Bulletin of

IAPT @40

www.indapt.org.in

Scan to Read IAPT Bulletin online

ISSN 2277-8950

THE INDIAN ASSOCIATION OF PHYSICS TEACHERS

A MONTHLY JOURNAL OF EDUCATION IN PHYSICS & RELATED AREAS

VOLUME 16 NUMBER 8 AUGUST 2024

This NASA/ESA Hubble Space Telescope image treats viewers to a wonderfully detailed snapshot of the spiral galaxy NGC 3430 that lies 100 million light-years from Earth in the constellation Leo Minor. Several other galaxies, located relatively nearby to this one, are just beyond the frame of this image; one is close enough that gravitational interaction is driving some star formation in NGC 3430 - visible as bright-blue patches near to but outside of the galaxy's main spiral structure. This fine example of a galactic spiral holds a bright core from which a pinwheel array of arms appears to radiate outward. Dark dust lanes and bright star-forming regions help define these spiral arms.

NGC 3430's distinct shape may be one reason why astronomer Edwin Hubble used to it to help define his classification of galaxies. Namesake of the Hubble Space Telescope, Edwin Hubble authored a paper in 1926 that outlined the classification of some four hundred galaxies by their appearance - as either spiral, barred spiral, lenticular, elliptical, or irregular. This straightforward typology proved extremely influential, and the detailed schemes astronomers use today are still based on Edwin Hubble's work. NGC 3430 itself is a spiral lacking a central bar with open, clearly defined arms - classified today as an SAc galaxy.

Link: https://www.nasa.gov/image-article/hubble-images-a-classic-spiral/

Bulletin of The Indian Association of Physics Teachers

http://www.indapt.org.in

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 of physics and related areas. Further, the Bulletin also highlights information about the activities of IAPT.

All communications should be addressed to:

Chief Editor (IAPT Bulletin), Dept. of Physics, P.U., Chandigarh – 160 014

Email: iapt@pu.ac.in

Registered Office

Flat No. 206, Adarsh Complex, Awas Vikas-1, Keshavpuram, Kalyanpur, Kanpur – 208017

E-Mail : iaptknp@rediffmail.com

Secretary :	*Treasurer :*	*Office Assistant :*
Sanjay Kr. Sharma	**D. C. Gupta**	**Vinod Kr. Prajapati**
sksharma777@gmail.com	guptadeepchandra117@gmail.com	iaptknp@rediffmail.com
Mob. 9415404969	Mob. 9839035685	Mob. 9935432990

Editorial

Sports and Physics Go Hand in Hand

The Olympic motto, "*Citius, Altius, Fortius"* (Latin for "Faster, Higher, Stronger"), reflects the pursuit of excellence and human achievement in sports. Physics has played a significant role in enhancing this motto. It is time to reflect upon this and how it provides an opportunity to reflect on how physics is used by athletes to achieve motto's spirit. On twenty seventh July, Google posted a doodle on skateboarding to celebrate the introduction of this sport in Olympics. Olympics as an event provides a grand spectacle of physics principles, through a distinct discipline of Sports Physics. Grandeur of opening and closing ceremonies is a spectacle of light and sound and this time it was a like a huge open cruise of participating nations. Let me come back to the motto once again and see which of the sports demonstrate these words in action and the role physics plays in it.

1. **Faster (Citius)**:
    - **Aerodynamics**: Understanding airflow and minimizing drag has led to faster swimsuits, streamlined bicycles, and efficient ski jumps.
    - **Biomechanics**: Analyzing sprinters' stride length, swimmers' strokes, and runners' techniques optimizes speed.
2. **Higher (Altius)**:
    - **Physics of Flight**: In high jump, pole vault, and gymnastics, athletes optimize takeoff angles and energy transfer to achieve greater heights.
    - **Materials Science**: Lightweight, strong materials enhance equipment (e.g., pole vault poles, ski jump skis).
3. **Stronger (Fortius)**:
    - **Strength Training**: Physics principles guide weightlifting techniques, muscle activation, and power development.
    - **Biomechanics**: Proper form and leverage maximize force output in throwing events (e.g., shot put, javelin).

Let me come back to the skateboarder and delve into the physics of skateboard rotation during aerial tricks. When skateboarders perform flips, spins, and other tricks, several key principles come into play:

1. **Angular Momentum**:
    - Angular momentum is crucial for rotational

motion. When a skateboarder initiates a spin (e.g., a kickflip or a 360-degree spin), they manipulate their angular momentum.
    - By tucking or extending their limbs, they alter their rotational inertia. Pulling their knees toward their chest reduces inertia, allowing faster spins. Extending their legs increases inertia, slowing down the rotation.

1. **Torque and Conservation of Angular Momentum**:
    - Torque (the rotational equivalent of force) plays a role in skateboard tricks. When a skateboarder flicks the board with their foot (as in a kickflip), they apply torque.
    - Conservation of angular momentum states that the total angular momentum remains constant unless an external torque acts on the system. Skateboarders use this principle to control their spins mid-air.
2. **Axis of Rotation**:
    - The skateboard's axis of rotation depends on the trick. For a kickflip, the axis is

perpendicular to the board's length. For a heelflip, it's parallel to the board.

- Understanding the axis helps skateboarders execute precise flips and spins.

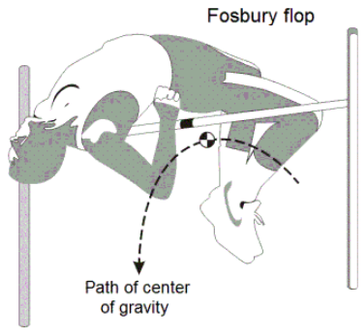
3. **Air Resistance and Stability**:
   - Air resistance (drag) affects skateboard rotation. Skaters tuck their bodies to minimize drag during spins.
   - Stability is crucial—keeping the board level ensures controlled rotations.

I have my favourite events also where physics principles are in action, let us see how:

1. **Archery**: In archery, the principles of projectile motion, gravity, and aerodynamics are crucial. The trajectory of the arrow follows a parabolic path, influenced by gravitational pull and air resistance. This also brings to my mind Sheetal Devi, armless wonder para-archer. Hope Deepika Kumari wins the event this time.
2. **Gymnastics**: Gymnasts demonstrate angular momentum, balance, and rotational motion. When they perform spins, flips, and twists, they manipulate their body's inertia and torque to achieve graceful movements. Dipa Karmakar has been the best bet but this time she has not qualified for the Paris Olympics.
3. **Swimming**: Hydrodynamics plays a significant role in swimming. Swimmers minimize drag by streamlining their bodies and adjusting stroke techniques. Fluid dynamics affects their speed and efficiency in the water. India has yet to make a mark in this field in Olympics.
4. **Ski Jumping**: Ski jumpers experience both gravitational potential energy and kinetic energy during their flight. The takeoff, flight, and landing involve principles of energy conservation and projectile motion. It is a part of winter Olympics and India has yet to win a medal
5. **Track and Field (Long Jump)**: Long jumpers optimize their takeoff angle and speed to achieve maximum horizontal distance. The jump combines principles of kinematics, energy transfer, and momentum conservation. This time Jeswin Aldrin is representing India in long jump event.

I find high jump as the trickiest event where a mindboggling innovation was brought by Dick Fosbury, here the high jumper crosses the bar by flopping on the back to achieve higher jump.

- **Innovation**: Fosbury introduced the "Fosbury Flop" technique in high jump during the 1960s.



- **Physics Behind It**: Instead of the traditional scissor or straddle methods, Fosbury jumped backward over the bar. This allowed him to clear greater heights by optimizing his center of mass and minimizing energy loss.
- **Impact**: His innovation not only won him Olympic gold but also transformed high jump worldwide. The Fosbury Flop is now the standard technique in the sport.

I see this as an opportunity to share videos with students on a particular sport of current Olympics and search for physics principles at play. These will form excellent projects at all the three levels. May be videos can be put under tracker software and lead to some quantitative analysis physics and conclusions. Let us avail this opportunity. Internet is abuzz with AI driven performance and sports trackers. Keep an eye on winners, you may find superiority of an Olympic medalist enhanced by physics behind the training. Enjoy 2024 Olympic games with a focus on physics.

P.K. Ahluwalia

Physics News

ATLAS probes uncharted territory with LHC Run 3 data

Despite its immense success in describing the fundamental building blocks of matter and their interactions, the Standard Model of particle physics is known to be incomplete. At the biannual ICHEP conference, held 17–24 July in Prague, the ATLAS collaboration presented its first results from searches for new physics at record collision energies, targeting magnetic monopoles produced in heavy-ion collisions. Magnetic monopoles are hypothetical particles with only a single north or south pole, making them magnetically charged. Consequently, the result sets the world's best limits on the production rate of monopoles created in ultraperipheral heavy-ion collisions for monopole masses below 120 GeV. Moreover, this analysis introduces a methodology for studying highly ionizing particles in heavy-ion data from the LHC and beyond. With more data from the LHC and its future upgrade, the High-Luminosity LHC, ATLAS physicists will continue their quest to find long-lived particles, magnetic monopoles and other hypothetical particles—all while further refining their search techniques and developing new experimental strategies

Read more at: https://phys.org/news/2024-07-atlas-probes-uncharted-territory-lhc.html
Provided By: CERN

Scientists discover energy and pressure analogies linking hadrons, superconductors and cosmic expansion

Quantum chromodynamics (QCD) is the theoretical framework for studying the forces within atomic nuclei and their constituent protons and neutrons. Mathematically, the forces inside nucleons can be compared to the force of gravity. However, quantum effects known as the "trace anomaly" that do not follow the same pattern can become prominent in nucleons. Mathematically, the forces inside nucleons can be compared to the force of gravity. However, quantum effects known as the "trace anomaly" that do not follow the same pattern can become prominent in nucleons. In both hadrons and superconductors, how particles are confined to a specific volume can be described with the same mathematical framework. This is also similar to the role of the cosmological constant or dark energy in regard to energy and pressure in the equations describing the expansion and acceleration of the universe. These examples illustrate how the concepts of energy, pressure, and confinement manifest across different physical systems, from the microscopic to the cosmic scales, providing a unified understanding of diverse phenomena in physics.

Read more at: https://phys.org/news/2024-07-scientists-energy-pressure-analogies-linking.html
Original paper: Physical Letters B (2023) DOI: 10.1016/j.physletb.2023.138418

Scientists resolves a long-debated anomaly in how nuclei spin

Atomic nuclei come in different shapes, varying from football-like ("prolate") to pancake-like ("oblate"). Prolate and oblate shapes have different moments of inertia. This is a body's resistance to having its speed of rotation altered by an external force. In previous research, measurements found that for fast rotations, for example in nuclei like neon-20 or chromium-48, the energy for spinning changes unexpectedly. For the first time in nearly 50 years, scientists accurately calculated the moment of inertia and studied its hypothesized anomalous increase through state-of-the-art simulations of nuclei. The simulations for neon-20 replicate the energy measurements. Remarkably, however, the simulations do not find the anomalous increase. Instead, they reveal a change in the interior of the nucleus. This represents a new insight into the physics of fast-rotating nuclei.

Read more at: https://phys.org/news/2024-07-scientists-debated-anomaly-nuclei.html
Original paper: Physical Review C (2023). DOI: 10.1103/PhysRevC.108.024304

Soumya Sarkar
IISER PUNE
INDIA

Article

Pleasures and Pangs of My Research and Journal Publication

Hardev Singh Virk
Professor of Eminence in Physics (Honorary)
Sri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab, India.
Email: hardevsingh.virk@gmail.com

Abstract

Research and teaching are both complementary in a science teacher's life. It gives lot of pleasure if your research work is published in a good journal. The author has reported his pleasures and pangs in the pursuit of research. Interdisciplinary research was not encouraged in Indian universities during early 1970s when he ventured into this arena. Journal publications are becoming more tedious and complicated for Third World scientists due to high cost of publications. Author has described his own pangs in vivid detail to bring home the truth.

