Bulletin of

₹ 25/-

ISSN 2277-8950

THE INDIAN ASSOCIATION OF PHYSICS TEACHERS

A MONTHLY JOURNAL OF EDUCATION IN PHYSICS & RELATED AREAS

VOLUME 14 NUMBER 11 NOVEMBER 2022

These pillars, flush with gas and dust, enshroud stars that are slowly forming over many millennia. NASA's James Webb Space Telescope has snapped this eerie, extremely dusty view of the Pillars of Creation in mid-infrared light – showing us a new view of a familiar landscape. Interstellar dust cloaks the scene. And while mid-infrared light specializes in detailing where dust is, the stars aren't bright enough at these wavelengths to appear. Instead, these looming, leaden-hued pillars of gas and dust gleam at their edges, hinting at the activity within. Thousands and thousands of stars have formed in this region. In MIRI's view, the majority of the stars appear missing because many newly formed stars are no longer surrounded by enough dust to be detected in mid-infrared light. Instead, MIRI observes young stars that have not yet cast off their dusty “cloaks.” These are the crimson orbs toward the fringes of the pillars. In contrast, the blue stars that dot the scene are aging, which means they have shed most of their layers of gas and dust. How vast is this landscape? Trace the topmost pillar, landing on the bright red star jutting out of its lower edge like a broomstick. This star and its dusty shroud are larger than the size of our entire solar system.

The Pillars of Creation is set within the vast Eagle Nebula, which lies 6,500 light-years away.

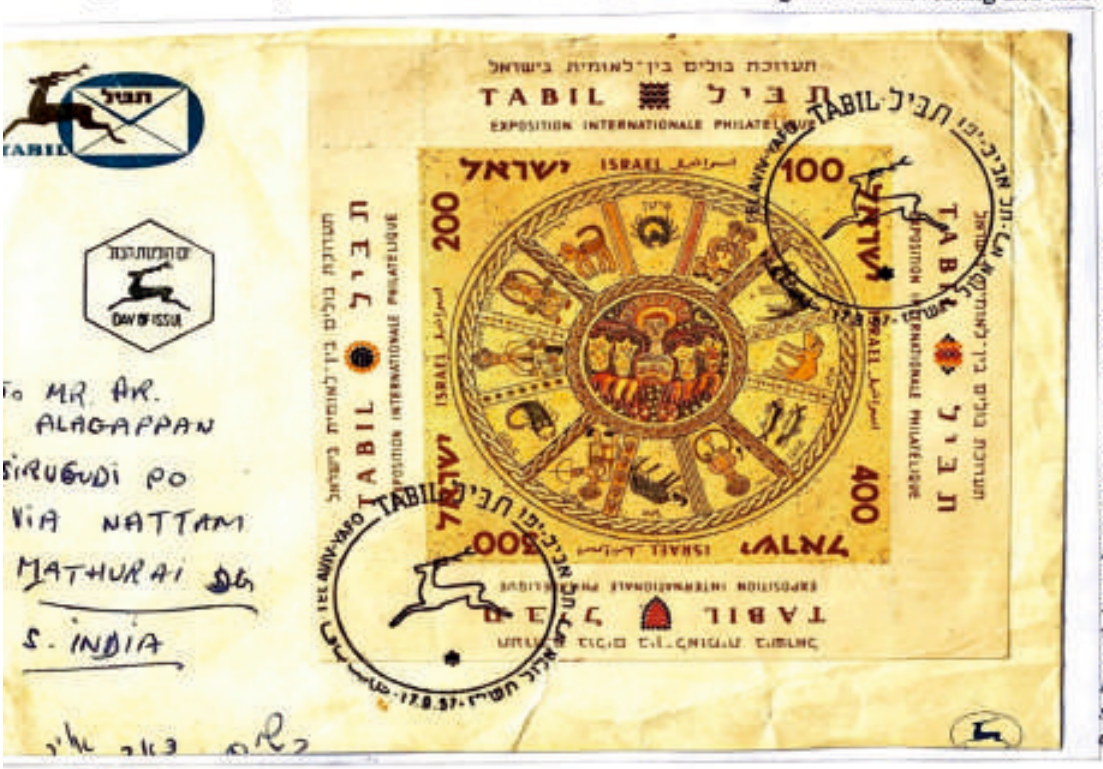
(https://www.nasa.gov/feature/goddard/2022/haunting-portrait-nasa-s-webb-reveals-dust-structure-in-pillars-of-creation)

The Story Of Cosmology Through Post Stamps 28

HUMAN EXPERIENCE OF THE SKY

CONSTELLATIONS

Division of the starry sky into recognizable figures evolved by different civilizations as expression of man's desire to impose order on apparent chaos of the night sky. So, the concept of humanization of constellation in order to recognise their fixed patten was in fact connected with need of fixing time of harvesting and also of journey



A commercially used miniature sheet on cover-

depict The Wheel of Zodiac – a mosaic floor of ancient Beit Alfa Synagogue (5th -6th century) Israel.

Central penal depict the 12 constellations of Sidereal Zodiac with the Hellenistic Sun God Helios, In pre modern Hebrew- astrology was known as 'Hokmat Ha Mazalot" the science of constellations

Zodiac Constellations depicted in the *margin of a sheetlet* of astronomical objects

BULLETIN OF
INDIAN ASSOCIATION OF PHYSICS TEACHERS
http://www.indapt.org **(ISSN 2277-8950)**

CHIEF EDITOR: U.S. Kushwaha, Chandigarh

EDITOR: Manjit Kaur, Chandigarh

ASSTT. EDITOR: Arvind K. Taneja, Chandigarh

EDITORIAL BOARD:
- L. Satpathy, Bubhaneswar
- H.C. Verma, Kanpur
- Pratip Kumar Chaudhari, Kolkata
- Vijay A. Singh, Mumbai

ADVISORY BOARD:
- Satya Prakash, Chandigarh
- Y.R. Waghmare, Pune

MANAGING EDITOR:
Sanjay Kr. Sharma
Email: sksharma777@gmail.com
Ph.: 9415404969

All communication regarding the contents of the Bulletin should be addressed to:
Chief Editor (IAPT Bulletin)
Indian Association of Physics Teachers
Dept. of Physics, P.U., Chandigarh - 160014
Email: iapt@pu.ac.in
Ph.: 7696515596 (USK), 9464683959 (MK)

The Bulletin is the official organ of the IAPT. It is a monthly journal devoted to upgrading physics education at all levels through dissemination of didactical information on physics and related areas. Further, the Bulletin also highlights information about the activities of IAPT.

INDIAN ASSOCIATION OF PHYSICS TEACHERS

REGISTERED OFFICE:
Indian Association of Physics Teachers
Flat No. 206, Adarsh Complex,
Awas Vikas-1 Keshavpuram,
Kalyanpur, Kanpur-208017
Ph. : 09935432990 • Email: iaptknp@rediffmail.com

EXAMINATION OFFICE:
Indian Association of Physics Teachers
15, Block 2, Rispana Road,
Near DBS (Post Graduate) College
Dehradun - 248001 (Uttarakhand)
Ph. : 9632221945
Email: iapt.nse@gmail.com, http://www.iapt.org.in

PRESIDENT:
P. K. Ahluwalia
Shimla (Himachal Pradesh)
Email : pkahluwalia071254@gmail.com
Ph. : 9805076451

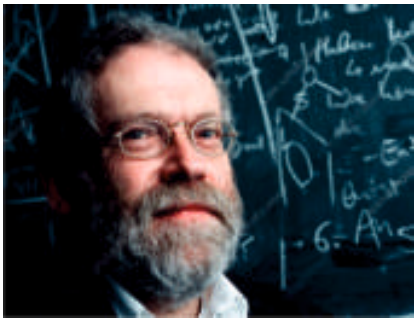
GENERAL SECRETARY:
Rekha Ghorpade
4, Sunder Niwas, CHS Ltd, Thanekar Wadi, Kopri,
Thane(East), PIN: 400603 Maharashtra.
Ph. : 9833569505
Email: gensecretary.iapt22@gmail.com

CHIEF COORDINATOR (EXAMS):
B. P. Tyagi
23, Adarsh Vihar, Raipur Road,
Dehradun-248001
Ph.: +91 135 2971255, 9837123716
Email: bptyagi@gmail.com

TYPESET: Gurbaksh Singh, singhgurbaksh119@gmail.com

The Nobel Prize in Physics 2022

Scientific background: "For experiments with entangled photons, establishing the violations of Bell inequalities and pioneering quantum information science"



How entanglement has become a powerful tool

Using ground-breaking experiments, Alain Aspect, John Clauser and Anton Zeilinger have demonstrated the potential to investigate and control particles that are in entangled states. What happens to one particle in an entangled pair determines what happens to the other, even if they are really too far apart to affect each other. The laureates' development of experimental tools has laid the foundation for a new era of quantum technology.

Manjit Kaur

PHYSICS NEWS

Trapping polaritons in an engineered quantum box

Australian researchers have engineered a quantum box for polaritons in a two-dimensional material, achieving large polariton densities and a partially "coherent" quantum state. New insights coming from the novel technique could allow researchers to access striking 'collective' quantum phenomena in this material family, and enable ultra-energy efficient and high-performant future technologies.

The key to the construction of the quantum box was the use of a "small" 2D material (tungsten disulfate) on top of a "large" heterostructure containing the same material. This allowed the researchers to carefully investigate and compare the properties of the polaritons trapped in the box and of freely moving polaritons.

Exciton-polaritons are a promising platform for future ultra-low energy electronics, because they can flow without any wasted dissipation of energy, in a fully "coherent" quantum state. Novel, 2D, atomically-thin semiconductors (TMDCs) are promising candidates for such future technologies because excitons are stable in these materials at room temperature.

Read more at: https://phys.org/news/2022-10-polaritons-quantum.html

Original paper: Physical Review Letters. DOI: 10.1103/PhysRevLett.129.147402

Entanglement-Enhanced Matter-Wave Interferometer: Now with Double the Spookiness!

For the first time, scientists have successfully combined two of the “spookiest” features of quantum mechanics to make a better quantum sensor: entanglement between atoms and delocalization of atoms.

By learning how to operate a matter-wave interferometer inside of an optical cavity, the team was then able to create entanglement between the different atoms to make a quieter and more precise measurement of the acceleration due to gravity. This is the first time that anyone has been able to observe a matter-wave interferometer with a precision that surpasses the standard quantum limit on precision set by the quantum noise of unentangled atoms.

By doubling down on the spookiness, future quantum sensors will be able to provide more precise navigation, explore for needed natural resources, more precisely determine fundamental constants, look more precisely for dark matter, or maybe even one day detect gravitational waves.

Read more at: https://scitechdaily.com/entanglement-enhanced-matter-wave-interferometer-now-with-double-the-spookiness/

Original paper: Nature DOI: 10.1038/s41586-022-05197-9

Searching for quantum gravity from under the ice

King's experimental physicist, Dr. Teppei Katori, is a lead analyst of data gathered by the ice Cube Neutrino Observatory in the search for quantum gravity. The observatory, buried deep beneath the Antarctic ice, detects astrophysical neutrinos. Researchers took data on the composition of neutrinos observed by the ice Cube over a period of seven and a half years and compared it to the expected composition had they been affected by modified space-time structure due to quantum gravity.

