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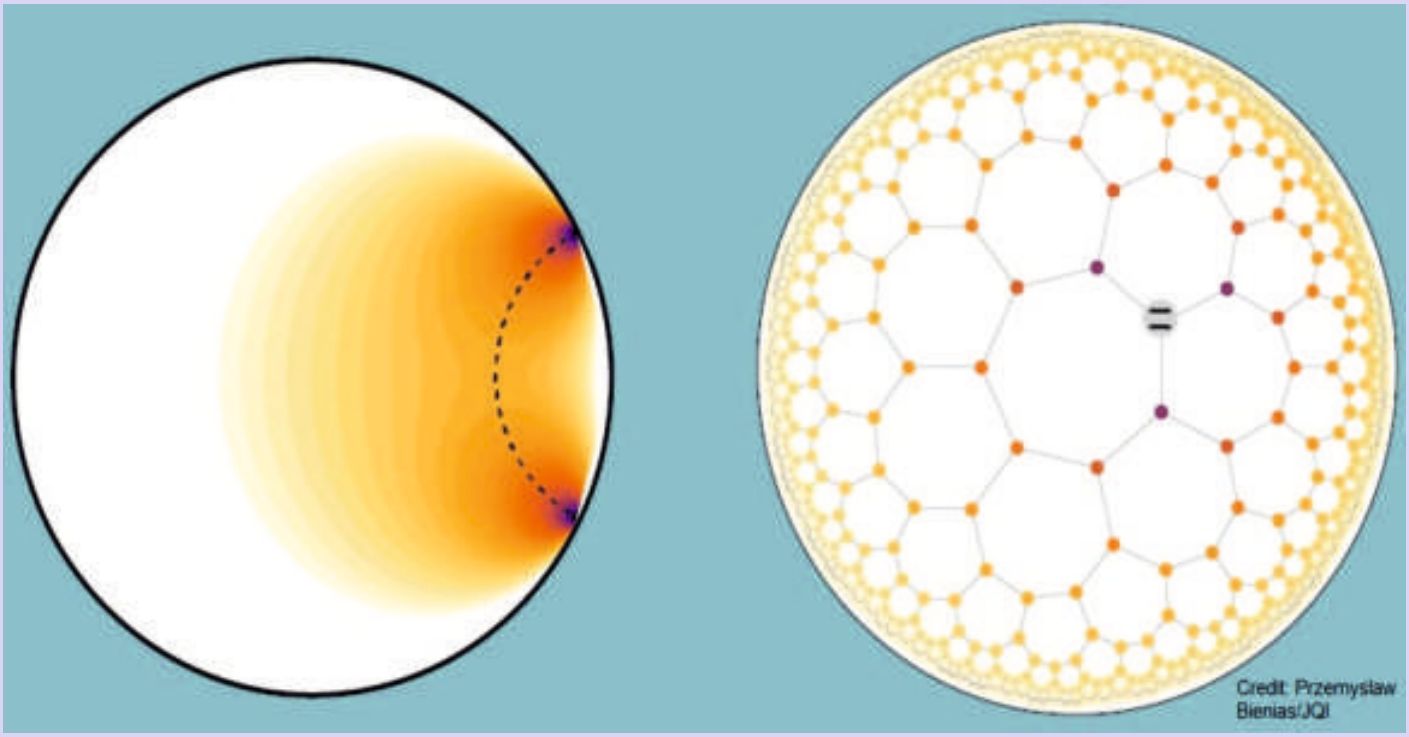

One of the mind-bending ideas that physicists and mathematicians have come up with is that space itself—not just objects in space—can be curved.When space curves (as happens dramatically near a black hole), sizes and directions defy normal intuition.Researchers have now laid a theoretical framework for adding qubits—the basic building blocks of quantum computers—to serve as matter in a curved space made of a circuit full of flowing microwaves. Specifically, they considered the addition of qubits that change between two quantum states when they absorb or release a microwave photon—an individual quantum particle of the microwaves that course through the circuit.

The theoretical framework is depicted by the simulated images shown above. (Left image) Microwave photons that create an interaction between pairs of qubits (black dots on the edge) in a hyperbolic space are most likely to travel along the shortest path (dotted line). In both images, the darker colors show where photons are more likely to be found. (Right image) A quantum state formed by a qubit (grey dot containing parallel black lines) and an attached microwave photon that can be found at one of the intersections of the grid representing a curved space.