1. Introduction

In ancient times, there were no research journals. Most of the innovators (Philosophers and Scientists) wrote their accounts in the form of manuscripts. Aristotle wrote 33 volumes, out of which Physics, Meteorology, Metaphysics, Politics and Poetics are famous and well known. Newton wrote several treatises of his discoveries but only 2 are famous: Principia (Philosophiae Naturalis Principia Mathematica)and Opticks.

The first scientific journal of the world was Journal des sçavans (Scholars' Journal) published in January 1665, followed soon after by Philosophical Transactions of the Royal Society of London in March 1665, and Mémoires de l'Académie des Sciences, Paris in 1666. However, the most popular journals of Science are Nature, Science (UK) and PNAS (Proceedings of National Academy of Sciences, USA). The two leading scientific journal publishers are Elsevier (Amsterdam) and Springer-Nature (London) publishing 2900 and 2700 journals, respectively. Other leading publishers include Wiley, Taylor & Francis, SAGE Publishing, Oxford University Press, Institute of Research and Journals-IRAJ, Cambridge University Press, Nature Publishing Group, and The Royal Society.

Almost all international journals are published in English language. Till 1950s, Scientists of European countries, Russia, China, and Japan preferred to publish in national journals but this trend is changing in recent years. Indian scientists from the very beginning preferred to publish in foreign journals. As a consequence, none of the Indian journal gained currency worldwide despite the fact that India is third largest producer of research papers at global level.

Popularity of research journals is measured by its impact factor (IF). The impact factor was devised by Eugene Garfield, the founder of the Institute for Scientific Information (ISI) in Philadelphia. Impact factors began to be calculated yearly starting from 1975 for journals listed in the Journal Citation Reports. It has created an unhealthy competition between scientists of developed and Third World countries. Most countries have adopted IF as a parameter for evaluation of research work of their scientists.

2. Pleasures of My Research and Publications

In 1972, I submitted summary of my Doctoral Thesis in the form of a research paper to Nuclear Physics B. It was accepted without any revision in one month. It was a great motivation for my research activity and I published four more papers in the proceedings of

Comptes Rendus de la Academie des Sciences, Paris during 1972.I preferred to publish in Indian journals, Current Science, and Indian Journal of Pure and Applied Physics, after my return to India during 1970-80s. Physical Review was not my choice as the Editors asked the authors to pay for publication charges in dollars per page. IF was not a consideration till my retirement from Guru Nanak Dev University, Amritsar in 2002. My publication score reached 300 journal publications in Indian and foreign journals on the eve of my retirement with an average of 10 publications per year during 1972-2002.

We were lucky to have research collaboration with established research groups in Europe and America. The list is inexhaustible but I will like to mention some prominent names, for example, RL Fleischer and PB Price (USA), the two pioneers of SSNTD technique; Robert Mc Corkell of Carleton University, Ottawa (Canada); Reimer Spohr and Christina Trautmann of GSI, Darmstadt (Germany) and R. Brandt of Marburg (Germany); G. Somogyi and Ilona Hunyadi from Debrecen (Hungary) and George Marx and Ester Toth of Budapest (Hungry); L. Tommassino and Fedora Quattrocchi from Rome (Italy) and Giovanni Martinelli from Modena (Italy).

In addition to research collaboration, we got liberal grants from funding agencies in India and abroad in the time-bound project mode. I offer my sincere thanks to Prof. Abdus Salam, Nobel Laureate, for providing the grant under TWAS (Third World Academy of Sciences) to set up Centre for Promotion of Science (CPS) in Guru Nanak Dev University, Amritsar. I owe my gratitude to funding agencies like CSIR, DST, UGC, BRNS (DAE) and MEF, Govt. of India for liberal project grants. I am indebted to my research workers and collaborators, who made my journey in science a fruitful experience and an adventure.

Why I call my research an adventure? My doctoral thesis and training in Pierre and Marie Curie University, Paris was in High Energy Nuclear Physics, popularly called Elementary Particles Physics. I worked on Nuclear Emulsion plates exposed to 14 GeV Proton Beam at Proton Synchrotron accelerator at CERN, Geneva. The upper limit in 1960s was just 27 GeV. There were no accelerators in India. I got into collaboration with JINR, Dubna (Moscow) and got a stack of emulsion plates exposed to 10 GeV Deuteron Beam. But there were no research facilities to carry out my experiments in Punjabi University, Patiala. Hence, I had to change my field of research from High Energy Nuclear Physics to Interdisciplinary areas of science.

It was an arduous task but I was determined to move forward. I enjoyed the status of a Senior Associate of International Centre for Theoretical Physics (ICTP), Trieste, Italy during 1988-93. It provided me an opportunity to attend training programmes, workshops and Summer Schools organised by ICTP. My foray into Earth Sciences started in 1978 after attending a 3-month training programme in Physics of Earth at ICTP in 1977. My research interests have been manifold including Nuclear & Radiation Physics; Geochronology; Earthquakes & Environment; Ion Tracks & Nanotechnology; History & Philosophy of Science; and Geochemistry of Groundwater at present.

3. An Overview of My Pangs of Research Journal Publications

These days, most of the journals are published in mixed mode, open access and closed. But most of the open access journals charge high fees, known as article publication charge (APC). It is unfortunate that Editors prefer to publish papers of authors who pay APC on priority. I have experienced this attitude of Editors in my recent research after retirement.

During this year, I submitted a Letter to Editor of a reputed journal with clear proofs of contradictory results published in his journal. He accepted my Letter but demanded 990 US dollars (+ Taxes) to publish it. I refused to pay. The Editor kept it pending for 3 months before it was published. In my view, Letters to Editor must get priority and appear in a matter of weeks, not months.

All journals adopting OPEN ACCESS mode are trying to loot authors. The APC varies from 1000 USD to 3000 USD. I have published dozens of research papers free of cost in Nuclear Instruments and Methods in Physics Research B during 1980-2000. Today, I happened to check APC for this journal using Google search and it declares 2920 USD for open access. You can find identical APC in other journals published by Elsevier and Springer Nature.

In my search to find some free journal, I came across Journal of Water and Health, for my latest research paper on groundwater contamination and its health hazards. During uploading my paper on journal template, I found a strange demand of the Editor asking for donation to the tune of 2000 USD. I opted for subscription without donation. I am not sure how much time will it take to get published? The Editorial office is in no mood to answer my queries during the last six weeks!

On the average, it takes 6-8 months to get your paper published in high IF journals. During 1970s, I could publish my papers in less than two months in any journal, Indian or foreign. Current Science was my favourite journal in India for fast publication. Now a days, it takes 6-8 months on the average. Fortunately, it has no APC but I was surprised when they asked me to pay for colour figures at the rate of Rs. 2000 (+ GST) per page.

How the Editors loot authors? All the publishers ask for Copy Right at the time of submission of paper. By providing this legal document, authors lose all ownership of their research publication. Journal publishers get the right to sell your research work. If anyone wants to read your publication, he has to pay 30-50 USD for purchase of a printed or online copy.

Another disadvantage of giving prior Copy Right to publisher is that you cannot submit your paper to any other journal during the pendency of its acceptance or rejection. Last year, a young author pleaded with Nature that authors must be given option to submit their research work to multiple journals. This will avoid delays in publication and losing the advantage of getting some prestigious awards due to tough competition in research at global level. I remember, CV Raman, the Indian Physics Nobel Laureate, was always prompt to publish his research work in Nature. He could beat Russian authors to get the Nobel Prize by his priority in research work publication.

In my view, Journal Editors are not top most scientists in their fields. It is a demanding job and requires full time dedication to the journal. My last comment may look harsh to the Editors but it is based on my recent practical experience. I submitted one of my best papers to a Springer-Nature journal. After 4 weeks, the subject Editor rejected it on flimsy grounds that it belongs to an area of Radioactivity, out of the scope of his journal. I took him to task that it has nothing to do with radioactivity but he did not yield to my plea. Then their support group suggested that I can submit to another journal relevant to the topic of my research. I did oblige. But there was another big surprise. Editor rejected it using another excuse that my paper involves Ethical issues like use of blood and body organs and I must get permission of my government. I was almost crying hoarse on the decision of honourable Editor. I wrote him to reconsider his decision as our research work does not involve human beings or animals. It is simply an empirical model used to calculate the biokinetics of Uranium if it enters by ingestion in human body.

At the end of the day, I have decided to retire from my active research after a span of 54 years (1970 – 2024) due to stubbornness of Journal Editors, APC and copy right issues. I wish you all success in your research journey.

Article

A new method for determination of the dispersive power of the material of a lens

Sanjoy Kumar Pal[1,4], Pradipta Panchadhyayee[2,4*], Soumen Sarkar[3,4], Shinjinee Das Gupta[5], and Debapriyo Syam[6]

[1]Anandapur H.S. School, Anandapur, PaschimMedinipur, West Bengal, India
[2]Department of Physics (UG & PG), Prabhat Kumar College, Contai, Purba Medinipur, India
[3]Karui P.C. High School, Hooghly, West Bengal, India
[4]Institute of Astronomy Space and Earth Science, Kolkata -700054, W. B., India
[5]Department of Physics, Victoria Institution (College), Kolkata-700009, W. B., India
[6]Kalpana Chawla Centre for Space and Nanosciences, Kolkata -. 700010, India
[*]E-mail: *pradipta@pkcollegecontai.ac.in*

Abstract

In this article, we present an innovative approach for studying the variation of the refractive index of the material of a bi-convex lens with wavelength. We have used a set of LEDs (Light Emitting Diodes) as sources of light of different wavelengths (or colours). First, we have found the wavelengths from the forward characteristics of these LEDs. Then we have determined the refractive indices of the material of the lens, for different colours of light, through the well-established u-v procedure commonly used for lens analysis and finally we have found the dispersive power. Our results are in accordance with Cauchy's formula.

1. Introduction

In college laboratories, students typically find the dispersive power of a prism's material using a spectrometer, prism, and sodium/helium light [1,2]. However, for school students, handling a spectrometer and sodium/helium lamp can be very challenging [3]. Additionally, most school laboratories do not have enough funds to procure costly instruments like spectrometers and sodium/helium lamps. This problem creates a situation where senior secondary school students often learn about dispersive power and Cauchy's formula, without being able to verify them experimentally. To address this issue, we propose a low-cost and easy-to-handle experimental setup for determining dispersive power and verifying Cauchy's formula. In the present work, we describe a simple but novel method to determine the dispersive power of the material of a double convex lens. Here, we have used four LEDs that emit light of four different colours, as the sources of light. We have determined the refractive index of the material of the lens for different wavelengths of light emitted by these four LEDs and our results show the variation of the refractive index with wavelength as described in textbooks. The main objective of this experiment is to find the value of the dispersive power of the material of a double convex lens. The lens needs only be nearly equiconvex.

2. Theoretical Framework

The basic idea is to use the lens formula to measure refractive index, μ, for different colours of light. Thus, for an LED emitting light of a definite colour (say, j; see Fig. 1)[4],

$$\frac{1}{v_j} + \frac{1}{u} = (\mu_j - 1)\left(\frac{1}{R_1} + \frac{1}{R_2}\right). \quad (1)$$

Where v_j is the image distance, and u is the object distance as shown in the Fig. 1.

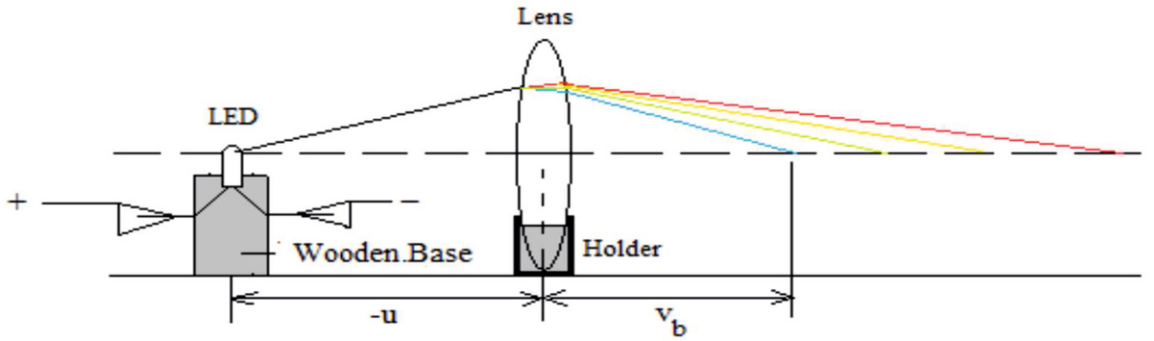


Fig.1: Schematic diagram of the experimental setup.