The experiment found no discernible evidence of quantum gravity. It did however further improve understanding of models that could change neutrino composition. Commenting on the findings, Teppei said, “The observations from the Ice Cube are helping to push the boundaries of our understanding of space-time."

Read more at: https://phys.org/news/2022-10-quantum-gravity-ice.html

Original paper: Nature Physics DOI: 10.1038/s41567-022-01762-1

Soumya Sarkar
IISER Pune
India

Measuring The Electronic Charge – A Fundamental Physical Quantity

Pruthul Desai
Sir P T Sarvajanik College of Science, Surat
Email: principal@ptscience.ac.in

Abstract

Theoretical Physics uses various concepts of Mathematics to formulate theories to explain observed natural phenomena. The fundamental laws of nature, expressed in the form of mathematical equations, sometimes contain physical constants. Also, we have come across basic physical quantities like charge associated with fundamental particles. Determining the value of the fundamental physical quantities is of great importance. During the last two centuries ingenious experiments were designed to accurately measure these quantities. One of the pioneering experiment that led to the determination of value of fundamental electric charge (electron) called the Millikan oil drop experiment, fetched Millikan the coveted Nobel Prize in Physics in 1923. In this article, starting from the initial efforts to the successful measurement of the fundamental electric charge by Millikan, is presented.

Introduction

The world around us is of baffling complexity. It is, as Schrodinger has remarked, a miracle that in spite of the baffling complexity of the world, certain regularities in the events could be discovered [1]. In Einstein's view, 'the supreme task of a physicist' was to comprehend the orderthat underlies the workings of the entire cosmos - from the behavior of the tiny particles jiggling around inside atoms to the convulsions of galaxies in the outer space [2]. The laws of nature which precisely express such regularities, are formulated in the mathematical language. These mathematical equations contain a collection of mysterious physical invariants called physical constants which do not change with time. For example, the speed of light, Planck's constant, Gravitational constant etc. Furthermore, we also observe that there are a few fundamental physical quantities associated with fundamental particles such as charge, mass etc. For deeper understanding of the interactions between fundamental particles it is imperative to accurately measure the values of these fundamental physical quantities.

Quantitative predictions of the basic theories of physics depend on the numerical values of the fundamental physical quantities and constants which appear in these theories. An accurate determination of these quantities, therefore, is essential, if one hopes to achieve an accurate quantitative description of the physical universe. Over more than three centuries, accurate determination the value of the fundamental quantities/constants has become the holy grail for physicists. Various ingenious experiments were designed to determine physical quantities/constants with remarkable accuracy and precision. One such artful experiment to determine the charge ofan electron - a fundamental physical quantity, was designed by the American Physicist, Robert Millikan.

Early investigations of electric phenomena

The history of investigations into different electric phenomena dates back to the Greek philosopher Thales of Miletus (640 - 546 BC) who is credited with first observation of effects produced by electric charges. He observed that when an amber rod rubbed with silk cloth it attracts small pieces of paper. He tried to find an explanation but was at its wits' end. Not much progress was made till next 2000 years when the word 'electricity' was first coined. More systematic investigations on charges and its associated phenomena were carried by the American polymath, Benjamin Franklin, in the eighteenth century. He concluded that a charge comes in two types, positive and negative and the two types always comes in equal amounts - known as the law of conservation of charge. In the nineteenth century, it was observed by scientists that a body can get charged by removing or adding an electron - a negatively charged particle, to it.

Although they found evidence about Franklin's assertions, they were clueless about the exact value of charge carried by an electron.

In the early twentieth century, concerted efforts were made to determine the fundamental charge which potentially paved way for the profound understanding of electrical phenomena. "Everyone was interested in the charge of the electron," Millikan wrote in his autobiography, "for it is probably the most fundamental and invariable entity in the universe, though its value had never been measured up to this time with an accuracy as good as a hundred per cent [i.e. the uncertainty is as big as the thing to be measured]." In 1907, Millikan was almost forty years old and had written several text-books with a little worthwhile contribution to research. To make his mark in the field of research was the *raison d'être* for Millikan to commit himself to measuring this vital minuscule quantity.

The Challenge

Millikan knew that measuring charge of these inconceivably tiny particles was an uphill task which required ingenuity and luck. He was also aware of the fact that he was entering a crowded place because many scientists were already working on determining charge of an electron, given the fact that there was great scientific interest in it. His biggest competitors who already had a head start, were the scientists at the Cavendish Laboratory of Cambridge University which was headed by none other than the great Sir J. J. Thomson - the man who discovered e/m, charge to mass ratio for an electron. At Cavendish, they tried in many ways of determining the charge of an electron but the most promising method involved tracing the track of an electron in a cloud chamber.

This seemingly difficult task could be carried out, strangely enough, by measuring the rate at which the top surface of the cloud collapsed inside the chamber. Thomson used a radioactive substance to ionize supersaturated air present inside the chamber. Individual droplets were formed due to condensation of air. Thomson measured the rate of fall of these droplets inside the chamber and using Stoke's law, calculated the radius of the individual drops. From the total volume of the cloud and the size of individual drops, he could estimate the number of drops present. Assuming that each drop is formed by condensation of water vapour on an electron, Thomson tried to approximate the charge of an electron by dividing total charge on the cloud with the total number of drops present.

Thomson's student Harold Wilson further improved the method by placing two horizontal plates separated by a small distance inside the cloud chamber. An electric filed produced between the two plates (upper positive and lower being negatively charged) can control the motion of the charged droplet. The experiment used X-rays to produce successive ionized cloud formations between two horizontal metal plates, with the goal of measuring the rate of fall of the charged droplets in the cloud. Wilson measured the time taken by a drop to fall between the two plates, first under the influence of gravity and then under the influence of gravity plus the electric field. Even though Wilson's method was a significant improvement over that of Thomson, it had its own limitations because the clouds evaporated

quickly and successive clouds were often veryhard to compare.

Millikan enters the fray

Millikan attempted to calculate charge of an electron using Wilson's method but failed miserably. The instability in the cloud's upper surface simply made it impossible for them to measure anything with some semblance. He reported the problem to Ernest Rutherford. He pointed out that the rapid evaporation of ionized clouds was the culprit. Millikan realized that he has to come up with a radical idea to circumvent the problem of cloud evaporation.

Millikan decided to use stronger electric field and reverse its direction so that it would pull upthe charged drops against gravity, holding cloud steady while measuring the rate of evaporation. The moment he switched on the electric field, the entire cloud instantaneously dissipated to hisutter shock and disbelief. This, Millikan wrote, "seemed at first to spoil my experiment, and with it all other experiments depending upon measurements of the rate of fall of an ionized cloud." He realized that the method adopted by him was incapable of yielding the desired result.

But for all his efforts, mother nature was kind on him. While repeating the experiment, he serendipitously observed a handful of drops that remained suspended in the region between the plates, though the entire cloud itself collapsed. Although the strong electric field dissipated the cloud, the weight of a few drops was counterbalanced by the acting electric force thereby keeping them suspended in air. He immediately realized that using an appropriate electric field he could make a particular charged drop remain suspended in air or move it vertically up or down. He called it "the balance drop method." It helped him to study the movement of a charged droplet for sufficiently long period to make accurate observations about its motion. He repeated the experiment large number of times. In each case, he found that the charge needed to balance the charged drop was always integral multiple of the smallest charge he observed on a droplet.

To restrict the size of droplets entering the region between the two charged plate, Millikan modified his apparatus by drilling a hole at the center of the upper plate. As a result, drops of a particular size entered the region between the plates. He controlled the motion of an individual droplet by varying the electric field. He could suspend the drop in midair, allow it to drop down and even rise up. With this renewed capability, he carried out large number of observations ofthe motion of droplets.

Millikan was extremely lucky that only a narrow range of parameters made the experiment possible at all. Had the droplets been much smaller their Brownian motion while suspendedin air would have made taking readings hopelessly impossible task. Had it been much larger, Millikan would not have field of sufficient strength to balance the weight of the droplet. "Nature here was extremely kind," Millikan wrote later. "Scarcely any other combination of dimensions, field strengths, and materials, could have yielded the results obtained."

Millikan reported his results in 1909. His paper was atypical research paper. Unlike usual manner of presenting results, his findings of 38 droplets was accompanied by personal comments on the reliability of the result. The data sheet of his readings is shown in the Fig.(1). He categorized his results depending on his confidence level about its result. Two "best" resultswere marked three star with a comment that results were taken under perfect experimental conditions meaning that the accuracy of result was high because the motion of the droplets was observed for sufficiently long time. He double starred seven "very good" observations, single- starred ten "good" observations, and left unstarred thirteen "fair" observations. He candidly said that he had discarded three "good" observations - whose inclusion would not have affected the final result - because there was error in the measurement of the position of the dropletand the electric field; three because of changes in the field value; and one simply because itsvalue was nearly 30% lower than the others, which led Millikan to believe there had been some experimental error [3].

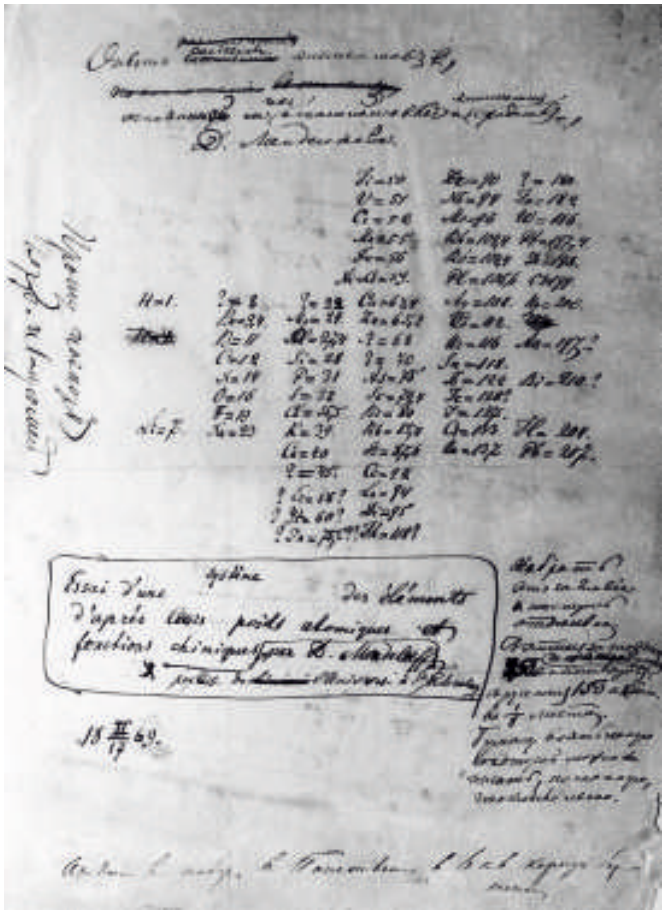


Figure 1: Millikan's data sheet
(Source: https://royalsocietypublishing.org/doi/10.1098/rsta.2019.0301)

In the same year, the results published by Millikan were challenged by Felix Ehrenhaft, a physicist at the University of Vienna. Taking small metal balls in place of water droplets, Ehrenhaft, using a similar apparatus, showed that there exists "subelectrons" whose charge is much smaller than that claimed by Millikan. In other words, Ehrenhaft was of the opinion that the minimum value of charge carried by an electron is far lower than the measured value as claimed by Millikan. Moreover, he recalculated the Millikan's data by including the discarded observations and showed that the American's findings supported his "subelectron" conclusions. Millikan refused to be give up and resolutely decided to give fitting reply to his critic.

