIFICATION OF SMALL SIGNALS USING WEAK MEASUREMENTS

Anirban Ch Narayan Chowdhury
IISER Pune, Pune

Abstract: The notion of a weak measurement was introduced in the late 1980's by Aharonov et al as a modification of the von Neumann measurement scheme. In this scheme, we measure a particular property of a system by coupling to a known pointer device and then inferring the system's property from the resulting shift in pointer state. In the modified weak-measurement scenario, the system is first initialized in a particular state (pre-selection), followed by interaction with the pointer, and finally a detection of the system in a state that is different from the initial one(post-selection). The pointer shifts induced by this procedure can be much larger than that obtained by a standard measurement scheme. Therefore, weak measurements can be used to amplify and detect very small signals. This has been demonstrated experimentally, for example in detecting a tiny spin-hall effect, for measuring small deflections of a mirror in an interferometer etc. The initial device states used in weak measurements are typically Gaussians. We have shown that by using orbital angular momentum states, or Laguerre-Gauss modes as initial device states, it is possible to enhance the sensitivity (as measured by the signal-to-noise ratio) of amplification. This has been calculated approximately for weak measurement using a parametric-down-conversion(PDC) interaction, and exactly for observables of the type $A^2 = I$ in a Stern-Gerlach like setup.

DESIGN AND DEVELOPMENT OF A LOW COST COMPUTERIZED LASER RAMAN SPECTROMETER AND REDUCING THE NOISE IN THE SIGNAL BY FUZZY LOGIC

Akhileshwar Mishra, Sachin Pandey, Jewel Aggarwal, Abhishek Pandey, Sarim Ali, Vishakha Kashyap, Anshul Aggarwal, Ankur, Meenal Gupta, Akansha Kapoor, Ajay Arora, Priti Sehgal, Divya Haridas, K. Sreenivas[1]
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Abstract: Raman spectroscopy provides key information about the structure of molecules and gives a characteristic fingerprint for chemical analysis. The theory of Raman spectroscopy is taught in theory classes for undergraduates but there is a perceived lack of suitable experiments in the teaching laboratories that provide practical training. Thereby undergraduates are only cramming the concepts of Raman spectroscopy without understanding the importance of it despite being the fact that Sir C.V.Raman and Krishnan had done marvelous research in this field which had bought the Nobel Prize in Physics for India. Raman spectroscopy experiment at the undergraduate level in India is neither explained in detail, nor is the experiment done due to the lack of an inexpensive Raman spectrometer. Such equipment is still not available from commercial sources in India, and need to be imported. Research grade Raman spectrometers are available by importing at a huge cost, therefore the main problem in implementing Raman spectroscopy is its cost.
The aim in the present work is to design a low cost Raman spectrometer which would be indigenously designed for undergraduate students. The technique traditionally requires a grating monochromator, photomultiplier-tube detector, and an intense monochromatic light source. The spectrometer uses a green laser pointer (λ=532 nm) to illuminate the sample via a microscope objective. Backscattered Raman radiation is collimated by the same objective, green-laser light is blocked by a filter, and the remaining Raman radiation focused into a glass fiber that is connected to a visible spectrometer with a grating monochromator and a linear diode array CCD detector. Signals are transferred via the USB connection to a computer where the signals are processed and displayed. During data acquisition of the spectrum with CCD, noise superimposes on the signal. Image processing and fuzzy technique is used to remove the additive noise to extract the pure signal. It is a great challenge to develop algorithms that can remove noise from the image without disturbing its content. The neighborhood averaging and smoothing by image averaging are the classical image processing techniques for noise removal. Fuzzy logic provides the mathematical model for approximate reasoning, which mimics human reasoning and can be therefore very powerful. Hence we have used the concepts of fuzzy logic to remove noise and extract pure signal. Raman analysis of benzene and Carbon tetrachloride has been done successfully with our designed Raman spectrometer.

ECO FRIENDLY PHYSICS

Ruchi Srivastava, Vanita Srivastava, Rudrani Bhardwaj
M.P.G. College, Hardoi

Abstract: Now a days pollution and global warming are the biggest problem for the earth. Polluting environment has become our habits. Today the great use of polymers, electronic equipments another industrial products cause of polluting our earth usually we think that science gives us a dirty and polluted atmosphere besides providing us great comfort but its not true. Every coin has two faces, it depends on us that we see either head or tail. Likely

about use of science, it totally depends on its user whether they use it for good results or not. Today where the great industrial development pollutes air and causes global warming while physics also provides many techniques through which we can achieve our requirements without polluting or destroying the nature. Here we have some shown some techniques which can be used to make physics eco-friendly.

A STUDY ABOUT THREE COMMON FORMS OF PLASMA

Honey Arora, Ramandeep Kaur and Parveen Bala
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Abstract: We are surrounded by plasma, meaning to say that 99% of the universe is in the plasma form. Our sun and all the stars are made of plasma, much of interstellar space and intergalactic space is filled with plasma. Plasma is the fourth state of matter other than solid, liquid and gas. Plasma is a quasi-neutral medium of positive and negative particles which responds strongly to electromagnetic fields. Although these charged particles are unbound, these are not free. When these charges move they generate electrical currents with magnetic fields, and as a result, they are affected by each other's fields that is we can say that they show collective behaviour. We live in 1% of that universe which is not actually plasma. The reason being high temperature conditions required for its quasi-neutral existence. The common forms of plasma include artificially produced, terrestrial plasmas and space and astrophysical plasma. Artificially produced plasmas are found in plasma displays, inside fluorescent lamps, plasma balls etc. Terrestrial plasmas include lightning, sprites, polar aurorae etc while space and astrophysical plasmas includes solar wind, interstellar medium, intergalactic medium, interstellar nebulae etc. In this presentation, a study of these forms of plasma has been conducted and explained with the help of pictures.