Here R_1 and R_2 are the radii of curvature of the convex lens. In the above equation, all the quantities are positive. The letter j is used to signify any of the four different colours light produced by the LEDs: red (r), yellow (y), green (g), and blue (b).

Let us write the harmonic mean of R_1 and R_2 as R_h. Then

$$\frac{2}{R_h} = \frac{1}{R_1} + \frac{1}{R_2}$$

Thus, $\frac{1}{v_j} + \frac{1}{u} = (\mu_j - 1) \cdot \frac{2}{R_h}$

It follows that

$$\mu_j = 1 + \frac{R_h}{2} \cdot \left(\frac{1}{v_j} + \frac{1}{u}\right). \qquad (2)$$

Such an equation can be written down for every colour of light. Now, let the arithmetic mean of R_1 and R_2 be R:

$$R = \frac{1}{2}(R_1 + R_2).$$

We estimate the difference between R_h and R. Let us put $R_1 = R + \varepsilon$ and $R_2 = R - \varepsilon$. Thus,

$$R_h = \frac{2R_1R_2}{R_1+R_2} = \frac{R^2-\varepsilon^2}{R}.$$

Suppose, $\varepsilon = \alpha R$. Then

$$R_h = \frac{R^2-\varepsilon^2}{R} = R(1-\alpha^2).$$

So, even if $\alpha = 0.2$, and therefore R_1 and R_2 differ by as much as 40%,

$$R_h = 0.96R$$

One may, consequently, replace R_h by R in the calculations. To find R, the thickness T and the diameter W of the lens are to be measured. From the figures given below (Fig.2),

$$R^2 = \left(R - \frac{T}{2}\right)^2 + \left(\frac{W}{2}\right)^2,$$

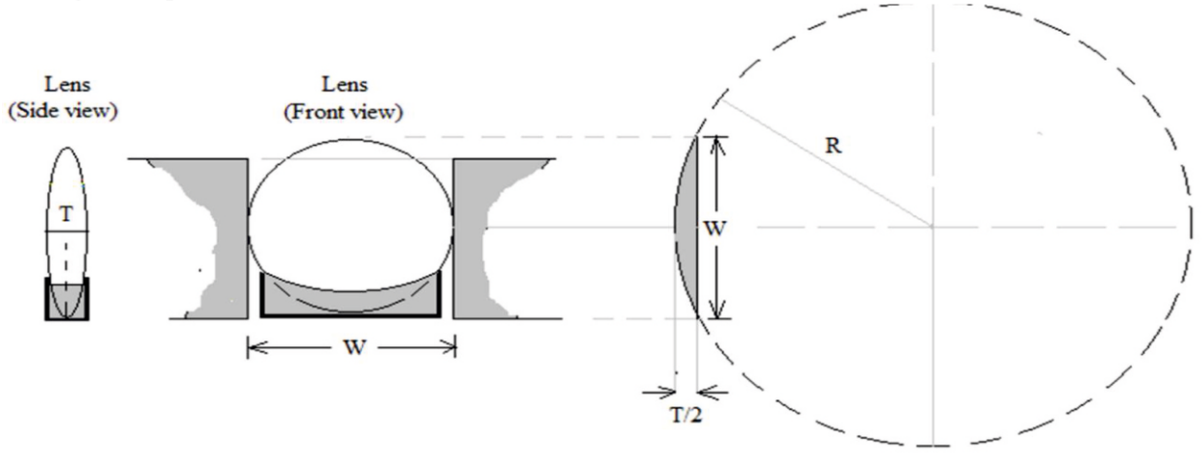


Fig. 2: Diagram showing the meanings of W and T.

or,

$$R = \frac{1}{4T}(W^2 + T^2) \approx \frac{W^2}{4T}, \qquad (3)$$

as the measured value of T is small in comparison to that of W.

Here, a nearly equiconvex lens is used and the correct value of the mean radius of curvature (R) of the convex surface is very much crucial for the success of the experiment. To measure R, a prerequisite is the value of the thickness T of the ideal biconvex lens. To this end, one has to find the values of t (total width along the principal axis of the lens) and d (width of the internal thick disc across the principal axis of the lens). Most lenses have a 2-3 mm thick disc-like central region. This protects the periphery of the lens from damage. T can be computed from the relation $T = t - d$. The meanings of the quantities t and d should become clear from Fig.3. The uncertainty in the value of T is given by

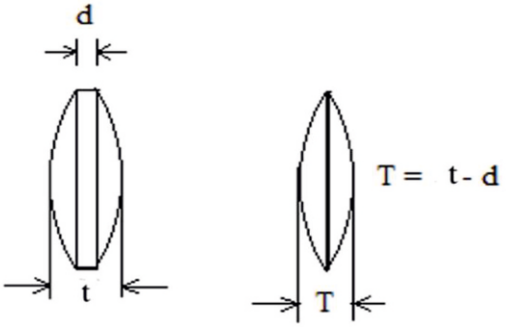


Fig. 3: Diagram shows what t and d stand for.

Likewise, the values of the other refractive indices can be worked out. By definition, dispersive power 'ω' of the material of the lens is given by

$$\omega = \frac{\mu_b - \mu_r}{\mu - 1} \qquad (5)$$

where

$$\mu = \frac{1}{2}\left(\mu_g + \mu_y\right).$$

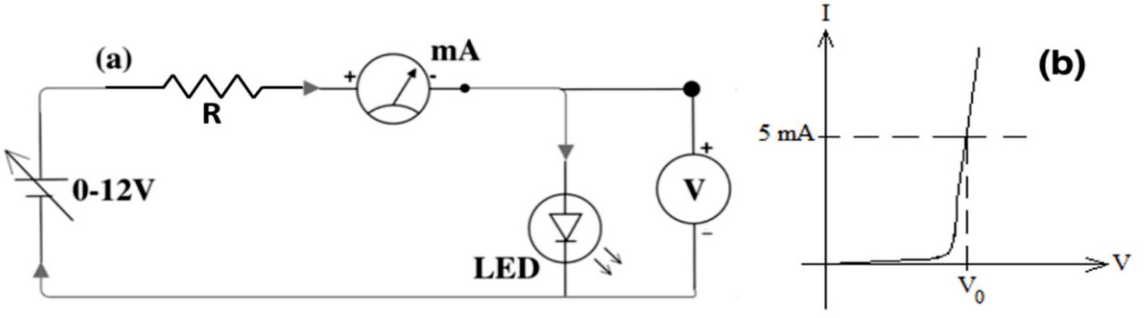


Fig. 4: (a) Circuit diagram for drawing the I-V characteristic of LED in forward-bias mode. (b) Nature of I-V characteristic curve.

$$\delta T = \sqrt{(\delta t)^2 + (\delta d)^2} \approx \sqrt{2} \times 0.02 \approx 0.03 \text{ mm}$$

One can compute the value of μ_b from the expression

$$\mu_b = 1 + \frac{R}{2}\left(\frac{1}{v_b} + \frac{1}{u}\right). \qquad (4)$$

To draw the μ - λ curve, it is necessary to know the value of the wavelength of light, i.e. λ, for each LED (actually, there is a little spread, proportional to the absolute temperature of the pn junction, of wavelength in the light emitted by a LED [see ref. 5]). To this end, the old

method of finding λ from the voltage (V_0) across a forward biased diode corresponding to a reference value of current (5 mA) is adopted. A resistor R (> 390 ohms) may be inserted in the circuit for greater safety. A schematic diagram of the circuit to be set up for this purpose and the expected nature of $I-V$ characteristic curve are given below (Fig. 4) [6-10].

We can write the following approximate expression: $eV_0 = h\nu = \frac{hc}{\lambda}$

or

$$\lambda = \frac{hc}{eV_0} \approx \frac{1240}{V_0(\text{in Volt})} (\text{in nm}). \qquad (6)$$

One is now in a position to draw the μ - λ curve and may try to fit the data to Cauchy's formula, viz.

$$\mu = A + \frac{B}{\lambda^2}. \qquad (7)$$

The values of A and B can be extracted from the above equation.

3. Experiment and Analysis of Results:

We have taken a double convex lens, which is almost equiconvex. Using a digital slide calliper (vernier constant 0.01 mm), we have measured W, t and d as mentioned in Eq. (3) and finally computed the average radius of curvature of the lens as 10.26 ± 0.005 cm (see Table 1).

Table 1 : Data for radius of curvature of lens

Obs. No.	W (mm)	t (mm)	d (mm)	T (mm)	R (cm)	Average value of R (cm)
1	50.08	8.63	2.51	6.12	10.25	10.26 ±0.005
2	50.07	8.62	2.52	6.10	10.27	
3	50.06	8.63	2.52	6.11	10.25	
4	50.07	8.64	2.53	6.11	10.26	
5	50.06	8.62	2.52	6.10	10.27	

In the next step of our experiment, we have used four good-quality LEDs with transparent encapsulations, that emit lights of four different colours, and recorded the voltage-current data for each LED in the forward-bias condition and plotted the data. Wavelength of the light emitted by a particluar LED was calculated from the value of the voltage V_0 using the forrmula given in Eq. (6). The wavelengths obtained for the four types of LEDs are given in Table 2

Table 2: Data for wavelength of light emitted by different LEDs

Colour of light	V_0 (V)	Wavelength (nm)
Red	1.894	654
Yellow	2.135	580
Green	2.461	520
Blue	2.831	456

Note: The uncertainty in the value of $\lambda \approx \pm$ 7 nm. See the section on error estimation.

Next, we placed the lens in a lens holder and covered it with black paper, leaving a hole of 1 cm diameter at the centre to minimize spherical aberration. A white screen was placed on the right side of the lens, and a glowing LED was positioned on the left side of the lens (see Fig. 5). We have biased the LEDs by using a variable (0-12V) DC power supply. The entire system was placed on the top of a large table, making a collinear arrangement. A wooden scale was placed on the table surface, following the same alignment, to measure the object and image distances. The table and the nearest walls were covered with black paper. Next, we allowed a red (i.e. red light emitting) LED to glow. The lens was positioned 13.0 cm away from the source LED, which is referred to as the object distance (u). We adjusted the position of the white screen until the clearest image was formed on it. The object distance (u) and the corresponding image distance (v) were measured from the lens centre to approximately the mid-points of the LED and its image along the principal axis of the lens. We have repeated the experiment using yellow, green, and blue

Table 3: Data for object distance and image distance for different LEDs and calculation of refractive index for each colour and the dispersive power of the lens material

Colour of light	Obs. No.	Object distance, u (cm)	Image distance, v (cm)	Average image distance, v (cm)	Refractive index	Dispersive power
red	1	13.0	37.3	37.25	1.532	0.0298 ±0.0118
	2	13.0	37.2			
	3	13.0	37.3			
	4	13.0	37.3			
	5	13.0	37.2			
	6	13.0	37.2			
yellow	1	13.0	36.4	36.33	1.536	
	2	13.0	36.3			
	3	13.0	36.3			
	4	13.0	36.3			
	5	13.0	36.4			
	6	13.0	36.3			
green	1	13.0	35.5	34.54	1.539	
	2	13.0	35.6			
	3	13.0	35.5			
	4	13.0	35.6			
	5	13.0	35.5			
	6	13.0	35.5			
blue	1	13.0	33.6	33.55	1.548	
	2	13.0	33.6			
	3	13.0	33.5			
	4	13.0	33.5			
	5	13.0	33.6			
	6	13.0	33.5			

LEDs. The values of the refractive index of the material of the lens for these four colours were computed using Eq. 2. Finally, the value of the dispersive power of the material of the lens was determined with the help of Eq. 5. The data are presented in Table 3 with the recorded readings of u and v, along with the calculated values of the refractive indices for four colours, and the value of the dispersive power of the material of the lens.