Millikan worked hard to further improve his experimental set up so that he can take more accurate readings. While on his way back from a conference at Winnipeg, Canada, he had his moment of epiphany: why not replace water droplets by oil drops? In his autobiography written twenty years later, Millikan described the breakthrough as a "eureka" moment realizing that it was foolish to try to combat the evaporation of water droplets when clock oils had been developed specifically to resist evaporation [4].

The oil drop experiment

On his return to Chicago, Millikan headed straight to his laboratory to work on oil drops. The schematic diagram of the apparatus is given in the Fig.(2).

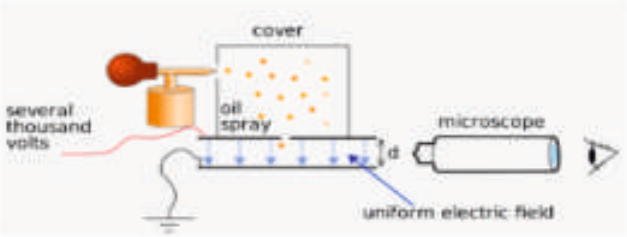


Figure 2: Schematic diagram of the Millikan's oil drop experiment

An atomizer is used to spray oil droplets into the chamber. Due to friction, the oil drops get charged. In the original experiment Millikan had used X-rays to charge the droplets. Some of the droplets pass through an orifice at the centre of the upper plate. A high potential differenceis applied between the two plates so that a uniform electric field **E** is established in the region between the two plates as shown in Fig.(2). The forces experienced by the oil drop is shown in the Fig.(3).
In the balanced condition of forces acting on the oil drop, we get

$$QE = mg \Rightarrow Q = \frac{mg}{E} \quad (1)$$

where Q is the charge on the droplet, m is its mass and **E** is the electric field between the twoplates. If the distance between the two plates is d and the potential difference is V (which is around a few thousand volts), then

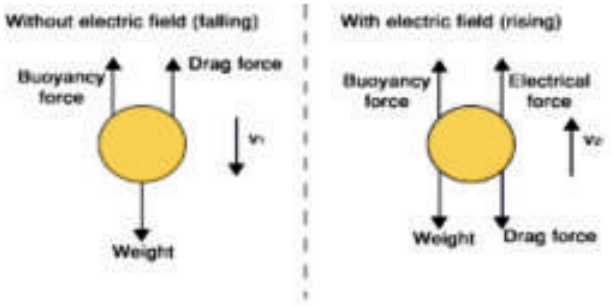


Figure 3: Total force experienced by an oil drop

$$E = \frac{V}{d} \quad (2)$$

Taking into account the buoyant force acting on the droplet in the presence of air, the charge, Q, is given by

$$Q = \frac{4\pi}{3}\frac{R^3(\rho-\rho_a)gd}{V} \quad (3)$$

where R is the radius of the droplet, ρ and ρ_a is the density of oil (droplet of radius R) and air respectively.

In order to measure the radius of the drop, the droplet is allowed to fall between the two plates in the absence of electric field. As the drop falls, in the presence of the drag force, it attains the terminal velocity v_T. The viscous (drag) force, F_v, acting on the droplet is given by,

$$F_v = 6\pi\eta R v_T \quad (4)$$

where η is the viscosity of air. When the droplet acquires terminal velocity, the net force actingon it is zero. We can write,

$$F_v = 6\pi\eta R v_T = mg - \frac{4\pi}{3} R^3\rho_a g = \frac{4\pi}{3}R^3(\rho - \rho_a)g. \quad (5)$$

The radius of the drop can be evaluated using the formula:

$$R = 3\left(\frac{\eta v_T}{2(\rho-\rho_a)g}\right)^{1/2} \quad (6)$$

From the measured value of terminal velocity, v_T, and the radius of a droplet, R, Millikan determined the charge using the eq.(3).

Millikan continued to upgrade his set up by deploying more accurate time piece and better temperature control equipment. Finally, in 1913, after taking large number of observations using the improved set up, Millikan published his results in a comprehensive research paper. This time, however, he presented the results obtained for all the 58 droplets which were studiedby him. Within the experimental error, every one of the drop had a charge equal to some integral multiple of a basic charge e. The value of e was determined to be $4.77 \pm 0.0009 \times 10^{-10}$ esu.

Though the equipment used by Millikan was rudimentary as compared to the modern day gadgets, it is quite remarkable that he could measure the charge of an electron with a reasonably good accuracy. The profound significance of Millikan's findings, though using a simple set up,has secured the oil drop experiment its place in the pantheons of all-time great experiments in science.

Because other evidences mounted in favor of quantization of charge, Millikan's result was accepted by the scientific community. That charge is quantized was successfully demonstrated by Millikan. In 1923, Millikan was awarded the Nobel Prize in Physics, partially for this monumental work. In his Nobel Prize winning lecture, Millikan, announced that "*He who has seen the experiment has literally seen the electron.*"

Conclusion

Using a simple experimental set up Millikan determined the charge of an electron with reasonable accuracy. His work was of immaculate rigor. The oil drop experiment successfully proved the quantization of charge. This small yet non-zero value of charge has played a crucial role in making the Universe the way it is today. The life on our planet, a rarest of rare phenomenon, occurred because of fine tuning of all fundamental physical constants of nature. Millikan's measurement of one of the fundamental physical constants, has marginally opened a window through which we hope to unravel the greatest mystery of all: Origin of life.

References

[1] E. Wigner, Communications in Pure and Applied Mathematics, vol. 13, No. I (1960).

[2] A. Einstein on 'Principles of Research' (1918).

[3] R. P. Crease, *The Prism and the Pendulum*, Random House, New York (2003), p. 151.

[4] R. Millikan, *Autobiography*, Houghton Mifflin, New York (1950), p. 75.

Prof. D.P. Khandelwal Birth Centenary Celebration

Activity-1

Organizers: Seth Kesarimal Porwal College of Arts, Science, and Commerce Kamptee.

Activity: "know Our Scientists" Seminar Competition for the B.Sc. Students.

Chief Guest: Dr. Abha Khandelwal, Retd Head Department of Computer Science Hislop College Nagpur

Convener: Dr. Priyanka D. Bhoyar, Department of Physics.

Date: 21/09/2022

Dr. Abha Khandelwal, Dr. Vinay Chavanalong with other dignitaries and participants

Prof. D.P. Khandelwal Birth Centenary activity was conducted at Seth Kesarimal Porwal College of Arts, Science, and Commerce Kamptee, a small town near Nagpur, Maharashtra. A seminar competition, "KNOW OUR SCIENTISTS" was organized for B.Sc. students. The motive of this competition was to encourage students to be aware of Scientists and to develop their confidence and presentation skills. The biographies of 11 scientists were presented by students: Prof. D.P. Khandelwal, Subrahmanyan Chandrasekhar, ChandrasekharaVenkata Raman, Vikram Sarabhai, Homi J. Bhabha, MeghnadSaha, SatyendraNath Bose, A. P. J. Abdul Kalam, Hargobind Khorana, C. N. R. Rao, and Babu Lal Saraf. The life of the scientist inspired students. The life member of IAPT Dr. Abha Khandelwal, Retd Head Department of Computer Science Hislop College Nagpur was the chief guest. In her inspirational speech "Curiosity is the mother of invention" she urged students to be curious about what is happening in their surroundings. Dr. P K Ahluwalia President of IAPT Dr. Y.K. Vijay Director of the Innovation hub, and Dr. Samanta Convener of the Dr DPK Biography committee (IAPT) graced the event with their virtual presence. Ahluwalia narrated ideology of Dr D P Khandelwal. He made audience aware of various educational activities which are held round the year for the students and Physics Teachers by IAPT. Shri Anil Khandelwal and Dr. Narendra Khandelwal graced the occasion with their presence. Principal Dr. Vinay Chavan thanked the IAPT for the opportunity and encouraged students to take part in such activities. Sana Aafreen won first prize, Diya Khere stood Second, Mrunal Sayare and Samana Fatema shared third prize. Rohit Prajapati from Semester- V won the trophy from IAPT for his splendid performance. The program was conducted by Ayesha Shiddhiqua (B.Sc. Sem III).

Dr. Abha Khandelwal presenting trophy to Rohit Prajapati

Activity 2

Organizers: **Dhote Bandhu Science College, Gondia**.

Activity: **'*Science to Society*' Activity in collaboration with IAPT Innovation Hub**

Chief Guest: Dr. Abha Khandelwal, Retd Head Department of Computer Science, Hislop College Nagpur.

Resource Person:Prof Y. K Vijay, Director CIST, IIS University, Jaipur.

Convener: Dr. Anand M. More.

Date: 27/09/2022

Department of Physics, Dhote Bandhu Science College Gondia conducted '***Science to Society***' activity by organizing virtual 'Tour to Innovation Hub of IAPT, Jaipur' to celebrate Dr. D. P. Khandelwal Birth Centenary Year on 27 September 2022. Principal, Dr. Anjan Naidu, Dr. Abha Khandelwal, Dr. S. K. Paliwal

and Dr. D. S. Choudhary graced the occasion. Dr. Anjan Naidu emphasized the use of Science to Society in the Introductory Speech. He asked the students to use technologies for understanding the concepts of physics. Dr. Abha Khandelwal, the chief guest introduced working of IAPT. She enlightened the memories of **Founder President of IAPT, Dr. D. P. Khandelwal**, a legendary physicist. She briefed the students about involvement of physical phenomenon around everyone. She introduced students to Computational Physics, and explained how It has enabled physicists to understand complex problems more completely, as compared to using theoretical and experimental methods alone.

Dr. P. K. Ahluwalia, president IAPT, interacted with students on this occasion in online mode. Dr. Ahluwalia congratulated Dhote Bandhu Science College for arranging this program. Dr. Y. K. Vijay, resource person of the event demonstrated physics experiments to student using simple techniques. He used simple setups for demonstration of difficult concepts of physics. Principal Dr Anjan Naidu assured that he will get Innovation Hub established at the college so that students can do activities by themselves to understand physics.

Dr. Anand More conducted the event. Dr. Ashish Shahare handled technical part of online event. Dr. P. K. Nagpure, Prof. Y. S. Bopche and other teaching and nonteaching staff contributed immensely for the very success of the event.

Dr. Abha Khandelwal with Teaching Staff

Dr Abha Khandelwal presenting memento to Principal on behalf of IAPT

Activity 3

Organizers: Department of Physics Shri Shivaji Education Society Amravati's SCIENCE COLLEGE, Congress Nagar, Nagpur

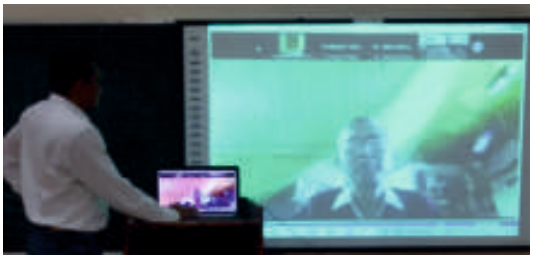
Activity: Guest Lecture by Prof. P. K. Ahluwalia, President IAPT.