(https://scitechdaily.com/enhancing-mind-bending-simulations-of-curved-space-with-qubits/)

The Story of Cosmology through Postal Stamps- 14

THE REVIVAL OF ASTRONOMY

GALILEO *GALILEI-Sidereus Nuncius*

With the invent of telescope by ***Hans Lipperchey*** in 1608, ***Galileo*** later improved its resolving power and made several observation and discoveries which he mentioned in his first publication ***"Sidereus Nuncius"*** the Starry Messages. (1610). Some of the prominent discoveries were-Moons of Jupiter, Craters and Mountain on the Moon, Ring of Saturn and Sun Spots. His discoveries with telescope revolutionised Astronomy and paved way for accepting Copernica.n Heliocentric system.

Rings of Saturn, first thought to be group of small satellites.

Souvenir sheet with pair of Se Tenant Stamps -depict Jupiter and its four moon-Io, Europa, Ganymed, Calisto, discovered by Galileo by his telescope. He named them -Medicean Star
Second stamp shows -Space probe to explore Jupiter and named after Galileo

Sun Spots, telescope and Lietuvan Observatory with ***commemorative cancellation*** of Copernican system

Sketch of Lunar surface by Galileo with craters and Mountains as seen by Telescope

Souvenir Sheet of 3 stamps commemorating 400 year of Galileo using his Telescope depict telescopic view of faint stars as seen by Him in the Orion Constellations

The silver.coated margin stamps in the middle depict Logo of International Year of Astronomy 2009

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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.

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Rebooting IAPT

Dear members in the last two months IAPT initiated a virtual dialogue with Regional Councils and Sub Regional Councils to gauge the aspirations of honourable members for taking the programs of IAPT to the students, researchers and teachers of Physics in a focussed way through the participation of 22 Regional and Sub - Regional Councils. First step in that direction is to draw a calendar of yearlong activities as a commitment to do actions. For us, it has been a dialogue for setting the goals to be achieved and monitored for fine tuning and implementation. The mantra Which is emerging is plan actions and not results. Principle of causality will take care of the results.

For this, in all the zones, Zonal Vice Presidents have created groups to strengthen our flagship programs like National Competition of Innovative Experiment in Physics (NCIEP), National Competition of Essay Writing in Physics (NCEWP) and National Competition of Innovation in Computational Physics (NCICP) and to brainstorm on launching programs such as workshops on problem solving, Physics Education Research and creating hubs for variety of focussed activities on the pattern of micro community science centres for students in small-small groups down to village level mentored by a local resource person trained to undertake that task. We are looking forward to indulgence and participation of more than 8500 members to run and hone these activities and spread Love for Physics.

With the buzz of implementation of National Education Policy 2020 all around, IAPT has a very important role to play. As an apex body of physics teachers, we need to look into it and contribute meaningfully to its formulation for implementation and make sure that no aberrations happen in the name of reducing the syllabus. It is desirable that in the light of curricular frameworks we come out with model syllabi with logically connected flow of topics with well

.....*Continued Page 84*

drafted learning outcomes, teaching and learning resources, readings and rubrics to help in assessments. It should act as a hands on minds on scaffolding for learning physics.

Executive Council has decided to increase the visibility of IAPT on Facebook to reach out to a wider audience. Another decision taken is to incentivise the working of Regional Councils for doing sustained best work during the year. We are sure that we can deliver our ideas in the field together.

As I write this, we are celebrating National Science Day in the spirit of विज्ञान सर्वत्र पूज्यते dedicated to the discovery of Raman Effect. It reminds me of a thought-provoking quote by Bharat Ratan CV Raman calling upon us to do something worthwhile:

I think the Chief Thing is to take some pleasure in your work. Sometimes I say, our salvation is in our own hands. If we in this country can focus our minds to do something, we will find something to do and we shall certainly get a place to do it. Stimulus is needed very much. Stimulus is sometimes they say not a spirit of mutual admiration but it is necessary to have criticism, even hostility, provided it is not carried too far, it is good for a man.