Based on the computed values of the refractive indices we have plotted the graph showing the change in refractive index with wavelength. The graph (Fig. 6a) has the expected nature.We have also presented a graph on the variation of

refractive index for different colours of light with the square of the reciprocal of wavelength, which is in conformity with the variation predicted by Cauchy's formula (Eq. 7). The values of Cauchy's constants A and B as obtained from the graph (Fig. 6b) are 1.518 and 5958.1 nm^2, respectively.

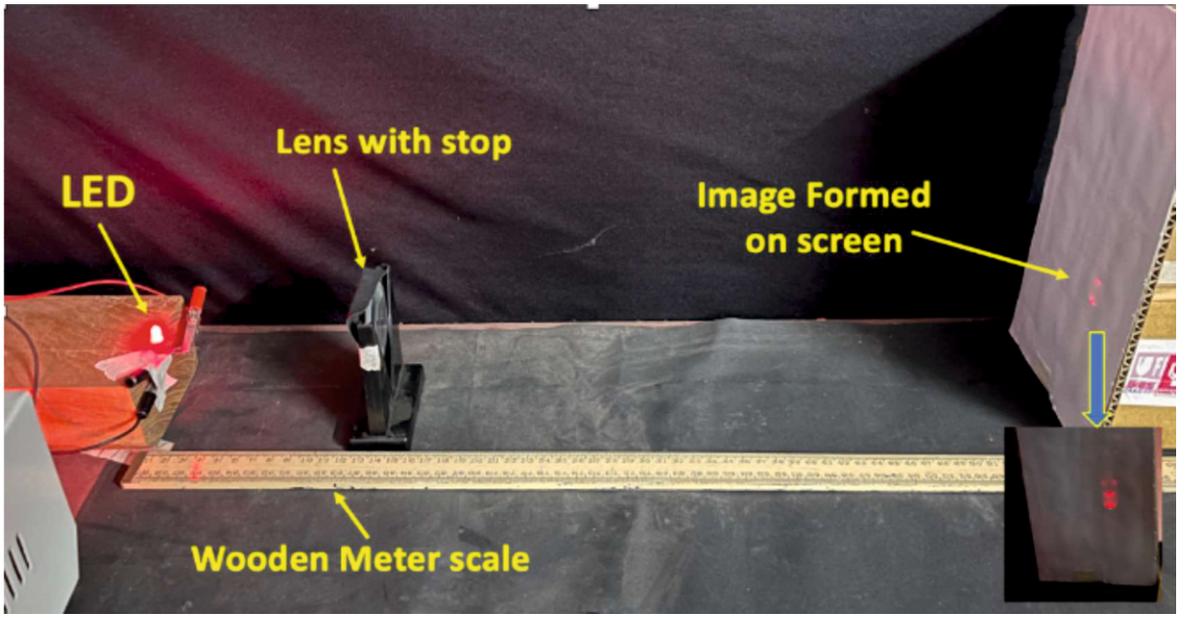


Fig. 5: Experimental setup

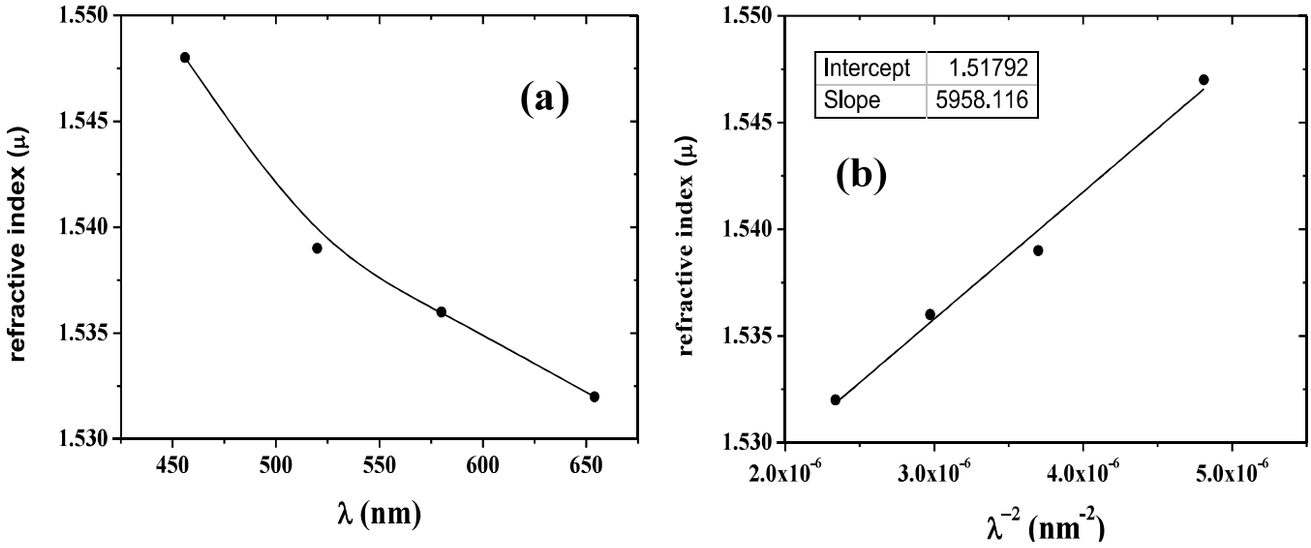


Fig. 6: (a) Graph of refractive index versus wavelength;(b) graph of refractive index versus the reciprocal of the square of the wavelength.

4. Error estimation:

A. Error (or uncertainty) in λ:

(i) Due to error in the measurement of V_0:

Let the wavelength, λ be 550 nm (average value for the four colours) for which V_0 is 2.255 V (from formula).

$$\frac{\delta\lambda}{\lambda} = \frac{\delta V_0}{V_0} \approx \frac{\pm 0.01\ V}{2.255\ V} = \pm 0.0044$$

Thus $\delta\lambda = \pm$ 2.42 nm.

(ii) Due to non-monochromaticity of the source, the spread in wavelength [5] is

$$\Delta\lambda \approx \frac{1240}{(eV_0)^2} \times 2k_B T \text{ (nm)},$$

where k_B is the Boltzmann constant, e is the charge of electron and T is the absolute temperature.

For V_0 = 2.255 V and T = 300K (this is an assumption), $\Delta\lambda \approx 12.60$ nm. Thus, on this account,

$\delta\lambda = \pm$ 6.30 nm.

Overall,

$\delta\lambda = \pm$ 2.42 nm $\pm$ 6.30 nm

For uncorrelated errors, $\delta\lambda = \pm\sqrt{(2.42)^2 + (6.30)^2} \approx \pm 6.74$ nm.

B. Error in R:

$$R = \frac{1}{4T}(W^2 + T^2) \approx \frac{W^2}{4T}$$

So,

$$\delta R \approx \frac{W\delta W}{2T} - \frac{W^2\delta T}{4T^2}$$

Now, $(\delta W)_m = \pm$ 0.0038 mm and $(\delta T)_m = \pm$ 0.005 mm [$|(\delta W)_m|$ and $|(\delta T)_m|$ represent standard deviations in the mean of W and T, respectively]. Hence (using the average values of W and T as found), $(\delta R)_m = \pm 0.0154$ mm $\pm$ 0.084 mm. For uncorrelated errors, $(\delta R)_m \approx \pm 0.0854$ mm.

C. Error in μ:

Consider the case of μ_b.

$$\mu_b = 1 + \frac{R}{2} \cdot \left(\frac{1}{v_b} + \frac{1}{u}\right)$$

$$\delta\mu_b = \frac{\delta R}{2} \cdot \left(\frac{1}{v_b} + \frac{1}{u}\right) - \frac{R\delta v_b}{2v_b^2}$$

In this experiment, $(\delta v_b)_m = \pm$ 0.0224. Using the value of $(\delta R)_m$, as found above, we find $(\delta\mu_b)_m = \pm 0.00456 \pm 0.0001$.

For uncorrelated errors, $(\delta\mu_b)_m = \pm 0.00456$.

Similarly, we find $(\delta\mu_r)_m = \pm 0.00443 \pm 0.000083$. For uncorrelated errors

$$(\delta\mu_r)_m = \pm 0.00443.$$

Finally

$$\delta\omega = \frac{\delta\mu_b - \delta\mu_r}{(\mu - 1)} - (\mu_b - \mu_r) \cdot \frac{\delta\mu}{(\mu - 1)^2}$$

Where, μ is the average value of the refractive index.

Or $(\delta\omega)_m = \pm\frac{\sqrt{((\delta\mu_b)_m)^2 + ((\delta\mu_r)_m)^2}}{(\mu - 1)} \pm (\mu_b - \mu_r) \cdot \frac{(\delta\mu)_m}{(\mu-1)^2}$.

Taking

$$(\delta\mu)_m = \frac{(\delta\mu_b)_m + (\delta\mu_r)_m}{2}$$

we find

$$(\delta\omega)_m = \pm 0.01177 \pm 0.00025.$$

For uncorrelated errors, $(\delta\omega)_m = \pm 0.0118$.

4. Conclusion

Through this article, we have presented a simple and alternative method to verify the change in the refractive index of a material with the variation in wavelength of light. The main components of the experiment are four LEDs emitting light of four different colours, a DC variable power supply, and a bi-convex lens. We have calculated the wavelengths from the forward characteristics of the four LEDs. The primary objective of the experiment is to determine the refractive indices for different wavelengths and hence the dispersive power of the material of the convex lens by using the well-known *u-v* procedure in the case of a lens. The value of the dispersive power, as found by us, is 0.029±0.0118. Lastly, we have also determined the values of Cauchy's constants A and B.

Reference:

1. P.R. Bhattacharjee, Optik 155 (2018) 344-350
2. C.I Robledo-sanchez, A Jaramillo-Nunez, D.M. Gale, G Camacho, Proceedings Volume 3831, Sixth International Conference on Education and Training in Optics and Photonics; (2000) https://doi.org/10.1117/12.388698
3. M. Michelini and A Stefanel, optics Il Nuovo Cimento C 38 (2015) 105–26
4. R. Horn, M.Rosenberger, G Notni, A Golomoz, R.Fütterer, P.G. Dittrich Measurement: Sensors 18 (2021) 100113
5. B. E. A. Saleh and M. C. Teich, , John Wiley and Sons (2019)
6. J. O'Connor and L.O'Connor, Phys. Teach. 12 (1974) 423–425
7. J.W. Jewett Jr.,Phys. Teach. 29 (1991) 530–534
8. D.F. Holcomb, Phys. Teach. 35 (1997) 261
9. L.Nieves, G.Spavieri, B.Fernandez, and R.A.Guevara , Phys. Teach. 35 (1997) 108–109
10. F. Zhou, T.Cloninger, Phys. Teach 46 (2008) 413-415

QR Codes to Participate in Four-part to Survey to Draft Vision IAPT@50

www.indapt.org.in

Perspective on future growth of IAPT
first part of the four parts survey
Vision IAPT@ 50 part I

www.indapt.org.in

Identifying Strategic Focus Areas
Second part of the four parts survey
Vision IAPT@ 50 part II

www.indapt.org.in

Member Engagement and support
Third part of the four parts survey
Vision IAPT@ 50 part III

www.indapt.org.in

Evaluation of Progress and Impact
Third part of the four parts survey
Vision IAPT@ 50 part IV

District Science Workshop at Yadgir

Venue: Aryabhatta International Academy, Yadgir

Participants: Teachers

No. of Teachers: 75

Date: 2 and 3 May 2024

Organized by: Mr Sudhakar Reddy, Chairman, AIA

Time: 10:00-17:00, both days.