Topic: "**Queen of Flat Land of Crystals: Graphene."**

Guest: Dr. Abha Khandelwal, Retd Head Department of Computer Science Hislop College Nagpur.

Convener: Prof S. W. Anwane, Head of Department of Physics

Date: 28/09/2022



Dr Abha Khandelwal paid tribute to Prof D P Khandelwal. She narrated his contribution to the subject of Physics. She explained his vision to uplift the standard of physics teaching in India, the core purpose behind the formation of IAPT.

Dr. S W Anwane, Head of the Department of Physics, gave introductory remarks where he explained the contributions of the Late Dr.Pajabrao Deshmukh, who formed the Shri Shivaji Education Society in 1932.

Dr. Shahin Sayyad introduced the guest speaker, Prof Ahluwalia. Prof. Ahluwalia delivered an excellent and highly informative lecture on *Queen of Flat Land of Crystals: Graphene*. He put light on all the details of Graphene. Around 275 students participated. Principal Prof Mahendra P. Dhore addressed the session and discussed the importance of practical learning for students. Shri B T Kumbhare proposed the vote of thanks.

All postgraduate students in Physics, from Shri Shivaji Science College NAGPUR, AMRAVATI, AKOLA, Vidyabharti College, Amravati and SFS College Nagpur attended the lectures. Convener Dr. Gajanan L Jadhav smoothly conducted the session.

Activity 4

Organizers: Department of Physics & Department of Computer Science, Sardar Patel Mahavidyalaya, Chandrapur

Activity: Lecture by Dr Abha Khandelwal on "Let's get acquainted with COMPUTATIONAL PHYSICS followed by Students' Seminar Competition on Application in Computational Physics and visit to **Dr D P Khandelwal INNOVATION HUB Science Gallery at Guru Nanak Public School Ballarpur for'*Science to Society*' Activity in collaboration with IAPT**

Chief Guest: Dr. Abha Khandelwal, Retd Head Department of Computer Science, Hislop College Nagpur.

Resource Person: Prof Y. K Vijay, Director CIST, IIS University, Jaipur.

Convener: Dr. Urvashi P. Manik & Dr. S. B. Kishor

Date: 30/09/2022 and 01/10/2022

On first day 30/09/2022

Dr. Abha Khandelwal, the chief guest introduced working of IAPT. She enlightened the memories of **Founder President of IAPT, Dr. D. P. Khandelwal**, a legendary physicist. She briefed the students about involvement of physical phenomenon around everyone and can only be realized and understood if student has tried to know concepts and principle of physics. Principal, Dr. Pramod M Katkar, Vice Principal Dr. Swapnil V. Madamshettiwar, Dr. S. B. Kishor and Dr. Urvashi P. Manik graced the dais on this occasion.

Dr Abha , introduced students to Computational Physics and explained how it has enabled physicists to understand complex problems with more depth as compared to using theoretical and experimental methods alone.

Dr. P. K. Ahluwalia, president, IAPT, interacted with students on this occasion in online mode. He congratulated Sardar Patel Mahavidyalaya for arranging this program.

On 1st October 2022 Second Day around 40 students of B.Sc. SEM I along with Dr Urvashi Manik HOD Physics visited **Dr D P Khandelwal INNOVATION HUB Science Gallery at Gurunanak Public School Ballarpur.** Dr Dr. Y. K. Vijay, resource person of the event demonstrated physics experiments to student using simple techniques. He used simple setups for demonstration of difficult concepts of physics. Dr. Urvashi P. Manik emphasized the use of Science to Society in the Introductory Speech. She asked students to use technologies for understanding concepts of physics.

Principal Dr. Pramod M. Katkar assured that he will get Innovation Hub Science Gallery established at the college so that students can do activities by themselves to understand physics.

Dr Abha Khandelwal presenting Memento to Principal Dr. Pramod Katkar on the behalf of IAPT

Asst. Prof. Neha G. Giradkar conducted the event and Dr. S. B. Kishor proposed the vote of thanks. Asst. Prof. Gitesh Burande handled technical part of online event. Dr. Varsha Thakre, Dr. Pankaj Dhumane, Dr. Rajani Singh, Asst. Prof. Mitali Sarkar, Asst. Prof. Nigar Pathan and other teaching and non-teaching staff contributed immensely for the very success of the event.

Students with resource person Prof. Y K Vijay at Guru Nanak Public School, Ballarpur

Activity 5

Organizers: Guru Nanak Public H. S. School, Ballarpur

Activity: **Inauguration of Prof D P Khandelwal INNOVATION HUB, Science Gallery** and Student's Seminar on "Innovation in Science"

Chief Guest: Dr. Abha Khandelwal, Retd Head Department of Computer Science, Hislop College Nagpur.

Guest of Houner:Prof Y. K Vijay, Director CIST, IIS

University, Jaipur.
Convener: Mrs. Prabha Ranjit Nair, Administrator Guru Nanak Public H. S. School
Date: 29/09/2022 & 01/10/2022

On Birth Centenary of Dr. D.P Khandelwal Guru Nanak Public H.S School organized **two days** programs.

Students' seminar on **"Innovation in Science"** was organized on 29th September 2022 in School Auditorium.

The dignitaries of the Program were, Chief Guest Dr. Abha Khandelwal, Guest of Honor Dr. Y.K.Vijay, The Judges were Mr. Gulab Singh Chauhan, Dr. Gopal Gond, Dr. Prafulla Katkar, School President Mr. Kailash Khandelwal, Jr. College Principal Mr. Dilip Kumar Shah and School Head Mistress Mrs. Rumana Sheikh.

The Program started with Saraswati Vandana. School Head Mistress Mrs. Rumana Sheikh welcomed the dignitaries. Then, Students seminar Competition started on the Topics "Innovation in Science". Students were well prepared and presented their presentations with new ideas, new thoughts and explained the revolution Science has made and has brought many new innovations in Medical Field, Artificial Intelligence etc.

Dr. Abha Khandelwal appreciated the efforts of participants for their confidence and presentation. Judges expressed their views that these students are the Budding Scientists of tomorrow and encouraged the students. Judges also appreciated the School Management Members for their hardships in bringing up the school at good position. School President Mr. Kailash Khandelwal in his speech, encouraged the students to become a part of IAPT Organization.

On Second day 1st October 2022, Dr. Abha in her speech, paid tribute and shared the memories of the founder of IAPT, Dr. D.P.Khandelwal. Dr. Y.K.Vijay in his speech, said that Innovation Hub is like the toys and he explained with the help of small experiments and cleared the concepts included in those experiments. He presented a Memento to the School President Mr. Kailashji Khandelwal on behalf of IAPT and thanked him for establishing the **"Dr D P Khandelwal Innovation Hub, Science Gallery"**.Dr. P.K.Ahluwalia addressed virtually and said that their Organization promote students for International Physics Olympiad.

"Dr D P Khandelwal Innovation Hub, Science Gallery" was inaugurated by Dr. Abha Dr. Y.K Vijay explained the each and every model presented in the Hub and its working and made students aware of fact that how and where these physics phenomena happens in our daily life too.

The program was anchored by Mrs. Anita Reddy.

National Anveshika Experimental Skill Test - 2022

A unique test embodying the principles of NEP

RC – 11 And Focus IAPT Anveshika, Andhra Pradesh

After Corona, we, the team of FOCUS IAPT ANVESHIKA & RC – 11 conducted NAEST – 2022, offline successfully at four centres. NAEST is a unique competition in which thousands of school and college students participate and the evaluation is based on their skills to perform physics experiments. NAEST assesses and nurtures keen observational skills, analytical skills, and experimental skills of a student in physics. It embodies the principles of NEP 2020 - joyful learning, learning to learn, experiential learning and competency-based assessment.

Hon'ble Vice Chancellor Prof. Mokka Jagannadha Rao released NAEST brochure at AKNU, Rajamahendravaram. After that all our team members shared the brochure through students, through teacher friends, through local newspapers, through old participants,through Whats App and email to all the educational institutions, throughout the Andhra Pradesh

Next, NAEST Screening 2022 is conducted at all the 4 centres in A.P as per the below schedule. In this screening test totally 1012 students participated. First, the question paper given to the students, and they answered the questions by observing the offline one-minute videos.In this event by watching the videos, students write the answers in the given question paper consisting of multiple choice answers with negative marks.

Here we showed 13 videos related to our daily life events such as 1) Two water bottles connected with pipe to ask pressure related questions, 2) Two different conducting wires to ask about the relation between resistance, conductivity and resistivity, 3) Bottle with two holes and water, by closing or opening the cap of bottle, the student has to find the relation between pressure at top hole and bottom hole, 4) By hanging and vibrating the Chimta, asked about the centre of mass of the chimta, 5) The boy is struggling hard to pull the inverted mug from the bucket of water,6) floating rubber ball in water to ask about the up thrust , 6) balloon kept inside the syringe, 7) two magnets separated by some distance, 8) plastic bottle hanging by threads, 9) Temperature of water in small bowl which is kept in another hot water vessel, 10) Two different watts filament bulbs to measure voltage and current, 11) Measuring of lengths of different given objects with self-made Vernier callipers etc., While participating in this NAEST, every student improves their observation skills, analytical skills and recollects their concepts and its applications. After answering the question paper, the videos are again played and, on each video, discussion took place by our resource persons and students enthusiastically try to answer those videos. Few participant students said, though they are observing such things in daily life, they do not get a chance to think about the reason behind that. After evaluation, 35 students from junior category and 25 students from senior category total 60 students were selected for the next level i.e., State Level PRELIMS to be conducted on September 18th, 2022, at RK Jr & Degree College, Vizianagaram.

1st Centre date & Venue: July 7th, 2022,Adikavi Nannaya University, Rajamahendravaram.
Title of the programme: SCREENING NAEST - 2022
Participants: 250 High School, UG & PG Students and 15 Teachers.
Organised by: Department of Physics, University College of Science & Technology, Adikavi Nannaya University (AKNU),Quanteem Physics Alumni Association-AKNU Rajamahendravaram.
Catalysed and supported by: Focus Iaptanveshika & IAPT RC 11

Convener: Dr. S Rajyalakshmi, EC Member IAPTRC-11 & Regional Coordinator, FOCUS Anveshika &Course Coordinator, Department of physics, University College of Science & Technology, AKNU.
Resource Person: Mr. V. Rajasekhar, Asst. Prof of Physics, Dept. of Physics, AKNU..


2nd Centre
Date & Venue: July 30th, 2022, Sri GCSR Degree College, Rajam.
Title of the programme: SCREENING NAEST - 2022
Participants: 392 High School, UG & PG Students and 20 Teachers.
Organised by: Department of Physics, Sri GCSR Degree College – Rajam, Srikakulam.
Catalysed and supported by: Focus Iaptanveshika & IAPT RC 11
Convener: Sri.G.Mohana Murali Krishna, HOD Physics, Sri GCSR Degree College – RajaDr. M. Purushottam, Principal, Sri GCSR Degree College – Rajam, addressing the gathering

Resource Person: Dr. J. Chandrasekhar Rao, HOD Physics, Govt. Degree College -Rajam; President


IAPT RC-11; State Co-ordinator, FOCUS IAPT ANVESHIKA.