You are most welcome to send your suggestions to my e-mail box and General Secretary's mail box.

Wishing you an innovative and inspiring National Science Day.

P.K. Ahluwalia
President IAPT

⁂

A REQUEST TO IAPT MEMBERS

We are in the midst of celebrating the birth centenary of the freedom fighter, celebrated educationist and founder of our organisation Indian Association of Physics Teacher (IAPT), Dr D P Khandelwal. His journey for life started in Dungarpur in Rajasthan on 01.10.1921 and ended in Pune on 12.02.1996. He had his primary education in Dungarpur, Secondary in Udaipur, Intermediate and Undergraduate in Ajmer (all in Rajasthan), Postgraduate in Agra in Uttar Pradesh and PhD in Nainital in Uttarakhand. For research and teaching he was associated with many places including Karachi, Agra, Nainital, Kanpur, Jaipur and Pune . Except Karachi, IAPT can organize celebration programmes for paying tribute to Dr. Khandelwal in those places if the local educationists and the IAPT members take initiatives.

The Khandelwal Centenary Committee (KCC) requests each member to share, if he or she possesses, the photocopies of the books, articles (on physics/science or any social problems), research papers on mainstream physics or physics education authored by him as well as the letters received from him, with the KCC Convener.

KCC also request the members to write articles for the Commemorative Volume, paying homage to Dr Khandelwal.

Kindly contact

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PHYSICS NEWS

Researchers use tiny magnetic swirls to generate true random numbers

Whether for use in cybersecurity, gaming or scientific simulation, the world needs true random numbers, but generating them is harder than one might think. But a group of researchers has developed a technique that can potentially generate millions of random digits per second by harnessing the behaviour of skyrmions—tiny magnetic anomalies that arise in certain two-dimensional materials.

Most random numbers produced by computers aren't random in the strictest sense. Computers use an algorithm to generate random numbers based on an initial starting place, a seed number. But because the algorithm used to generate the number is deterministic, the numbers aren't truly random.

The researchers found that when a skyrmion is held in place, they fluctuate randomly in size.The researchers estimate that by optimizing the defect-spacing in their device, they can produce as many as 10 million random digits per second, providing a new and highly efficient method of producing true random numbers.

Read more at :https://phys.org/news/2022-02-tiny-magnetic-swirls-true-random.html

Original paper : Nature Communications (2022). DOI:10.1038/s41467-022-28334-4

JET Fusion Facility – At Temperatures 10x Higher Than the Centre of the Sun – Sets a New World Energy Record

Following the example of the sun, fusion power plants aim to fuse the hydrogen isotopes deuterium and tritium and release large amounts of energy in the process. The only plant in the world currently capable of operating with such fuel is the European joint project JET. Prior to the change of the wall material, JET had set the world energy record in 1997 with a plasma that produced 22 megajoules of energy. This record stood until now.In the recent record-breaking experiment, the fusion reactions in JET released a total of 59 megajoules of energy in the form of neutrons during a five-second phase of a plasma discharge. Expressed in units of power (energy per time), JET achieved a power output of just over 11 megawatts averaged over five seconds. The previous energy record, set in 1997, was just under 22 megajoules of total energy and 4.4 megawatts of power averaged over five seconds.

Read more at :https://scitechdaily.com/jet-fusion-facility-at-temperatures-10x-higher-than-the-center-of-the-sun-sets-a-new-world-energy-record/

Chaining atoms together yields quantum storage

Engineers have developed an approach for quantum storage that could help pave the way for the development of large-scale optical quantum networks.The new system relies on nuclear spins—the angular momentum of an atom's nucleus—oscillating collectively as a spin wave. This collective oscillation effectively chains up several atoms to store information.

The workutilizes a quantum bit (or qubit) made from an ion of ytterbium (Yb), a rare earth element also used in lasers.The teamembedded the ion in a transparent crystal of yttrium orthovanadate (YVO4) and manipulated its quantum states via a combination of optical and microwave fields. The team then used the Yb qubit to control the nuclear spin states of multiple surrounding vanadium atoms in the crystal.As they can with classical computers, engineers would like to be able to connect multiple quantum computers to share data and work together—creating a "quantum internet."