The 'Prof H C Verma Hall' was inaugurated by none other than Prof H C Verma, a memorable event for the participants and the organizing school. Every word and action of the ever-lovable Professor was documented in the newspapers as videos, pictures, and news items. Later in the valedictory feedback sessions, the participants acknowledged their presence, in this hot and clumsy weather, was essentially to learn from the source of knowledge, as they had a flavour of 'Concepts of Physics' earlier!

Each activity was simple, yet hard to realize. They helped in understanding one's understanding! '*We did not know that we do not know'* these simple concepts like 'the *plane* of the incident ray, normal, reflected ray' concerning the plane mirror. Why does only one hand slide below a rod/pen though we are applying the same effort in both?' Is the centre of mass of a body movable or fixed? Can the centre of mass be above, below, or in line, with a rigid body? Any object available was a good one for explaining some physical variables. Interaction with the teachers was at its peak.

Do-it-yourself activities were completed to observe the scientific principles hidden in its operation. Teachers participated actively and exercised their team spirit well. Questions, discussion in the group, observation, and answers were the sequence, and excited answers were the consequence!

A celebration of the presence of Prof Verma was marked with a grand north Karnataka lunch with the school's management. The afternoon sessions were equally interactive, drawing ray diagram of the image due to a plain mirror may look simple, yet challenging. Participation was 100%. Is salt soluble? If so, how long will a teaspoon of salt dissolve completely in a glass of water? 'Do it to find out' is the best way.

Designing your boat, loading it to the brim, and hoping it will continue to float was a fun game. Yet lots of concepts on floatation and sinking get

clarified. Can we learn from such activities? The answer was YES. A class-work on floating bottles enhanced the learning. An escorted visit to the campus concluded the day's happenings.

The enthusiasm of the teachers was spirited for Day Two. Teachers and guests from unrelated faculty were enjoying the sessions. Sizzling discussions on a not-so-very-difficult-topic ended with a climax.

Students of the school participated in the video quiz, LEPTON to experience the Science skills they need to hone in NAEST 2024. The neighbouring school students were invited to partake in the learning and enjoy.

The feedback in the valedictory function marked the impact of the two-day Science Workshop for teachers.

Sarmistha Sahu

Report

National Level Workshop and Hands-on-session on Technology Enhanced Physics Teaching (TEPT – 2024)

To explore the extensive use of technology in teaching and learning as per National Education Policy - 2020 (NEP- 2020) and to make Physics understandable, perceivable and enjoyable, the **Department of Physics, Sri Ramakrishna Engineering College,** Coimbatore, Tamilnaduin association with **Indian Association of Physics Teachers (IAPT RC – 13)**has organised a National Level Workshop and Hands-on-Session on Technology Enhanced Physics Teaching (TEPT – 2024) on 19.07.2024. This program is organised exclusively for the **Physics** teachers of **Engineering**, **Polytechnic** as well as **Arts and Science Colleges** in various districts of Tamilnadu and Nationwide. Around 50 participants attended the workshop and Hands – on –Session and got benefitted from the experience of eminent resource persons. The Formal Inauguration took place in the presence of the Chief Guest **Dr. V. Madhurima, Professor, Department of Physics at the Central University of Tamil Nadu, Thiruvarur**and with the participants from various parts of the nation.

Dr. V. Madhurima, gave a Hands-on-Session highlighting the relevance of experimental learning in fostering scientific curiosity among learners focussing on the concepts of magnetic levitation, Doppler Effect and some laser experimentsalong with an insightful lecture titled **"Nurturing Scientific Curiosity through Experiments."**Her session was not just informative but also deeply engaging, emphasizing hands-on learning and practical applications of fundamental physics concepts.The lecture began with a focus on the importance of understanding the dimensions of universal constants, laying the groundwork for the subsequent experiments.

Demonstration of creative experiments

by Dr. V. Madhurima, Professor, Department of Physics at the Central University of Tamil Nadu, Thiruvarur

She also emphasized problem-solving techniques using both open-ended and closed-ended approaches. This dual approach ensures that participants develop a comprehensive toolkit for tackling scientific challenges.Fundamentals of optics were elucidated through self-developed models which serve as

effective teaching aids by making abstract concepts more tangible and understandable.The interactive nature of the session was enhanced through group activities involving rulers, which likely focused on measurements and experimental precision.

Dr. Rajmohan Pardeshi, an Assistant Professor and IQAC Coordinator at KRE Society's Karnatak Arts, Science and Commerce College in Bidar, Karnataka delivered an informative talk titled **"Generative AI and Technological Tools for Physics Teaching."** His discussion centredaround leveraging Information and Communication Technology (ICT) tools to enhance the effectiveness of Physics education through interactive teaching, learning, and assessment.He gave algorithms to be handholded in ChatGPT like zero–shot prompting, multi–shot prompting, chain of thought prompting, act as or 'you are' prompting.

Demonstration of Technological Tools to be used in Physics Teaching

by Dr. RajmohanPardeshi, Bidar

Dr. Pardeshialso gave an exposure to the resources for Quantum Computing, Quill Bot - AI Writer, Wolfram Alpha, Deep Brain, Mobile Apps for Physics Lab Experiments and Virtual Reality. He emphasised on integrating these ICT tools underscores their potential to transform physics education making it more dynamic, accessible and effective inpreparing students for the challenges of modern scientific inquiry and technological advancement.

Both the sessions were proved to be highly educational and culminating that concluded with the distribution of certificates. Feedback from the participants has been overwhelmingly positive. They expressed that the hands-on sessions provided them with a robust platform to innovate their teaching methods, including conducting demonstration experiments during classroom sessions and organizing informal lab activities outside of regular class hours. Participants felt they gained substantial takeaways from the workshop, enhancing their ability to effectively impart knowledge and engage students in physics education.

M. Chitra

National Graduate Physics Examination - 2024 Part C

Dr P K Dubey

As a routine annual exercise NGPE – 2024 Part C (An examination in experimental skill) for Top 25 students of NGPE 2024 shortlisted on the bases of their performance in theory part A and Part B (held on Jan 21, 2024) has been conducted on June 22 & 23, 2024 at the Inter-University Accelerator Centre (IUAC) Aruna Asaf Ali Marg New Delhi. Twenty students from different parts of the country reported for the examination. The students and teachers coming from outside Delhi were provided accommodation in the guest house of the center. It was an initiative of IAPT RC 1 President Prof Seema Vats, the Secretary Yogesh Kumar, Prof Y K Vijay and the Chief Coordinator (Examination) Prof B P Tyagi to request Prof Avinash Chandra Pandey the honourable Director IUAC New Delhi to allow the conduct of the NGPE Part C examination in Delhi and to provide necessary facilities.

Inaugral Session: Lightening of lamp

IAPT feels indebted for all kind of helps provided by Prof Pandey and the team at IUAC for an excellent arrangement. The services of Shri VVV Satyanarayana of IUAC and Prof Vandana Luthara of Gargi college needs a special mention. Because of the unavoidable circumstances Prof Pandey could not be present at the inaugural session and shri Abhijeet Sarkar Scientist H represented him in an excellent way.

Mr VVV Suryanarayan expressing at inaugural session

Day 1: Saturday, June 22, 2024

The inaugural program has started with the dignitaries Prof. B P Tyagi, Shri Abhijit Sarkar, Prof. Y K Vijay, Prof. P K Dubey, and Prof. Vandna Luthra were on the dais to light the lamp to begin the inauguration program, which was then followed by the welcoming address by Shri V V V Satyanarayana, the local

Chief Guest Shri Abhijit Sarkar

coordinator of this program. The opening remarks were given by Prof. B P Tyagi, He detailed the working of IAPT for the benefit and enrichment of the students and teachers at all levels since last 40 years. The keynote speaker, Shri Abhijit Sarkar has given a talk on the 'Accelerators at IUAC'.

Prof. Y K Vijay briefed the activities of IAPT RC-6 and the status of the Innovation Hub Science Galleries setup across the country. Shri V V V Satyanarayana has delivered a talk with the title 'Teaching/Learning Science through Experimentation and Exploration' and briefed the history and the ongoing activities of the teacher training program on ExpEYES at IUAC. Inaugural program ended with a vote of thanks by Prof. P K Dubey.

Inaugural Session

Though the Top 25 students appearing at NGPE 2024 were shortlisted for the NGPE 2024 Part C exam from different corners in the country, but only 20 of them were present. Because the students were unfamiliar with ExpEYES an excellent experimental kit prepared by IUAC, an orientation session was held, which included downloading the software on to their laptop / mobile phones, investigating the capabilities, and utilizing the resources provided. It has been proved that the amplitude, frequency, and other parameters can be measured using an oscilloscope mode in the ExpEYES kit. It has been proved that by utilizing ExpEYES, one may analyze the Fourier spectrum of any given signal. By the end of the presentation, all of the students were prepared to use ExpEYES with their laptops/mobile phones, which was really needed.

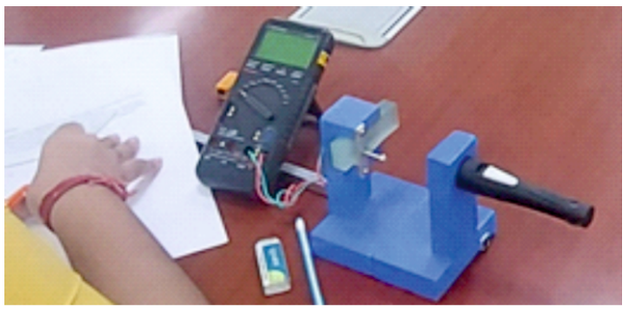
Day 2: Sunday, June 23, 2024

On the day of examination, all the twenty participants and the resource persons assembled in the examination hall sharp at 9.00 am. After ensuring their attendance, Prof B P Tyagi gave them all necessary instructions to perform the three experiments in the stipulated time. Two to three teachers were deputed on each experiment to sincerely judge the performance of the students. The three experiments were designed and developed by the team of professors from different institutions in Delhi and outside. Each student is expected to perform all the three experiments. The complete Examination was for 150 marks and for 3 hours duration. The details of Experiments are given in the table below.

#	Experiment	Setup By
1	To determine the light absorption coefficient (μ) of glass	IAPT RC-1
2	To determine the velocity of Stationary waves, generated in the circular shaped metallic strip and find tension in the metallic strip.	IAPT RC-6
3	To study Half wave rectifier to find the Ripple Factor and to perform the Fourier analysis with and without various filters.	IUAC, New Delhi

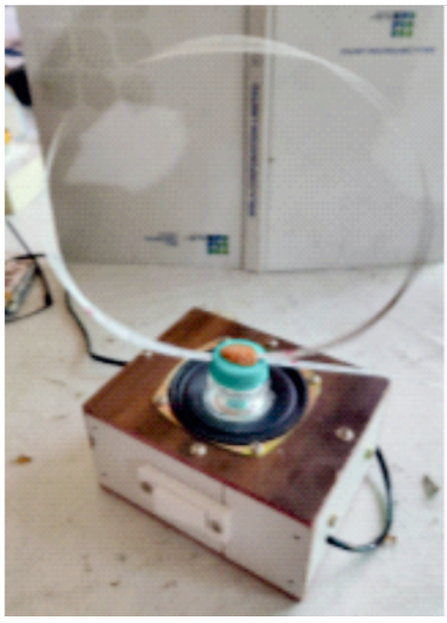
Experiment 1: To determine the absorption coefficient (μ) of glass.

The given apparatus consisting of an optical bench with uprights to hold the white LED source, a number of glass slabs, the light dependent resistance (LDR) and a multimeter for observations.



Experiment 2: To determine the velocity of stationary waves generated in the circular shaped metallic strip and to find tension in the metallic strip.