3rd Centre date & Venue: August 18th, 2022,AP Model School, Tamada, Srikakulam.
Title of the programme: SCREENING NAEST - 2022
Participants:83 High School& Intermediate students and 8 Teachers.
Organised by: AP Model School, Tamada, Srikakulam
Catalysed and supported by: FOCUS IAPTANVESHIKA & IAPT RC 11 Sri. Varanasi. Srinivasa Rao and his team conducting NAEST Screening at AP Model School, Tamada, Srikakulam.
Convener& Resource Person: Sri. Varanasi. Srinivasa Rao, PGT, AP Model School, Tamada, Srikakulam

4th Centre date & Venue: September 3rd, 2022,RK Jr & Degree College, Vizianagaram.
Title of the programme: SCREENING NAEST - 2022
Participants: 287 High School, UG & PG Students and 17 Teachers.
Organised by: RK Jr & Degree College, Vizianagaram.
Catalysed and supported by: Focus Iaptanveshika & IAPT RC 11 Dr. J. Chandrasekhar Rao, HOD Physics, Govt. Degree College -Rajam&Sri V Srinivasa Rao, E C Member, RC 11, Conducting NAEST Screening at RK Degree College Vizianagaram

Convener&Resource Person: Dr. J. Chandrasekhar Rao, HOD Physics, Govt. Degree College -Rajam; President, IAPT RC-11; State Co-ordinator, FOCUS IAPT ANVESHIKA..


Seminar and Poster Presentation Competition

Topic: Ozone Layer: Formation, Depletion and Recovery
Resource Person: Dr. Ajay Kumar, Department of Environmental Science and Technology, Central University of Punjab, Bathinda.
Schedule: 10:00AM-1:00P, Mon 19/09/2022
Sponsored by: DBT Star College Schemeand IAPT (RC-02)
Activity Incharge: Ms Harpreet Kaur Brar

Participating Departments: Physics, Chemistry, Zoology, Botany and Commerce
Beneficiaries: Students of B.Sc./ B.A. / B.Com (68)
Program Coordinator: Dr. KulwinderSingh Mann

To celebrate "World Ozone Day" the Department of Physics, DAV College, Bathinda organized a Guest Lecture and inter-departmental Poster Presentation Competition under the aegis of DBT Star College Scheme. The Principal Dr Rajeev Kumar Sharma welcomed the expert and participants.The seminar started after a brief introduction about the expert by Dr. Gurpreet Singh.

The resource person delivered a power point presentation on "**Ozone Layer: Formation, Depletion and Recovery".** Tracing 600 million years' history of Ozone layer formation, Dr. Kumar explained how ozone layer has played a key role in the evolution of life on mother earth and is a natural umbrella to harmful UV radiations coming from outer space. He explained good and bad ozone in a very simple manner and described various pollutant gases emitted from daily use appliances like, refrigerator, air conditioners, etc. which are depleting the ozone layer.

Giving a free hand to their creativity, students, on the occasion, presented their posters on the same theme. The first prize was awarded to Jashanpreet and Amandeep (B.SC. III Non-Medical), second prize was won by Sachit (B. Sc. III Medical), third prize bagged by Amandeep (B.Sc. I Medical) and the consolation prize was given to Amaan and Hargun (B.SC. I Non-Medical).

Principal Dr. Rajeev Kumar Sharma expressed his deep sense of gratitude to Dr. Ajay Kumar for sharing new ideas about the importance of Ozone. He exhorted the students to limit the use of motor vehicles in order to combat increasing air pollution. The event concluded with a vote of thanks by Dr Kulwinder Singh Mann.

K S Mann

Workshop on 'Innovative Experiments in Physics'

Mata Jijabai Government P.G. Girls College, Indore under the aegis of World Bank Project, and Indian Association of Physics Teachers – RC- 06 & 09 during September 19-21, 2022.

A workshop on 'Innovative Experiments in Physics' was organized by Department of Physics, Mata Jijabai Government P.G. Girls College, Indore under the aegis of World Bank Project, and Indian Association of Physics Teachers - Regional Chapter 06 & 09 during **September 19-21, 2022,** in hybrid mode. More than 300 girl students actively participated in the event.

Day1 - The workshop was inaugurated by Chief Guest of the occasion Prof. S.B. Wellankar who is a visiting faculty at IPS-Indore, and Retd. Professor at Holkar Science College - Indore. Prof. S. K. Joshi, National Coordinator-NCEWP, Vice-President, Central Zone-IAPT, Ex-principal, Govt. P.G. College, Ratlam, and Prof. B. D. Shrivastava, President-IAPT RC-09, and Professor-Govt. P.G. College, Dhar graced the occasion as Guests of honour. Prof. S. B. Wellankar gave an interactive lecture on 'Energy and Interaction'. He enlightened audience through video clips to visualize the concept of mass and energy and how mass is converted in different forms of energy (Mass-> K.E.-> P.E.). Prof. S. K. Joshi narrated the IAPT activities and initiatives. He talked about various competitions organized by IAPT for students, and teachers.

Further, eminent speaker Prof. Y.K. Vijay, President-IAPT RC-06, Director-CIST, IIS University, Jaipur, and Mentor of workshop Dr. Vipin Kumar Jain, IAPT RC-06 EC Member, Associate Professor, JK Lakshmipat University, Jaipur started experiential learning session on 'Innovative Experiments in Physics' in which 08 experiments and many other projects were demonstrated in virtual mode through Google Meet over big screens. Through demonstration of such innovative experiments and projects, they explained scientific concepts of measuring Sparking potential and Relative dielectric constant of medium by Hertz Experiment, Refractive Index of liquid by prism, Study of interaction between hanging/ floating magnets, Measurement of input and output impedance of power source, L-R and R-C circuit parameters, Resistance of bulb at varying potential, vibration modes, Bohr Model, etc. First day interaction was ended with a note to meet again on second day for taking observations and relevant calculation with graphs.

Day2- Second day started with a lecture on Climate change by Dr. B. D. Shrivastava. His interactive talk was mainly about Global warming, Green House Gases, and Carbon Footprint. He told extensively about our everyday activities that causes emission of GHGs. He made everyone calculate the magnitude of GHG emitted from everyone's home due to consumption of electricity, petrol, diesel, and LPG. Students were asked to download the USHA app, designed by Govt of Madhya Pradesh to spread awareness about the energy consumption among students, and citizens.

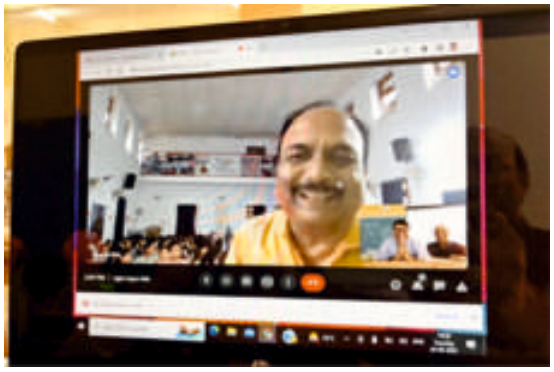
Further, Prof. Y.K. Vijay and Dr. Vipin Kumar Jain discussed the calculations and graphs of the previous day's observations noted down by the students during the demonstration. They demonstrated remaining experiments and few more projects in the last session of Day2. Most of the students interacted and gave feedback of their great learning experience. Students were excited and thrilled to learn through such simple and concept clearing experiments. Through these interactive sessions, students could realize the importance of experimentation in scientific learning. They showed interest to visit a laboratory having such facilities in future.

Day3- Before valedictory session, an open house and feedback session was organized. Several doubts of students were cleared patiently and received their feedback for further improvement. Valedictory function of the workshop, organized at Seminar Hall No. – 01,

was presided by Dr. Vandana Agnihotri, Principal In-charge of the organizing college. Prof. S. K. Joshi graced the valedictory function as Chief Guest. In his address, he stated how the Special Lab environment is designed to engage and empower the students with opportunities in Scientific Research. He also briefed about the facilities available in RRCAT and IUC.

Dr. Sunil Ujale, Organizing Secretary of the workshop, informed that Department of Physics signed an MOU with Innovation Hub, set up by IAPT RC-06, at Shree Vaishnav Vidhyapeeth University, Indore in collaboration with IAPT RC-09. The session was coordinated by Dr. Namita Sisodia. Workshop was ended with delivering vote of thanks by Dr. Priti Gadkari, Head of Department of Physics.

Y K Vijay



To our readers

For change of address and non-receipt of the Bulletin, please write (only) to:
our New Address :

The Managing Editor

Flat No. 206, Adarsh Complex,
Awas Vikas-1 Keshavpuram, \
Kalyanpur, Kanpur-208017
Email : iaptknp@rediffmail.com
Mob. : 09935432990

3-Day Outreach Programme of Midnapore College (Autonomous)
On October 6,7 and 8, 2022

Birsingha Bhagabati Vidyalaya and BirsinghaVidyasagar BalikaVidyapith were the joint hosts, of a three-day outreach programme of Midnapore College(Autonomous) on Hands- on- Experiments for the students of these two schools. Midnapore Education and Service Society, and Science Centre, Midnapore were the collaborators of this event. Purpose of the event was to acquaint the school students with the inexpensive experiments to understand the basics in different science domains, which they can perform even in their home environment.

The Activity

Altogether 85 students of Classes VIII, IX and XI participated for performing experiments on physics, chemistry and biology. Students enjoyed the experiments very much and expressed their desire for the continuation of the programme for few more days. The faculty members and the ex-students of Midnapore College and the Associates of IAPT-Midnapore College CSC and Science Centre, Midnapore offered expertise. Teachers of some local schools also extended their helping hand. Even in these holidays, the Heads of the two schools and a good number of their teachers worked hard, to make the programme a success. The ex -students of Birsingha Bhagabati Vidyalaya, established by Vidyasagar in 1853, contributed significantly in organizing this academic activity.

On the 6th of October, 2022, the outreach programme was initiated in presence of the dignitaries like Dr G C Bera, Principal, Midnapore College, Dr A Gupta, Principal Sebayaton Sikshak Sikshan Mahavidyalaya, Jhargram, Mr P K Pathak, Headmaster, Birsingha Bhagabati Vidyalaya (BBV) and Mrs Mira Roy, Headmistress, BirsinghaVidyasagar Balika Vidyapith (BVBV) and the resource persons. All the speakers emphasized the objective of the programme, its importance and utility with particular reference to the damage done by pandemic in the realm of education.

On the first day, after formal inauguration, the students of classes IX and XI were engaged with biology experiments while class VIII with chemistry experiments.On the second day, all the students had performed some measurement based experiments in physics. On the final day, the students of the two higher classes performed chemistry experiments and the students of class VIII the biology experiments.