MAGNETOHYDRODYNAMICS THEORY

PTS College Science, Surat

RELATIVISTIC APPROACH AND DE BROGLIE HYPOTHESIS

Dnyanesh Tikhe and Mayur Arsade
KZS Science College, Nagpur, Maharashtra

Abstract: The matter wave concept sought by de Broglie can be applied to photon, electron, neutron, atom and molecule. Evidence of wave nature of macroscopic objects can never see. The group velocity of matter waves related to relativistic particle and non relativistic particle can be calculated using de Broglie's hypothesis.

MOTION

Vijayakumar Gidad,, Karibasaiah Devaramane and Mithun
Laxmi Venkatesh Desai college Raichur, Karnataka

Abstract: The world is filled with things in motion, things as small as dust large as galaxies, all continually moving. Your book may seem to be lying quietly on the desk, space but each of its atom is constantly vibrating. The "still" air around you consists of molecules tumbling wild at various speeds, most of them moving as fast as rifle bullets. Light beams dart through the room covering the distance from wall to wall in about a hundred million of a

second and making about ten million vibrations during that time. The whole earth, our spaceship itself, is moving at about 29 km/s around the sun.

PERMANENT MAGNET- THE SUPER BATTERIES

Ramanpreet Singh
Department of Physics, Panjab University, Chandigarh

Abstract: Arranging magnets on rotor and staror system in such a way that magnets on rotor are repelled and continuous rotational motion is obtained and that motion can be used to obtain electricity through generators. Energy obtained from system will cause loss in magnetization of magnets, which is very less ranging from 10 to 100 years. Thus, the super batteries.

IMPROVING EFFICIENCY OF BUILDING AIR CONDITIONERS USING PEOPLE COUNTING SENSORS

Vishal Goyal
Department of Physics, Panjab University, Chandigarh

Abstract: Prototype of People counting sensors based control for Building Air conditioner is developed and discussed and improvement of efficiency is also discussed. Every human entity emits an approximately definite amount of heat energy to atmosphere, which disturbs temperature equilibrium made by Air conditioner. So we prototyped a control to Air conditioner based on people in area.

NEGATIVE INDEX META MATERIALS

Anjali, Neha, Maninderjeet Kaur
Department of Physics, Panjab University, Chandigarh

Abstract: We will be presenting the concept of NEGATIVE INDEX METAMATERIALS in our poster, which was introduced by Russian Physicist, Vaselago, in 1967.
Negative index metamaterials are the materials with negative refractive index due to simultaneous negative permittivity and permeability in a certain frequency range. These materials have various properties different from the normal (positive index) materials like reversed Snell's law, reversed Doppler effect, obtuse angle Cherenkov radiation etc. Negative index metamaterials also have varied applications like – with these materials resolution below diffraction limit becomes possible. Other potential applications for negative index materials are soltions, optical nanolithography, nanotechnology circuitry, as well as a near field superlens that could be useful for biomedical imaging and subwavelength photolithography. Also electromagnetic waves travel differently in these materials which earn them a name left handed materials.
So our poster will include some basic theory regarding metamaterials, the various properties distinguishing metamaterials from, basic wave propagation characteristics in these media and their applications.

FLEXIBLE ELECTRONICS

Nitisha Sharma and Anurag Seth
Department of Physics, Panjab University, Chandigarh

Abstract: Imagine the world with computers as thin sheet of paper, iphones which can be folded, skullcaps which can sense force of impact on an athlete's head, and extremely small sized sensor stickers which can measure your body temperature! No one would have ever thought of printing big circuits on just a thin sheet of insulator until the discovery of the core of the today's electronic technology, i.e. Printed circuit boards (PCB's), in early 20^{th} century. These have not only reduced the size of the big wire wrap circuits but also the operating voltage required for them. It is hard to satisfy human's curiosity! Now we wish to incorporate the whole circuitry including electronic components and conducting path ways on a flexible insulated substrate. All these can now be made possible with the very new technology called 'Flexible electronics' on substrate such as transparent conductive polyester film using Photolithography. Due to the introduction of this technology, long existed problems like limited space or board thickness, in electrical connections where space is the deriving factor can be effectively managed. Through this poster presentation, we would like to share this new interesting and highly appreciable technology, and its implementation.

FORCE SENSORS AND ITS APPLICATIONS

Richa and Kavita
Department of Physics, Panjab University, Chandigarh

Abstract: I will present poster on some applications of electronic sensor an method of how to improve accuracy of experiments performed in labs. Let's take an example of experiment 'determination of the co-efficient of viscosity of various liquids by using Stroke's method' it can be made more accurate using electronic sensors. We use stop watch to measure the time that the steel ball takes to travel certain vertical distance. This may include manual errors and the results will not be accurate. If we use sensors, errors will be reduced to much lower value or it may include no error at all. So in the poster such sensors and their working will be discussed with their more useful applications.