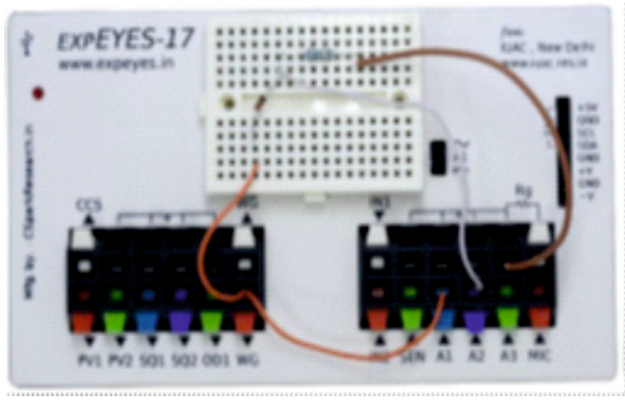
The given apparatus consists of a speaker which vibrates at the frequency f = 50 Hz of AC mains, a transformer providing 6 volts output, and a thin metallic strip 6 mm wide and 1 meter in length. The mass per unit length of the given strip is m = 44 mg/cm. The strip can be arranged in a circular shape of different radii and may be fixed on the given speaker. While generating the stationary waves in the circular shaped metallic strip, nodes and antinodes can be observed along its circumference. In order to achieve resonance, radius of the metallic strip need to be adjusted.



Experiment 3: To study a Half Wave Rectifier to find the Ripple Factor and to perform the Fourier analysis with and without various filters.

To perform this experiment, ExpEYES (Experiments for Young Engineers and Scientists) developed under PHOENIX project at IUAC has been used.

The offered apparatus includes a signal generator, a four-channel oscilloscope, a breadboard, and other items required for the practical. A P-n junction diode, current limiting resistor, capacitors, connecting wires, and multimeter has been included. The kit includes FFT analysis, which allows us to plot the Fourier series of any signal and find frequency components and their levels from the plots.



Students Performing

Students Performing

Valedictory Ceremony:

The valedictory Session headed by the respectable Director Prof Avinash Chandra Pandey was started by Shri V V V Satyanarayana who welcomed the students, IAPT members, resource people, and IUAC colleagues. Prof. B.P. Tyagi thanked IUAC, particularly Prof. A.C. Pandey, for granting permission to host this event at IUAC and V V V Satyanarayana for handling it so well. Hexpressed to the students that it is good to win but more important is to to participate. He congratulated all the five students declared to be the gold medalists of the year. He invited them to come to the IAPT annual convention to be held at Dharamshala in October 2024 to receive their medals in the inaugural function. Five of the twenty NGPE finalists who have been selected for the award of Gold Medal of NGPE 2024 are:

1. G1111 24008 Rituraj Chahar, BSc III, St Stephens College, Delhi
2. G1112 24418 Anand, BSc III, Bhaskaracharya College, Delhi
3. G5643 24402 Dhruv Aalop Shah, BS I, IISc Bangalore
4. G5643 24409 Kanishk, BS II, IISc Bangalore
5. G7129 24428 Soumya Das, BSc III, Presidency University Kolkata

Prof. Y K Vijay and Prof. Vandna Luthra expressed their satisfaction with the way it was carried out and congratulated all twenty finalists. Few students and IAPT resource people have expressed satisfaction on the way the experimental test has been handled. It has definitely been conducted in a novel fashion.

Student expressing her views on NGPE 2024 Part C

Resourse person expressing her views on NGPE 2024 Part C

The students expressed their satisfaction in working in an innovative environment. The majority of the students were enthusiastic to learn about and work with ExpEYES, with all three experiments being extremely good.

The Experimental Kit awarded to Gold medalists

Prof. A.C. Pandey, Director IUAC, distributed certificates to the gold medalists and gave away the important experimental kit ExpEYES to all the five Medalists from IUAC. He expected that the medalists will bring out identical innovative kites by their own efforts in near future. He distributed certificates to all students who attended the examination. Valedictory program was concluded with vote of thanks by Prof. P K Dubey followed by a group photograph shown in the bottom.

Award of certificate

The resource persons contributing to this program include, Prof. A.C.Pandey, Director IUAC New Delhi, Shri Abhijit Sarkar Scientist H, IUAC, Prof. B P Tyagi Chief Coordinator (Examination) IAPT, Prof. P K Dube Coordinator NGPE, Prof. Y K Vijay President RC 6 (Rajasthan), Prof. Vipin Jain HOD Physics Ch. Bansilal University Bhivani (HR), Prof. D K Tyagi, HOD Physics DAV College Muzaffarnagar (UP) Prof. Rajesh Arora HOD Physics Dayal Singh College Karnal (HR), Prof. Vandna Luthra, Gargi College DU and the Examination Superintendent, Prof Seema Vats Motilal Nehru College DU and President RC 1 (Delhi), Dr. Yogesh Kumar, Hansraj College DU Secretary RC 1 (Delhi), Dr. Poonam Jain, Shri Arvindo College DU, Dr. S K Singhal, HoD Science Amity International School Delhi &Treasurer RC 1 (Delhi), Dr. Vijay Kumar HOD Physics GEH University Dehradun and Coordinator APhO, Prof. O S K S Sastri, HOD Physics, Central University of Himachal Pradesh Dharamshala and Sh. VVV Satyanarayana Scientist E at IUAC.

P K Dubey
Coordinator NGPE

NGPE 2024 Part C held at Inter University Accelerator Center New Delhi on 23.6.24

Letter to Editor

In the June 2024 edition of the Bulletin, Prof. Ahluwalia has raised a very pertinent issue: How can IAPT provide money to individual members or groups to organize Workshops or to set up innovative experiments (of reasonably sophisticated levels)?

He has wondered whether donations can be invited from the members of the IAPT or from the members of the general public or from companies for creating a large enough fund for the above mentioned and related purposes. I fully endorse his idea and I am prepared to donate a reasonable amount of money for meeting the objectives. Perhaps the national executive council of IAPT can arrange for the issuance of a Tax Exemption Certificate (under the relevant section of the IT act) so that more people would feel encouraged to donate money.

D. Syam (Membership no. L 2295)

A friend, dear to my heart
(A Tribute to Prof Dr. Gouri S. Roy)

Born on the 5th August 1955 to Smt. Chinmoyee & Shri. Ramesh Chandra Roy (An educationist who served as Principal of a reputed Degree College at Cuttack), Shri

Gouri Shankar Roy had his schooling in vernacular medium in Odisha, followed by college education for first two years in BJB College, Bhubaneswar being one of the premier Colleges (now autonomous) under Utkal University.

Then he joined Ravenshaw College, Cuttack (Now a University being the most preferred destination of the aspiring students of the State under Utkal University then) for Graduation and Masters in Physics with

specialization in Electronics.

Apart from PhD in Dielectrics, his specialization includes Guidance in Nanotechnology, Dielectrics, Ultrasonics, Condensed Matter Physics, Astronomy &

Astrophysics, Environmental Science, Meteorology.

Having authored six Books for academic curriculum Dr. Gori's had written a book titled "Astronomy Glossary Publication by Text Book Bureau, Orissa".

To his credit he had published 115 papers including in Japanese Journal of Applied Physics, Acta Chimica Hugarica, Bugl. Journal of Physics, Asian Journal of Physics, Czechoslovak Journal of Physics, Journal of

Applied Polymer Science, Latin American Journal of Physics Education, American Journal of Physics, Journal of American Science, INT J Pharma Bio Science apart from publication in number of Indian and

International Journals.

A guide to 11 PhD awardees and 14 M.Phil dissertation is notable.

Dr. Gouri was a member/ executive/ invitee in over 9 Councils/ Boards or reputed organizations like Indian Association of Physics Teachers.

Biographed in prestigious MARQUIS Who's who in the World (17th & 18th Edition), International Biographical Centre, Cambridge CB3QP, England, American Biographical Institute Inc. Directory of Association of Ravenshaw College of Physics Alumni.

A Directory of Oriya Scientists 2005.

Dr. Gouri held positions in Academic and non-Academic area as; (i) faculty, at Department of Physics, Ravenshaw College Cuttack (ii) Professor of Physics, G M College, Sambalpur (iii) Principal, Bhadrak College Bhadrak (iv) Principal, BJB College, Bhubaneswar (v) Director, Pathani Samanta Planetarium, Bhubaneswar (vi) Secretary Odisha Bigyan Academy, Bhubaneswar (vii) Chairman, CHSE Odisha (viii) **EC member of IAPT RC16, a Physics enthusiast and a student-loving teacher.**

But what speaks louder is Dr. Gouri's personality being most amicable, humble & courteous. He is adored for friendly relationship with students, colleagues, and seniors in academic area as much as colleagues of all strata in administrative assignments.

On the 29th of March, he was one of the driving forces to bring the alumnus of BJB College 1971 group for a get-together, Gouri abruptly finished his journey on the earth in the wee hours only to be survived by Ms. Chandana Roy (wife), Ms. Mousumi Roy & Ms. Moumita Roy (daughters).

Students looked around for guidance, Family for support, Colleagues for leadership, seniors for cooperation, Institutions for excellence, Government for smooth administration.

To sum it all his ability to listen patiently, to help bring comfort and confidence in people around him, feel the warmth of "a friend so dear to me" **Prof Dr. Gouri Shankar Roy.**

Pratap C Das (friend)

Ravenshavian of 1977

Minutes of Special EC Meeting on Sunday 28, 2024

A special Meeting of Executive council members of IAPT(Central) was held on Sunday 28, 2024 between 10:30 am and 2:00pm.

Following members were present:

1. Prof. P. K. Ahluwalia, President
2. Prof. Rekha Ghorpade, GS
3. Prof. Ranjita Deka, VP (East Zone)
4. Prof. Shivanand Masti, VP (West Zone)
5. Prof. Nagaraju, VP (South Zone)
6. Prof. A. K. Jain, VP (Central Zone)
7. Prof. O. P. Sharma (RC-01)
8. Prof. Meenakshi Sayal (RC-02)
9. Prof. Sundar Singh (RC-04)
10. Prof. Y. K. Vijay (RC-06)
11. Prof. Chetan Limbachiya (RC-07)
12. Prof. Sudam Mane (RC-08)
13. Prof. P. K. Dubey (RC-09)
14. Prof. M. S. Jogad (RC-12)
15. Prof. Makhanlal Nanda Goswami (RC-15)
16. Prof. Dilip Bisoyi (RC-!6)
17. Prof. Kalipada Adhikari (RC-18)
18. Prof. H. K. Pandey (RC-19)
19. Prof. Miskil Naik (RC-21)
20. Prof. Rajeshwar Rao (RC-22)
21. Prof. B. P. Tyagi, CCE
22. Prof. Sanjay Kumar Sharma, Secretary, IAPT
23. Prof. D. C. Gupta, Treasurer, IAPT
24. Prof. K. N. Joshipura, Ex-Officio member (immediate past GS)

Co-opted Members:

25. Prof. Bhupati Chakraborty
26. Prof. Swapan Majumdar
27. Prof. Vandna Luthra
28. Mr. Vinod Prajapati, Kanpur Office

Prof. Rekha Ghorpade, GS welcomed the honorable EC members and requested

Prof. P. K. Ahluwalia, President IAPT to chair the meeting. Prof. Ahluwalia thanked Prof. Rekha and accepted the request and permitted the meeting to proceed. As per the agenda of this special meeting, items were taken up one by one for deliberations and decision as given below:

1. **Election Process (2025-2027):**

   GS, in her opening remarks explained the purpose of the special meeting and explained in brief that IAPT would like to go for hybrid mode of elections, i, e. online and offline for forthcoming IAPT elections to various positions of EC for the term (2025-2027). She also told the members, it is not possible to conduct elections completely online, as email ids of all the members are not available to us. We have to go for conventional Ballot paper method also, so that no member is deprived of IAPT elections. She requested Prof, Ahluwalia to explain the process further. Prof. Ahluwalia informed that there had been some discussions with service providers for online elections and the expenditure would be around one lakh rupees. Prof. O. P. Sharma suggested that we can use some other technology available which will not cost so much. Prof. Jogad raised the query, whether there is any legality problem. GS informed there could not be any legal issue, as long as we allow every member to vote. Prof. Bhupati Chakraborty said, this time we should go for our earlier method, and for the next elections after we complete the process of getting emails of all the members, we can adopt process of online elections. Prof. Tyagi, Prof. Mane and few others supported the same. However, after some deliberations, all the members agreed to adopt hybrid mode. It was also decided to form a group of members to work on online elections. Prof. O. P. Sharma was requested to help and he agreed.