In choosing the experiments, the experts have kept their interdisciplinary aspects in mind and during experimentation they have explained them; they also showed how data have to be collected and analyzed to elicit certain scientific concepts- in the process a good deal of mathematics is learnt.

The Feedback

At the end of the third day, a feedback session was organised to understand the feelings of the participants about the three-day activity. Mr P K Pathak, the Headmaster, BBV chaired the session. Mr Haragobinda Doloi Retd Bengali teacher of the school led the ceremony of garlanding the statues of Bhagabati Devi and Vidyasagar and he along with Dr S Bhattacharya jointly anchored the session. In his brief note, Mr Hargobinda Doloi, a renowned scholar on Vidyasagar, explained the role of Vidyasagar in introducing modern education and research in science and mathematics. Dr Bhattacharya informed that this activity demonstrated that sophisticated experiments could be performed even without a sophisticated lab. After wards, he invited the students to share their views on this programme. Almost all of the participants who spoke on this occasion, unanimously suggested that this programme should have been continued for some more days. This essentially reflects the need and usefulness of the 3-day experimental programme. The dignitaries present were also of the same view.

Mrs Mira Roy, the Headmistress, BVBV proposed the vote of thanks.

Enhancement of Quality of Science Education: A Modest Beginning

It is known to everybody that in the academic schedule of the schools, lab based education has taken a back seat long back; the Covid 19 has just accelerated the degradation of the quality of science education in the last two years. The two schools in Birsingha are not exceptions. So the motivation of organizing such an activity in the birthplace of Pandit Iswarchandra Vidyasagar, who was instrumental in introducing modern education in science and mathematics, is the outcome of a desire that the schools of this village should be different and the other schools should consider them as their role models. Through this activity a modest beginning has been made for the enhancement of quality science education in these two schools.

Future Activity: An Immediate Need

In a programme on hands-on experiments, one needs to collect data and analyze them using the mathematical tools for constructing scientific meaning out of the data. But the problem is that pandemic has given our students huge marks in the name of evaluation, incommensurate with their knowledge and compromising with their ability to use mathematical tools. This outreach programme teaches us that an appropriate initiative has to be taken immediately to train our students of different classes, particularly at the lower classes so that they can understand the basic mathematical tools and their applications. This knowledge is absolutely necessary for handling the hands-on experiments, particularly their design and analysis part. For this purpose different educational institutions and the social organizations, particularly those dedicated to Vidyasagar, have to be motivated to organise outreach programmes. If this initiative is successful in Birsingha then this model can be adopted elsewhere to construct a solid base for imparting education in science and mathematics.

Resource Persons

The names of the people who guided the students for their academic activities are given below. The names of the persons without whom it would have been difficult to organise the event, are also noted herein.

Midnapore College : Tanumoy Pal and AnirbanSamanta (both ex-student and CSC Associates), S C Samanta (Associate Professor, Retd), Dr S Patra (Faculty), Kali Kinkar Raul (CSC Associate, Office staff), Braja Pramanik (ex-student and manufacturer and supplier of scientific instruments).

Bantul Santra (ex -student and Teacher, Natuk HS School)

IIT, Kharagpur: Dr Aniban Mukherjee, Project Officer, NDLI.

BirsinghaBhagabatiVidyalaya (BBV):

PrasantaMordune, Dr S Bhattacharya, Amit K Pal, Dr U K Mallick and Amit Kumar Pal (All teachers).

Birsingha Vidyasagar BalikaVidyapith (BVBV): MalabikaGhosh (Teacher)

SebayatonSikshakSikshanMahavidyalaya, Jhargram : A .Gupta (Principal)

Amandapur HS School:

Sanjay Pal and PapunMondal (both teacher)

Aulia HS School: Ananda Das, Teacher

Meherpur HS School :ProloySantra (Headmaster)

S K Pan (Headmaster,Midnapore Collegiate School; Retd& Secretary, Science Centre, Midnapore)

Rajnagar HS school: Tapas Porel(Retd teacher and Asstt Secretary, VidyasagarSmoronSamiti)

Others who helped immensely in Miscellaneous activities: Yajneshwar Mandol, Prasad Ghosh and Tapan Das (all ex-students of BBV).

Debabrata Roy, Amit Kumar Chowdhury and HargobindaDoloi(Teachers, BBV).

KoushikPramanik (Faculty, Ghatal RS College)

An Appeal

Anybody who is proud of Vidyasagar and thinks his legacy should pervade all the time and guide us at least in the realm of education, should come forward and contribute significantly, academically or otherwise, for the enhancement of the quality of education in these two Birsingha schools, which would eventually become role models for others.

.**Acknowledgement**
Heartfelt thanks are due to Mr P K Pathak HM, BBV for his excellent management of the event and Mrs M Roy, HM, BVBV for providing good food at relatively low cost. Also, sincere thanks are due to supportive staff of the two schools who extended their help, whenever needed.

Epilogue
Afterwards, in continuation with this activity, Dr B.N Das, former Vice President of IAPT and a notable Science Show Master presented a Science Show for the same group of student- participants on 19.10.2022. Dr A Rana, Chemistry Faculty of City College, Kolkata demonstrated some interesting experiments in the same venue on that day. Participants enjoyed very much.
As the students are found to be weak in mathematics, it has been decided that during Christmas holidays Birsingha students of class IX would teach maths class VII and XI would teach class VIII as a part of the scheme : Active Teaching Learning Processes; IAPT members residing in the proximity would take significant role in this continuing activity.

Subhash Chandra Samanta
Coordinator

REPORT (RC-04)

Motivation And Innovations In Physics In Daily Life

Name of the activity: "Motivation and Innovations in Physics in daily life".
Date / Duration: 06 September, 2022, half day.
Venue of the activity: Maharshi Patanjali VidyaMandir, Teliarganj, Prayagraj 21104 (Uttar Pradesh).
Organizing institute along with collaborations: RC – 04 with collaboration MPVM School, Prayagraj and IEEE Uttar Pradesh Section.

The activity was organized with the request of MPVM School to motivate physics students and Prof. D. P. Khandelwal birth centenary year. More than 120 students of class 11th and 12th with school teachers gathered at the school hall, where a motivation talk was delivered by Dr Akhilesh Tiwari, Associate Professor (Physics). The subject of the talk was to pursue a career in Physics and related areas after 12th. Some innovative experiments from IIITA-Akhil-IAPT Anveshika were demonstrated to the students, and the students were encouraged to ask the questions. The speaker motivated the students to raise queries from the experiments and encouraged them to discuss with their friends and then discuss with their teachers. The students were motivated enough to do experiments themselves and find out the answers. The principal thanked Dr. Tiwari and requested him for longer session of experiments to be organized in future at IIITA-Akhil-IAPT Anveshika.

Akhilesh Tiwari
Secretary

Personal Thoughts on Undergraduate Physics Teaching…….

After graduating with a doctoral degree from IIT Delhi, in July 2004, I joined Instruments Research and Development Establishment (IRDE) Dehradun as a Scientist 'C'. IRDE is one of the best and oldest laboratories in the field of optics and photonics under the Defence Research and Development Organisation (DRDO). I contributed in the design and development of a photonic correlator for automatic target recognition at IRDE. This was my first encounter with real application of the theoretical knowledge after earning the doctoral degree in physics. There were lots of challenges and intricacies in developing a prototype. I realized the difference between conceptual knowledge and its actual implementation at work. Since my doctoral research work involved theoretical and experimental studies, I could sink myself with the excitement and challenges. This learning experience suggests that we should always think of applying theoretical concepts for solving real-life problems. This is what a teacher is supposed to develop in a student.

The role of a teacher is very important in a way that teachers should first acquaint the students with the underlying concept of the domain, connect it with real-life applications, and excite and encourage them to explore improved and better alternative solutions. During this continued process of learning, teachers must always be there with the students as shadow. This is what Acharya Vinoba Bhave meant with his statement that learning by doing should be aim of education. The statement is timelessly relevant. In the present era this concept is being emphasized as developing innovative skills in our young kids. The innovation would lead to entrepreneurship.

I had sincere interest in academics. In order to pursue that, in June 2007, I joined Indian Institute of Technology Guwahati. There, I formally started my physics teaching to the undergraduate and postgraduate students. The foundation of the subject seeded at the school level gets strengthened at undergraduate level. At this stage, students try to understand the concepts of physics and to analyze them critically. At the same time, solving numerical problems help understand concepts better. That is why the concept of tutorial classes is immensely useful where students are encouraged to solve problems on their own on the black/white board in front of the whole class. The teacher pitches in as and when required. Following this process, students not only understand the concept in a better way, they gain much desirable confidence as well. This process installs and generates interest in teaching among future teachers too.

Also, while explaining theoretical concepts, practical demonstration should be carried out in the class, as far as possible. For example, while explaining the diffraction of light wave, using a laser pointer and a slit, the diffraction pattern (spreading of light) can be generated and can be displayed on a plane white wall or on a plane white sheet of paper. With varying the width of the slit, the pattern changes and how diffraction becomes prominent when width of the slit becomes comparable to the wavelength of the light wave. Having discussed the concept of diffraction of light, it becomes important to explain some of the real life applications of the diffraction of light.

In optics, there is a saying – 'light added to light gives darkness'. It means when two light beams are combined, it will not only result light with enhanced intensity but darkness too. This saying corresponds to the interference of light waves, in which bright and dark fringes are produced. With little efforts, the interference of light can be demonstrated in the classroom. Such demonstrations help students understand the underlying concepts in a better way. Here, it becomes important to explain the concepts of phase and coherence. It connects with the coherent, partially coherent, and incoherent types of optical sources. Lasers and light emitting diodes (LED) become very relevant which have large numbers of applications. With the recent invention of blue LED, white LEDs became possible, which is credited to light every house in India.

Coming back to the classroom teaching, one encounter four categories of students broadly; outstanding, good, average, and poor in academics. For a teacher, it is easy to place students under these categories after interacting with them in initial few classes. The main emphasis lies in bringing the academically poor students at least to the level of average and then motivate them to reach to the level of good. This is a real challenge for a teacher. Interacting individually with such students periodically may help improve their understanding and performance. Many teachers may follow different ways in dealing with this task.

Next important point is the method of teaching; use of black/white board, with power point presentation, screening relevant videos, or a combination of all. Each method has its own benefits and shortcomings. In case of using black/white board while teaching, teacher mostly looks at the board while writing, deriving expressions, or drawing sketches. During this period, some students look at the board and many do not pay attention or follow what the teacher is doing as the eye contact gets lost. The technological advancement helps reduce some of these issues, where teacher writes on the electronic board facing students. Hence, during this period the eye contact between students and teacher remain largely established. The power point-based teaching is a good way where useful videos and animations are used to clarify the concepts, but it requires electronic gadgets. Since power points are prepared beforehand with much of creativity, teachers explain the concept quickly. This helps teacher save time in the class. However, most of the students may not be able to take note of everything that is required for revisions. To solve this issue, it becomes very important on part of the teacher that power points get shared with the students. Education technology experts complain that seeing power point presentations for long hours create headache to the listener. Hence, this long hour exposure should be avoided. Unfortunately, for the last two years due to COVID-19 pandemic, online classes forced us to follow this mode of teaching and learning.