2. **Appointment of Returning Officer for IAPT elections:**

   GS informed the members that Prof. P. D. Lele, who worked as a RO for the last elections was contacted and has agreed to accept the responsibility this time also. All the members approved the same.

3. **Recommendations for various positions in IAPT Central EC:**

The recommendations received by GS were discussed at length and following recommendations for the term (2025-27) were approved by the members.

S. No.	Post	Recommendations by Central EC
1.	President	Prof. P. K. Ahluwalia, Retd. Prof. HP University, Shimla.
2.	General Secretary	Prof. Rekha Ghorpade, Retd Prof. R. J. Co College, Mumbai
3.	Vice President (North Zone)	Dr. Meenakshi Sayal, Jalandhar
4.	Vice President (Central Zone)	Prof. Vipul Rastogi, IIT, Rourkee, Uttarakhand
5.	Vice President (East Zone)	Dr. Ranjita Deka, Pragjyotish College, Guwahati
6.	Vice President (West Zone)	Prof. Y. K. Vijay, Retd Prof. Univ of Rajasthan, Jaipur
7.	Vice President (South Zone)	Dr. Rajeshwar Rao, Prof. of Physics, KITS Huzurabad, Telangana
8.	Vice President General	Prof. P. C. Deshmukh, Retd Prof. IITM
9.	Member RC-01, Delhi Haryana	Shri. R. K. Tewari, Retd Principal HMDAV School, Delhi
10.	Member RC-02, Punjab, J&K	Dr. Neetu Verma, Head, Dept. of Physics, KMV Jalandhar
11.	Member RC-03, Chandigarh	Dr. Sheojee Singh, Asso. Prof. Govt. College, Chandigarh
12.	Member RC-04, Uttar Pradesh	Dr. Sundar Singh, Dept of Physics, Bareilly college
13.	Member RC-05, Uttarakhand	Dr. P. P. Pathak, Gurukul Kangri, Univ of Haridwar.
14.	Member RC-06, Rajasthan	Prof. Y. C. Sharma, Retd Prof, JNU Jaipur
15.	Member RC-07, Gujarat Daman, DDN, Diu	Dr. Chetan Limbachia, Head, Dept of Applied Physics, Univ of Baroda
16.	Member RC-08, Maharashtra	
17.	Member RC-09, Madhya Pradesh	Dr. Uttam Sharma, Prof. & Head, Dept Of Physics, SVV Vishwavidyalaya Indore.
18.	Member RC-10, Chhattisgarh	Dr. A. K. Shrivastava, Dean, Faculty of Science, Dr. C. V. Raman Univ. Kota, Bilaspur, Chhattisgarh.
19.	Member RC-11, Andhra Pradesh	
20.	Member RC-12, Karnataka	Dr. S. M. Khened, Retd Principal, LVD Collllege, Raichur
21.	Member RC-13, Tamil Nadu & Puducherry	Prof. Madhurima, Prof. Central Univ. Tamil Nadu
22.	Member RC-14, Kerala, Lakshadweep	

23.	Member RC-15, West Bengal, Andaman, Nicobar Islands, Sikkim	Dr. Makhanlal Nanda Goswami
24.	Member RC-16, Odisha	
25.	Member RC-17, Asam	
26.	Member RC-18, Tripura, Meghalaya, Mizoram, Manipur, Nagaland	Dr. Kalipada Adhikari
27.	Member RC-19, Bihar	Dr. Pramendra Ranjan Singh, Principal, Narayan College, Bihar.
28.	Member RC-20, Jharkhand	
29.	Member RC-21, Goa	Mr. Yeshwant M. Gaunkar
30.	Member RC-22, Telangana	Dr. Ch Ramakrishna, Asso. Prof.(retd), Dept of Physics, Shadan Inst. Of PG Studies, Hyderabad
31.	Member RC-23, Himachal Pradesh	Shri Dinesh Kumar Sharma, Kangra H.P.

It was recommended by some of the members that Dr. V. Rajeshwar Rao, who was recommended by RC-22 as its representative to EC, be recommended as VP-South Zone. However, Prof. Bhupati said, the decision of the RC must be respected. He suggested, President and GS would settle the issue by talking to RC-22, which was agreed to by the President and GS.

It was decided that the vacant positions be filled after RC elections. If central office does not receive representative from RC even after elections, President and GS may take the decision.

During deliberations Prof. OP Sharma raised his concern about the non-eligibility of an EC member to be elected as an office bearer after completion of two consecutive terms as EC member. He suggested that this matter needs a relook at the appropriate forum for best democratic practices to prevail in the system and not depriving deserving candidates from serving IAPT.

1. Any other item with the permission of the chair:

I. Dr. Dilip Bisoyi, EC member from RC-16 Odisha raised a concern over non-cooperation from the office bearers of RC-16. Prof. Ahluwalia suggested, GS can convene a meeting with RC-16 EC members. Zonal VP(East) may be invited for the meeting. RC-14 also needs similar intervention, suggested Prof. Ahluwalia for its effective functioning and carrying forward tasks of IAPT in that region.

II. GS informed that the document on 'Guidelines for the appointments of various IAPT coordinators, is getting ready and it will be shared with EC members before next EC meeting. Prof. Bhupati, convenor, along with two other members, prof. P. D. Lele and Prof. S. K. Joshi have worked on it meticulously. Prof. Ahluwalia appreciated the efforts by Prof. Bhupati Chakraborty in drafting the final notification for this purpose.

Prof. Bhupati acknowledged the contributions of President and GS in pushing this matter towards conclusion.

Meeting ended with vote of thanks to the chair and honorable members.

Rekha Ghorpade,
General Secretary, IAPT

(Note: As suggested by honorable members, President and GS contacted RC-22 to take the decision whether their EC members agree to recommend Dr. V. Rajeshwar Rao as VP-South Zone and recommend, other name as their representative to EC. RC-22 conducted an emergency meeting on the same day evening and sent new minutes to GS and recommend Dr. C. Ramakrishna in place of Dr. Rajeshwar Rao, who is recommended for VP-South zone).

Indian Association Of Physics Teachers
(Registered under Section XXI of Societies Act 1860, Reg. No. K-1448)
Regd. Office : Flat No. 206, IInd Floor, Adarsh Complex,
OPR-4, Awas Vikas-1 Keshavpuram, Kalyanpur, Kanpur-208017
Email: iaptknp@rediffmail.com Ph.: 9415404969, 9839035685, 9935432990

NATIONAL COMPETITION FOR INNOVATIVE EXPERIMENTS IN PHYSICS (NCIEP) – 16-18th October 2024, Dharamshala, HP

National competition for innovative experiments in Physics (NCIEP) is being held since 2003, to encourage Physics Teachers, students and Physics educators to conceive and set up original innovative experiments in Physics. The Competition is held every year at the venue of the Annual Convention of IAPT. Innovation rather than sophistication is the main theme and therefore the use of computers for data acquisition and display is not allowed.

1. The following categories are included:

   (A) The participant can be a teacher at any level or M. Phil. / Ph. D. awarded /Ph.D. pursuing student or a Scientist from national laboratories or a science communicator working in science centres, etc. He/she need not be an IAPT member.

   (B) The participant can be a student pursuing UG/PG course

   (C) The participant can be a High School student Studying in 9-12 standard.

   For all categories participants themselves have to demonstrate the experiment.

2. The experiment should be an original one, designed by the participant himself/ herself. It can be even a demonstration type experiment.

   For category B and C students can work under the guidance of a mentor .

3. Top 3 experiments from each category A, B and C are awarded cash prizes.

Selected entries from each category will be invited for demonstration at the 38th IAPT convention is to be held from 16th to 18th October 2024 at Dharmshala, Himachal Pradesh.. The invited participants will be paid railway fare from the workplace to the convention place as per IAPT rules. In case of joint authors, only one of the participants is eligible to receive TA (as per IAPT rules). Top ten student participant entries (for category B and C) may be given an amount of Rs 1000/- each towards expenditure incurred in setting up the experiment. Please submit the write-up of experiment as an email attachment (both word & PDF file is a must) to the coordinator at the email id: **nciepiapt03@gmail.com** The selected participant must come with his/her own setup for final demonstration.. Decision of the judges will be final..

Closing date to receive the entries is 31st August , 2024.

Please feel free for any query at e- mail: nciepiapt 03@gmail.com or WhatsApp number 8088812890

Dr Geetha R S, Coordinator, NCIEP 2024

FIRST STEP TOWARDS

INTERNATIONAL SCIENCE OLYMPIADS

NATIONAL STANDARD EXAMINATION IN PHYSICS	: NSEP 2024 - 25
NATIONAL STANDARD EXAMINATION IN CHEMISTRY	: NSEC 2024 - 25
NATIONAL STANDARD EXAMINATION IN BIOLOGY	: NSEB 2024 - 25
NATIONAL STANDARD EXAMINATION IN ASTRONOMY	: NSEA 2024 - 25
NATIONAL STANDARD EXAMINATION IN JUNIOR SCIENCE	: NSEJS 2024 - 25

These are the only examinations that lead to participation of Indian students in the National and International Science Olympiads. No other examination is recognized for this purpose.

Organized by

INDIAN ASSOCIATION OF PHYSICS TEACHERS (IAPT)

206, Adarsh Complex, Awas Vikas - I, Keshavpuram, Kalyanpur, Kanpur-208017

In co-ordination with
ASSOCIATION OF CHEMISTRY TEACHERS (ACT) &
ASSOCIATION OF TEACHERS IN BIOLOGICAL SCIENCES (ATBS)

Step II Toppers from these NSEP, NSEC, NSEB, NSEA & NSEJS from each State/Union Territory will be eligible for II stage i,e Indian National Olympiads (INOs) 2025 in respective subjects. For details see the website: www.iapt.org.in and the student's brochure.

Step III About 35 toppers in each of INPhO, INChO, INBO, INAO and INJSO will qualify for the Orientation Cum Selection Camp (OCSC) in respective subjects for two weeks at Homi Bhabha Centre for Science Education (HBCSE), Mumbai or Banglore Indian teams to participate in International Olympiads – 2025 will be selected on the basis of performance of students in respective OCSC.

In addition, about 8 toppers from INPhO may get an opportunity to participate in **Asian Physics Olympiad (APhO).** The APhO will be held in May 2025.

Language: Question Papers are in English, Hindi, Gujrati, Bangla, Tamil and Telugu or any Indian Language provided 300 students OPT for it

Awards: Students attending OCSC will be awarded Gold medals and a merit certificate in all subjects. Certificates shall be awarded to Toppers (National & State) of National Standard Examination.

Syllabus: NSEP, NSEC, NSEB: Upto CBSE class XII;
NSEA: Physics & Mathematics upto CBSE class XII along with basic Astronomy;
NSEJS: Physics, Chemistry & Biology upto CBSE class X.

Programme:

Centre registration: Aug 1 to Aug 20, 2024.

Student enrolment: Aug 21 to Sep 14, 2024

1. **Enrollment at Centre:** Pay fee to Centre In-charge.
2. **Direct Online Enrolment:** A student can enroll directly online at www.iapt.org.in; He/She will pay fee by online payment.

DATE AND TIME OF EXAMINATION: SUNDAY 24.11.24

NSEP : 8:30 AM to 10:30 AM
NSEC : 11:30 AM to 1:30 PM
NSEB : 2:30 PM to 4:30 PM
NSEJS: 2:30 PM to 4:30 PM

SATURDAY 23.11.2024

NSEA : 2:30 PM to 4:30 PM

Fee Rs. 300.00 per student per subject

PREVIOUS 10 YEARS QUESTION PAPERS BOOKLET WITH ANSWERS IN EACH SUBJECT IS AVAILABLE FOR Rs. 150/- EACH FROM IAPT OFFICE KANPUR (iaptknp@rediffmail.com)

Prof. BP Tyagi
Chief Coordinator (Examination)
23 Adarsh Vihar, Raipur Road,
Dehradun - 248001
Ph: 9837123716, E-mail: bptyagi@gmail.com
Visit Website: www.iapt.org.in

Dr. Anand Singh Rana (9412954316) Coordinator NSE
Dr D Uthra (8610886474) Coordinator NSEJS
IAPT Examination Office:
15, Block II, Rispana Road, DBS College Chowk, Dehradun-248001
Email: iapt.nse@gmail.com
Helpline: 9632221945, 8310281694, 8533993332

For all queries regarding the examination: Student may contact local centre in-charge else the Helpline.