Another important component related to physics in general and science in particular is the laboratory teaching. This is very essential to understand the underlying concepts. When I joined IIT Guwahati in June 2007, I was assigned the task of coordinating undergraduate 1st year laboratory. Since then I have been associated with the laboratory instruction. In this course, students carry out one experiment in every class of three hours and at the end submit a complete report containing all required calculations based on the data collected. Carrying out maximum probable error analysis is very important in this exercise. Once students complete the experiment and are ready with the report, they undergo a viva-voce. The interaction during viva-voce help students think more about what they have done in the experiment. The viva-voce is not just to test how much students have learnt rather it helps them to learn the concept and relevance of the experiment in practical life.

The last point related to teaching is the evaluation process. During evaluation, understanding of the concept and approach towards solving problems should be checked. It has been observed that in most cases, the evaluation is merely a test of memory power of the students. Personally speaking, I am not in favour of this mode. It is also seen that some teachers pose tough questions in the examination for which the students have not been trained. Ultimately this results in poor performance. To my understanding a communication gap arises because of nonlinear relation between teaching and evaluation. Thought provoking, analytical, and conceptual problems should be asked, which should be based upon the classroom teaching.

Industrial tour is another dimension of teaching. Wherever possible, industrial trip should be organized so that students would see the theoretical knowledge being connected with actual applications. Such trips are good for the students. They help them understand the connection between classroom teachings and industrial applications. I try my best to arrange industrial tours.

Overall, the teachers play an irreplaceable role in nation building by imparting the knowledge to upcoming generations. Teachers should become the role models for the students and society. I encourage students for discussion and help them develop critical and independent thinking skills. Through discussions and interactions with the students, I have learnt a lot. This will continue with my normal life. To conclude, I have narrated my personal thoughts on teaching of physics. I welcome suggestions from everyone to improve the skill further.

Naveen K. Nishchal

IIT Patna, Bihar

E-mail: nkn@iitp.ac.in

Prof B N Chandrika Memorial Events

The second event in memory of dear BN Chandrika, ex-General Secretary of IAPT was conducted on Tuesday, 22nd August 2022 at her own college, where she served and brought laurels to the Physics Department, till her last.

Remembering Chandrika

Prof.B.N Chandrika (1953-2013) was a Physicist, an extraordinary teacher, a Physics volunteer, a Physics enthusiast and above all a very good human being. Prof Chandrika had held many positions in IAPT, including that of General Secretary during 2007-09. She was the first one to hold INSPIRE science internship camp in her college (Vidya Vardhaka Sangha First Grade College, Bangalore) for pre- university students in Bangalore, and with her support and motivation other colleges followed. She became very popular by conducting five consecutive workshops on **'Physics through Experiments'** for PU college teachers funded by MHRD and IAPT during 1997-2001. During her tenure as General Secretary she was instrumental in organizing the IAPT convention inBangalore in 2008 and it was a great success. She was also instrumental in inviting and organizing the AsianPhysics Olympiad held in New Delhi in the year 2012. She is responsible for bringing Physics Education Research, as an area of research, to universities in Karnataka. It was by her active involvement; this Sub-RC 12 A was established in Karnataka in 2007-2008. We proudly belong to this RC and follow her footsteps.

The BN Chandrika Events were held in three sessions.

Instructions before the performance

In the morning session **'Chandrika laboratory'** was inaugurated by Dr Rekha, Principal, VVS First Grade College. Dr Ananda kumari, President RC12A, welcomed the students and the visitors to the laboratory.

Experimental Physics competition for plus two students were conducted. About 80 students from 18 colleges participated with a lot of enthusiasm. Dr M K Raghavendra, BS Achutha and team had a simple yet novel experiment for the students to unravel. Given the basic requirements, the groups had to create a neat grating with old CD, make stands and guides with paper, observe the spectra and determine the wavelength, all in one hour. Friendly supervisors were questioning, observing, assisting and answering their queries. The work-together-culture was instilled in the students.

A quick written **Quiz** for the school teams was an entertainer. The questions of everyday event, made the students think hard, beyond the books and left them groping for a suitable answer!

In the afternoon session an informative and entertaining lecture **'Doing Science can be fun'** was delivered By Dr. Raghavendra. Students interacted with the speaker and were thrilled.

Valedictory function was organised during the third session in the evening.

Chief Guest Dr H S Nagaraja, Chief Mentor, Prayoga Institute of Education Research enthused the students with his hilarious anecdotes and stories. His association with Late BN Chandrika as his student, colleague, co-worker and confidante was enumerated in a heart touching manner.

Prof. Lakshmi Narasu

Prof Lakshmi Narasu N H, Vice Chairperson VVS first grade College presided the meeting. Her good words about Chandrika's qualities and how that is relevant for all students to emulate, was very well highlighted. Her soft and commanding voice elevated our mood. Seemingly, Lakshmi Narasu-Veena Kawetakar-Chandrika BN were the three pillars of the Physics department at VVSFGC and their team spirit was again and again,coming forth in the associate teachers discussions.

Dr H S Nagaraja spoke eloquently about the advances in sciences and how the students should prepare for their examinations and their life ahead.He generously invited the students, teacher, researchers, physics enthusiasts to participate in projects, research to his Prayoga Institute of Education and Research, a facility, created at Bangalore suburbs for student education and research, partnering with Dayanand Sagar University.

The feedback from the studentsexpressed their thrill and excitement all throughout the Events.A couple of students exhibited their fascinating oratory skills too.

Prizes were distributed to the toppers of the Laboratory contest. The judges for the event were also felicitated.

Prizes were given to the winning teams in the Quiz competition.

RCIEP 2022 Prizes were also distributed to the winning participants in this special occasion by the Coordinator, Dr S N Shobha devi.

Prize Winning Team

Vote of thanks was presented by the RC12A secretary.The VVS Management and staff, student volunteers, sponsors, guests and students were all acknowledged for their whole-hearted support and participation.

RS Geetha

Coordinator

Celebration of International Year of Glass (IYoG)
International Conference on Functional Glasses (ICFG-2022) Nov 14, 2022
(& Pre conference Poster session to students on Nov 13)

Indian Association of Physics Teachers, Karnataka (IAPT- RC-12) &
The Institution of Electronics and Telecommunication Engineers (IETE), Kalaburagi
In Association with
Visvesvaraya Technological University, Centre for PG Studies, Kalaburagi
Karnataka Science and Technology Academy (KSTA) and
Karnataka State Council for Science and Technology (KSCST)

Venue: VTU's CPGS, Kalaburagi
Number of beneficiaries: 175, Mode: Hybrid: https://meet.google.com/gzq-ywin-oth

About Conference: Glass is one of the most ancient materials known and used by mankind. Glass, existing for millions of years, has fascinated and attracted enormous interest both scientifically and technologically, where and when glasses first appeared is not exactly known. The United Nations proclaimed Year 2022 as an International Year of Glass (IYoG), in its General Assembly on 18 May 2021, to throw a light on the role of glass in our societies and show how technologies like glass can contribute to sustainable development.

To commemorate this event Karnataka RC-12 will be organizing a 2 day International Conference on Functional Glasses in Hybrid mode, during November 13-14, 2022. Invited talks by speakers/experts in glass science and technology from various institutions in India and contributed preconference poster session will be broad frame work of the conference. Since there are research and development efforts going on in different laboratories/Institutions and industries in the country on glass/glass-ceramics, this conference will provide a common platform for different researchers. Teachers, researchers and students shall be invited to participate.

Resource Persons:

1. Dr. G. P. Kothiyal, Former Head Glass and Advanced Ceramics Division, BARC, Mumbai and Chairman MRSI Mumbai Chapter.
2. Dr. B. B. Kale, Director General, C-MET, Pune.
3. Dr.A R Kulkari, Emeritus Professor at IIT Bombay/Dr. Shiva Gadag, USA
4. Dr. M. S. Jogad, EC Member IAPT, Ex KSAWU, Ex Principal SB College, KSCST, SSSUHE
5. Prof Bernhard Rolling, Marburg, Germany.
6. Sri. P. S. R. Krishna, BARC/Dr. Rashmi P. Salagare, SSSUHE, Kalaburagi / Dr. B. S.Krishnamurthy.
7. Prof. José M.F. Ferreira, CICECO,University of Aveiro, Campus Santiago, PORTUGAL
8. Dr.Jayashankar, Professor(Rtd),Venkateshwar University, Thirupati, AP

Hands on skills on **"Glass Blowing and 3D Printing Techniques"** at **Govt. Tools & Training Centre, Kalaburagi** on 13 November 2022.**Poster Presentation Session on "Glass and Glass Cerami.cs Research Papers" and "History of Glass and its uses"** at **VTU Centre for PG Studies and Regional Office, Kalaburagi** on 13 November 2022. jogadms@gmail.com

(Note: Send abstract to jogadms@gmail.com 9880971208)

M S Jogad	**Baswaraj Gadgay**
Convener	**Co-Convener**
S M Khene	**L A Udachan**
Secretary IAPT RC-12	**President IAPT RC-12**

NATIONAL ADVISORY COMMITTEE

A H Rama Rao (President NES of Karnataka) **Chief Patron**
P K Ahluwalia (President IAPT), **Chief Patron**
U S Kushwaha, Chief Editor, IAPT Bulletin, Chandigarh
Satya Prakash, Ex VC, Chandigarh
Prabal K Maiti, Chairman, IISc, Physics Dept, Bengaluru
G Venkatesh, Fr.Vice President & Ex Chief Co-Ordinator, IAPT Exams
H S Nagaraja, Chief Mentor, Prayoga, Bengaluru
Manjit Kaur, Editor IAPT Bulletin Chandigarh
C NagarajaKumar, Ex Co Ordinator NSSP, Chandigarh
L Satpathy, Chief Editor, Student Journal of Physics Bhubaneswar
P Venkataramaiah, Ex V C (Mysore)
B P Tyagi, Chief Coordinator, IAPT Exams
R Ananda kumari, President, RC 12 A
H C Verma, VP Genetal IAPT
Y R Waghmare, Ex President IAPT
H C Pradhan, Ex president IAPT
K Siddappa, EX VC, Bangalore
P Nagaraju, Convener, NSSP 2022

NATIONAL ORGANISING COMMITTEE

S N Nagaraja Reddy, Secretary (NES of Karnataka) **Patron**
P Sadananda Maiya, Secretary (NES of Karnataka) **Patron**
Rekha Ghorpade, General Secretary, IAPT Patron
K S Nataraj, Director, B V Jagadeesh Science Centre, Bengaluru
Shivaram N Patil, Vice - President, RC 12A
Sanjay Kr Sharma, Managing Editor, IAPT Bulletin
M S Jogad, EC member IAPT, Karnataka
B A Kagali, Ex Chairman, Dept of Physics, Bangalore University
S Somasekhar, Member RC 12 A
N Nagaiah (BU), Ex Chairman, Dept of Physics, Bangalore University
K T Vasudevan, Co Ordinator PG Physics, The National College
K N Joshipura, Ex General Secretary, IAPT
Ramakrishna, President RC 22, (Telengana)
S M Khened, Secretary RC 12
Aravind N, Dept of PG Physics, The National College
Sarmista Sahu, Co-Convenor NSSP-2022