IAPT Examplar RC AWARD 2024
INDIAN ASSOCIATION OF PHYSICS TEACHERS
IAPT
भारतीय भौतिकी-शिक्षक परिषद
A great opportunity to show case your achievements
Who can nominate
Your EC Representative/ Zonal Vice President
Who Can Apply
Any RC and Sub Rc
Eligibility
Physics Teaching/ Learning, Popularization, Outreach programs by RC/Sub RC during the period Jan to Dec 2023
Time Line
on or before 30th August 2024
Get Nominated by 30th August 2024
Things Needed to Fill the form
Document the activities, photos, videos and report broadcast
Awards
Shreshtha
Uttama
&
Annanya
WE APPRECIATE WHAT IAPTIANS DO
Gain Recognition, Purse, Felicitation and Above All
Satisfaction to Serve Community with Distinction
Physics
Links:
Application Form:
https://www.cognitoforms.com/SarmisthaSahu1/ApplicationFormatIAPTExemplarRCAward2024
Nomination Form:
https://www.cognitoforms.com/SarmisthaSahu1/NominationFormForIAPTExemplarRCAward2024
Guidelines: https://www.indapt.org.in/campusfeed/32534
Cordinator: Professor Vandana Luthra
e-mail:rcawards.iapt@gmail.com
Phone:9811794118

ELECTION NOTIFICATION
INDIAN ASSOCIATION OF PHYSICS TEACHERS
EXECUTIVE COUNCIL Jan 01, 2025 - Dec 31, 2027

The election for the new EC for the term from **JANUARY 2025** to **DECEMBER 2027** is scheduled to beheld in November- December 2024 for the following posts:

1. President 1
2. General Secretary 1
3. Vice Presidents6 (one from each of the five zones + one from any one of the zones as a General VP)
4. Members- 23 (one from each of the 23 Regions)

(***Details of Zones/ Regions are given in Annexure I***)

Nomination papers for the above posts are invited so as to reach the undersigned on or before **17 SEPTEMBER, 2024 (Tuesday)**. The proforma for the nomination is given below. Before filing nomination, the candidate is expected to ascertain that he/she satisfies the eligibility criteria as per the Constitution 7 d (ii) and the Bye-Laws, Rules and Regulations 12(a) of the IAPT constitution.

(The clauses are reproduced for your reference in Annexure II.).

The nomination papers from the candidate duly filled in with all the details should reach the Returning Officer (RO) through

(i) Speed Post or courier. (ii) by hand (in a sealed envelope) or

(iii) email (a neatly scanned copy/clear photo of duly filled in nomination paper).

Note that if a nomination paper (scanned /photo) is sent by an email, the original nomination paper whose scanned copy has been sent earlier should be sent by speed post/courier or by hand so as to reach the RO within SEVEN days from the lastdate. Therefore, such an original nomination paper should reach the RO latest by **24 SEPTEMBER, 2024 (Tuesday).**

Prof. P. D. Lele,
Flat No. D-603, Gardenia, D-Wing,
CASA RIO.Palava City, Dombiwali East,
Maharashtra. PIN: 421204
Contact No.: 0940928834
email ID: pdlele@hotmail.com

PROFORMA OF NOMINATION PAPER FOR ELECTION TO THE EC

FOR THE TERM JANUARY 01, 2025 TO DECEMBER 31, 2027

(PLEASE FILL IN CAPITAL LETTERS ONLY)

(A) 1. NAME OF THE POST:

2. NAME OF THE CANDIDATE IN FULL:

3. LIFE MEMBERSHIP NO.:

4. POSTALADDRESS:

5. MOBILE NO.:

6. EMAIL:

(B) 1. NAME OF THE PROPOSER:

2. LIFE MEMBERSHIP NO.:

3. POSTALADDRESS:

4. MOBILE NO.:

5. EMAIL:

6. SIGNATURE OF THE PROPOSER:

(C) 1. NAME OF THE SECONDER:

2. LIFE MEMBERSHIP NO.:

3. POSTALADDRESS:

4. MOBILE NO.:

5. EMAIL:

6. SIGNATURE OF THE SECONDER:

(D) DECLARATION BY THE CANDIDATE / NOMINEE:

I declare that I do not hold any of the elective posts to the Executive Council more than once immediately prior to this nomination. I give my consent to the above nomination.

Signature:
Date:
Place

IMPORTANT DATES:

LAST DATE (for nomination papers to reach RO by speed post/by hand/ by email) --- 17SEPTEMBER, 2024

LAST DATE (for original nomination papers to reach RO by speed post/courier by hand) ---24 SEPTEMBER, 2024

Scrutiny of nomination papers and intimation of valid nominations to the Candidates--- 27SEPTEMBER, 2024

List of valid nominations along with recommendations by the outgoing EC (vide Bye-Law 13,see Annexure II) will be published in the OCTOBER 2024 issue of IAPT Bulletin.

LAST DATE of withdrawal of nominations by email --- 22 OCTOBER, 2024

List of unopposed Candidates, contesting Candidates and proforma of ballot paper will bepublished in the NOVEMBER 2024 issue of IAPT Bulletin.

Elections to the posts, if necessary, to be conducted through ballot papers to reach the RO ---NOVEMBER-DECEMBER 2024 (Date will be declared later) Elections results to be declared (on the website) - 20 DECEMBER, 2024. The results will be printed in JANUARY 2025 issue of IAPT Bulletin.

NOTE: The procedure of online election will be announced later on.

ANNEXURE - I

(a) REGIONAL COUNCILS

RC Nos– STATES and UTs COVERD

1 Delhi, Haryana
2 Punjab, Jammu-Kashmir, Ladakh
3 Chandigarh
4 Uttar Pradesh
5 Uttarakhand
6 Rajasthan
7 Gujarat, Daman & Diu
8 Maharashtra
9 Madhya Pradesh
10 Chhattisgarh
11 Andhra Pradesh
12 Karnataka
13 Tamil Nadu, Pondicherry
14 Kerala, Lakshadweep
15 West Bengal, Andaman & Nicobar, Sikkim
16 Orrisa (Odisha)
17 Assam, Arunachal Pradesh
18 Meghalaya, Mizoram, Tripura, Manipur, Nagaland
19 Bihar
20 Jharkhand
21 Goa
22 Telangana
23 Himanchal Pradesh

(b) ZONE - REGIONAL COUNCILS (RCs) COVERED

North: 1, 2 ,3 and 23

West: 6, 7, 8 and 21

South: 11,12,13,14 and 22

East: 15, 16, 17, 18 and 20

Central: 4, 5, 9, 10 and 19

ANNEXURE - II

CONSTITUTION

7. THE EXECUTIVE COUNCIL

(d) (i) The term of the elected members of the EC will be three years from January 1, after the elections. The term of the ex-officio members will be restricted to their period of holding office. The term of the coopted members will be decided by the elected members of EC.

(ii) A member of the EC will not be elected for more than two consecutive terms.

BYE-LAWS, RULES and REGULATIONS

12. (a) A member whose name is on the register of membership on the 1st October of the year of election, is entitled to vote at an election, however only a life member is entitled to contest an election, whenever suchan election is announced.

13. The EC may prepare a panel of prospective candidates for the various elective posts. This may be done at its regular meeting held earlier or a special meeting called for the purpose. These prospective candidates should be requested to file nomination papers when called for through the notification issued by the returning officer. This exercise of preparing a panel is necessary so that candidates known for their experience, sincerity, active participation and leadership get elected to the EC.

P D Lele
Returning Officer

On Epistemic Understanding of Derivations in Physics

We have been emphasizing in this column on the need to nurture a physics education research culture that resonates with and is true to the ground realities of classrooms in our schools and colleges. This article will review one such work - on epistemic understanding of derivations in physics (references cited below). The study takes into account the fact that a major component of physics education in Indian classrooms constitutes teaching of derivations, in the traditional lecture format (wherein the teacher works out the mathematical steps one by one on the blackboard). Taking this into account, the researchers conceived derivations as a connected sequence of different mathematical propositions forming an argument, broadly consistent with how they are often taught. They then analyzed the nature of these propositions and classified into three categories - i) purely mathematical, ii) physical, involving empirical inputs and iii) nominal, devoid of any mathematical or physical content. Epistemic clarity is then defined as students ability to discriminate between the nature of different propositions along these three categories. Based on this analysis, questionnaires (forced option test) were developed for various derivations (such as Bernoulli's equation, relation between specific heats of an ideal gas etc). Details of the design and development of the questionnaire/tool along with illustrative examples can be found in the following publications:

Sirnoorkar, A., Mazumdar, A., & Kumar, A. (2016). 'Students epistemic understanding of mathematical derivations in physics. European Journal of Physics, 38(1), 015703.

Sirnoorkar, A., Mazumdar, A., & Kumar, A. (2020). Towards a content-based epistemic measure in physics. Physical Review Physics Education Research, 16(1), 010103.

The questionnaire begins with an orientation note clarifying the meaning of the three epistemic categories mentioned above and the nature of propositions that would fall under each of them. The derivation under consideration is then presented as a series of propositions, closely aligned with the step by step description in a textbook or how they are often taught in the classroom. The students are then asked to evaluate each of the propositions constituting the derivation and assign them as nominal, physical or mathematical as per their judgement.

The questionnaire after development was validated and administered to a large and diverse sample of undergraduate physics students spread across the country. The data thus collected was analyzed using various statistical constructs. One interesting result was that those students who exhibited good epistemic clarity (high scores in the questionnaire) performed well in their university exams (content clarity) as well. In other words, epistemic clarity correlated with content clarity. However the vice versa was not found to be true - those with good scores in their university exams did not necessarily exhibit epistemic clarity.

This research also serves as a good model on how to nurture PER in a country like ours. The first author in both the papers cited above initiated the study as part of his M Sc project and later continued on it as he was teaching in a regional college in Kalaburgi, Karnataka. He collaborated with physics education researchers at Homi Bhabha Centre for Science Education, Mumbai by contacting them. The fact that he was a teacher and the realization of the whole research team on the need to do PER that is of direct utility to teachers and classrooms, shaped the overall design of the study. The questionnaires developed are ready to use diagnostic tool, that can be easily administered and analyzed. The lead author then went on to complete his Ph D in PER and is currently pursuing a post-doc, both in USA. Similar collaborations of teachers and physics education researchers can help us develop a critical mass of people working in the area, capable of addressing our unique concerns and thereby slowly nurturing the field in our country..

K K Mashood
HBCSE - TIFR, Mumbai

Postal Regd. No. Kanpur City-28/2021-23 Date of printing 01-08-2024 Date of posting 08-08-2024 RNI No. UPENG/2009/29982 ₹ 25/-

BULLETIN OF THE INDIAN ASSOCIATION OF PHYSICS TEACHERS

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

VOLUME 16 NUMBER 8 AUGUST 2024

IN THIS ISSUE

If undelivered please return to :

Dr. Sanjay Kr. Sharma

Managing Editor

Flat No. 206, Adarsh Complex,

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

Published by Dr. Sanjay Kr. Sharma on behalf of Indian Association of Physics Teachers. For circulation amongst IAPT members/subscribers only.
Flat No. 206, Adarsh Complex, Awas Vikas-1, Keshavpuram, Kalyanpur, Kanpur-208 017, Mob. 9415404969.
Printed at Sharda Graphics Pvt. Ltd., 123/766, Factory Area, Fazalganj, Kanpur-208012, Ph. 9336845329
Chief Editor: Prof. Manjit Kaur