LOCAL ORGANISING COMMITTEE

Y C Kamala, Principal, The National College
C R Sampathkumari, Principal, The National PU College
H C Bellad, Vice Principal, The National College
B G Jagadeesha, Dept of PG Physics, The National College
V S Shanthala, Treasurer RC 12A
Achutha, Ex Secretary, RC 12 A
N K Sathyapal Sharma, Co-Ordinator, Dept of Commerce
K M Raghavendran, Member RC 12 A
K R Madhura, Co-ordintor PG Maths, The National College
R S Geetha, Member RC 12 A
B S Srikanta, Ex president RC 12A
Ganesh Hegde, Dept of Physics, The National College
Amara Prabhu, HOD, Mathematics, The National College
S Cheluvappa, HOD Electronics, Th National College
M K Raghavendra, Member RC 12 A
S Shalini, HOD Computer Science, The National College
Shobhadevi S N, Member RC 12 A
Arvind K Taneja, Asst Editor, IAPT Bulletin
Radhika S M, HOD Chemistry
Abhiram J, Secretary NSSP 2022

Important Dates

Symposium Date **December 21-23, 2022**
(Wednesday to Friday)

Last Date for Submission of Abstracts **Nov. 25, 2022**

Notification of acceptance of Abstracts **Dec. 05, 2022**

Last Date for Submission of full Length paper / Registration **Dec. 10, 2021**

Guidelines for Submission

The soft copy of the paper in **MS-Word** should be sent to the **Email- nssp2022.karnataka@gmail.com**

Paper Specification:

Max. Length Extended Abstract about 2 pages

Margin 1" All sides, Font size & line spacing Times New Roman-12, Justified & 1.5

Title Page Title, Author, Affiliation, Contact Details, email, Phone number

Full length of the Paper About 6 pages including diagrams, tables, conclusion and references.

If paper is accepted, the paper will be published in student journal of Physics - International Edition, **ISSN 2319-3166.**

Payment Mode:
Registration through online.
Account Holder: **IAPT RC 12A**
Account Number: **04752010003124**
Bank: **CANARA BANK**
Branch : **Malleshwaram, Bangalore**
IFS Code CNRB0010424
MICR Code 560015232

Click / Scan QR Code for Registration

9th IAPT National Student Symposium on Physics (NSSP-2022)

Organized by
Indian Association of Physics Teachers
Regional Council RC 12 A
and
Department of Post Graduate Studies & Research in Physics
The National College (Autonomous)
Jayanagar, Bangalore - 560 070
in association with
B V Jagadeesh Science Centre
Jayanagar, Bangalore

December 21 – 23, 2022

Venue:
B V Jagadeesh Science Centre
The National College (Autonomous) Campus,
Jayanagar, Bangalore - 560 070, Karnataka

ABOUT NSSP

In recent years, our country has taken a series of measures to induce the spirit of innovation and creativity into our Education system. Projects and Dissertations have become an integral part of UG and PG curricula as per the new National Education policy. To foster a culture of innovation and creativity among the young students, IAPT hasinstituted theannual National Student Symposium on Physics (NSSP) exclusively for the UG and PG students. The Symposium provides a National forum to young students to present their new ideas and innovative work at an early stage of academic career. The yearly series started in 2013 in collaboration with the Department of Physics, Panjab University, Chandigarh. Eighth in the series was held at Indian Academy Degree College (Autonomous), Bangalore and NSSP – 2022.

ABOUT IAPT

A voluntary organization of Physics Teachers, 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 teachers and visionary (Late) Dr. D.P. Khandelwal with active support from like minded members with the aim of upgrading quality of physics teaching - learning at all level in the country. The Association operates through its 22 Regional Councils (RCs) grouped into 5 zones. There is a central Executive Council (EC) which coordinates all its activities.

Activities of IAPT:

Publications

Bulletin of IAPT – A monthly journal (40 pages) with the record of uninterrupted publication since 1984.

Journal of Physics Education – The IAPT has taken over the publication of this quarterly (previously published by UGC) publication since April 2001.

Student Journal of Physics – An International Edition (Earlier name-Prayas) – A quarterly journal carries out articles and research reports by UG/PG students.

Pragami Tarangand Horizons of Physics – Is a book series brought out for physics teachers and students.

Examinations for students

National Standard Examinations: NSE (NSEP, NSEC, NSEB, NSEJS, NSEA) – These examinations are conducted for +2 level students / higher secondary students every year since 1987. National Standard Examinations are held at 3 levels. These examinations constitute the first step towards participation in International Olympiads in respective subjects.

NGPE (National Graduate Physics Examination): This is conducted for Undergraduate level students every year. Gold medalists of NGPE, may join DAE directly through interview without appearing in the entrance test. S N Bose National Centre for Basic Sciences, Kolkata allows direct admission to toppers in NGPE after an interview for integrated Ph.D., programme. Five Scholarships have been instituted to encourage students to take up Physics as a career.

Extra Low - Cost Book (ELCB) programme - The aim is to help teachers build up their personal libraries.

For Teachers

NCIEP (National Competition for Innovative Experiments in Physics), NCICP (National Competition in Computational Physics) and Orientation Programmes /Seminars / Workshops / IAPT Dinabandhu Sahu Memorial Award: Awarded to Undergraduate Physics Teaching full time teacher as per UGC guidelines.

NCEWP (National Competition for Essay Writing in Physics) for both Teachers and Students.

NANI (National Anveshika Network of India): This provides a base for generating interest in Experimental Physics in students. There are about 22 centers and some more are in the offing.

CSC (Centre for Scientific Culture): The Centre established at Midnapore, WB, provides a year round exclusive facility of working experiments in Physics.

ABOUT NATIONAL COLLEGE

The National College, Jayanagar, Bangalore, is one of the Seventeen institutions being managed by the National Educational Society of Karnataka (NES), which was established in 1917 by Dr. Annie Besant with nationalistic ideas as the driving force. NES believes in Rural Education and therefore a number of High Schools are being run in Rural areas, thus it is serving diverse educational needs of the society. The college established in 1965 has evolved with well-equipped Laboratories and Digital Library speak volumes about the academic ambience of the College. The learners will surely be able to find themselves growing into better individuals than what they are when they enter the portals of the Institution. The institution also aims in inculcating values of life and discipline among students. The National College became Autonomous in the year 2006 – 2007. The College is reaccredited by NAAC with A grade in the year 2017. The special feature of this institution is B.V. Jagadeesh Science Centre which incorporates a well equipped museum and spacious lecture hall. Dr. H.N. Kalakshetra is an added attraction for cultural programme. Multi-Gym and the sprawling Playground provide the necessary infrastructure and space for all Co-curricular activities.

The College offers UG courses in Science, Commerce and Arts (B.A, B.Sc, B.Com, B.C.A, New Tech – Based UG Courses). The College also offers M.Sc, in Physics and Mathematics and M.Com. The research facilities and the dedicated faculty available in the PG Departments are attracting other College students also to carry out their projects.

ABOUT BVJ SCIENCE CENTRE

Built by the NES of Karnataka as part of the College campus, B.V. Jagadeesh Science Centre is meant to promote popular science. The main motive is to popularise science and draw the young generation towards basic science in these days of frenzy about Information Technology and Bio-technology. The Centre has a library of non-technical Science books and popular science journals. The Seminar hall with all modern equipment, facilitates lecture programmes which are arranged on every 2nd and 4th Saturday of every month. The centre also has two museum halls which house various exhibits pertaining to different branches of science. Every Saturday, students from high schools can visit the Science Centre, have a close look at the exhibits and also get to know first hand the mechanism of the apparatus. The Centre has been made possible by the initial donation by Mr. B.V. Jagadeesh an alumnus of the The National College, Jayanagar and the National College, Basavanagudi who is now an entrepeneur in the United States. His contribution also forms the highest amount donated by any individual to the NES of Karnataka. As a token of gratitude the centre has been named after him. The rest of the total expenditure has been collected from the public and the Government. It is a pubic institution open to any one interested in Science-education, established with the hope that the younger generation will make the best use of it.

INSTRUCTIONS FOR AUTHORS

Authors are requested to follow the guidelines for preparing the **manuscript in .doc/docx** format. Manuscripts submitted in only .pdf format will not be accepted.

- Fonts: Times New Roman
- Title: **14-Bold for Title**
- Size: **12-bold** for sections-headings
  11 for the text
- Line spacing must be 1.15.
- Total writeup: Maximum number of pages = 8
- References must be numbered and referenced in the text in square brackets [ ].
- The style of references, as shown, must be adhered to.
- Please submit the document in .docx/.doc format. Only .pdf format shall not be accepted.
- **Language and Grammar checks must be performed before the submission of document.**

Sample:

The perseverance has landed on the Mars

Astronaut Wiley
Moon University
Steller Space, US
email: unkown@starwars.org

Abstract
This is a sample text to guide the authors……..

Introduction
Please follow this pattern for preparing the draft of your paper….
and the references should be written in [ ].

..
..

References

1. B. Andersson and G. Gustafson, Nuc. Phys. B281 (1987) 289.

2. D.H. Perkins, Book in Particle Physics, 4th Ed., Cambridge University Press, (2014) 201.

The Story Of Cosmology Through Post Stamps 29

HUMAN EXPERIENCES OF THE SKY

CONSTELLATION-ZODIAC

A set of 12 stamps depict modern view of 12 Zodiac constellations situated within 9^0 band either side of ecliptic plane, along with the name of main prominent star of the constellation. In the right corner of each stamp depicted the Greek symbol of that constellation

Capricornus- Denab, Algedi (September)

Aquarius- Sadalsuud yellow supergiant -610LY (October)

Pisces- Kullat Nuun, yellow gient,294 LY, (November)

Aries-Hamal -66LY (December)

Taurus-Aldebaran,Orange gient 65 LY, (Jananuary)

Gemini-Pollux,34LY (Jan-Feb)

Cancer-Al Tarf,290LY (March)

Leo-Regulus,77LY(April)

Virgo-Spica,260LY(May)

Libra- Zuben Schumali,185LY Blue white dwarf (June)

Scorpuis -Antare, 550LY (July)

Sagittarius-Kus Australis, Binary star system,140LY(August)

Postal Regd. No. Kanpur City-28/2021-23 Date of printing 02-11-2022 Date of posting 08-11-2022 RNI No. UPENG/2009/29982

BULLETIN OF INDIAN ASSOCIATION OF PHYSICS TEACHERS

FOUNDED BY (LATE) DR. D.P. KHANDELWAL

VOLUME 14 **NUMBER 11** **NOVEMBER 2022**

IN THIS ISSUE

If underlivered please return to :

Dr. Sanjay Kr. Sharma

Managing Editor

Flat No. 206, Adarsh Complex,

Awas Vikas-1, Keshavpuram, Kalyanpur, Kanpur-208017

Published by R.N. Kapoor on behalf of Indian Association of Physics Teachers. For circulation amongst IAPT members/subscribers only.
L-117/302, Naveen Nagar, Kanpur-208025, Ph. 9415404969. Printed at Sharda Graphics Pvt. Ltd., 123/766, Factory Area, Fazalganj, Kanpur-208012, Ph. 9336845329
Chief Editor: Prof. U.S. Kushwaha