Read more at :https://phys.org/news/2022-02-chaining-atoms-yields-quantum-storage.html

Original paper : Nature (2022). DOI: 10.1038/s41586-021-04293-6

Pankaj Bhardwaj
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SciLAB console as a tool to explain Lissajous patterns

ARTICLE

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Abstract

The study of Lissajous patterns holds importance in both science and engineering education. The graphically illustrated interaction of particles in two perpendicular movements helps learners to understand many physical phenomena. However, it is a much more complex concept when it is being taught in class. In order to introduce this concept to learners who often get confused while learning it, a simple pedagogy is required. The purpose of this paper is to propose a replacement for the traditional methods of explaining Lissajous patterns to undergraduate students using SciLAB consoles.

Keywords: Lissajous pattern, SciLAB, simple-pedagogy

1. Introduction

The concepts of Lissajous patterns (curves, figures, *etc.*) are presented in many engineering and scientific branches as primers for undergraduate students [1].The concept is simple, but requires a lot of discussion in class. Sometimes, explaining the basics of it requires making endless graphical patterns, and occasionally even that fails [2].These days, students coming to a graduation course are well-equipped with computational skills.Instead of learning and then computing, they find it easier to compute first.This paper presents a simple pedagogy for explaining Lissajous patterns using the SciLAB console.SciLAB is an open source software widely used in educational institutions worldwide.It focuses primarily on electrical signals, but the concept could be applied to any other related field, such as Simple Harmonic Motion (SHM).

More than 100 years after it was discovered, the Lissajous figure is still widely studied [3]. Lissajous figures have been studied for the past 30 years, especially their shape, evolution trend, periodicity, and symmetry, and a set of characteristic and law has been formulated [4]. Many groups have recently emphasized the importance of studying Lissajous figures using different plotting tools [5-8].

Our study of Lissajous patterns begins with a mathematical introduction and plotting exercises using SciLAB console to show the various possible scenarios to get insight concepts.Putranta*et al.*[5] also suggest plotting the Lissajous curve in spreadsheets, but this will require more time and efforts than using SciLAB consoles. SciLAB console offers an additional benefit in that it can be used on smart phones through cloud computing.

2. Background &Procedure

Let us consider ac voltage source $v_1(t)$, generating anideal sinusoidal waveform of $1V$ and frequency $1/2\pi$, *i.e.* $v_1(t) = \sin(t)$. Suppose $v_1(t)$ is applied to horizontal deflection plates of Cathode Ray Oscilloscope (CRO). Let another sinusoidal waveform $v_2(t)$ of unit magnitude but unknown frequency and phase be applied to vertical deflection plates as depicted in Fig. 1. The pattern so obtained on CRO screen is called Lissajous pattern. These days, CROs are an uncommon sight, and the only thing we have are oscilloscopes. It worth mention that it is the *xy mode* that provides the Lissajous figures in oscilloscopes. Here, Lissajous pattern will be plotted on the SciLAB console using basic instructions(explained at the end of main text).

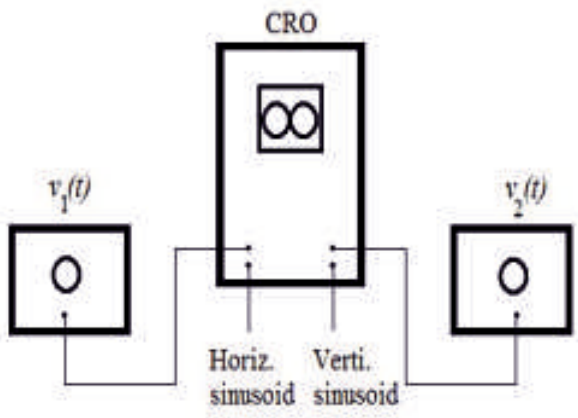

FIG. 1: Experimental Setup to obtain Lissajous pattern on CRO screen.

3. Signals with same frequencies

Let $v_1(t) = \sin(t)$ and $v_2(t) = \sin(t + \theta)$ *i.e.* both signals are of same frequencies but different phase.

1. $\theta = 0^{\circ}$

When$v_1(t) = v_2(t) = \sin(t)$ Lissajous pattern will be a straight line with unit slope.

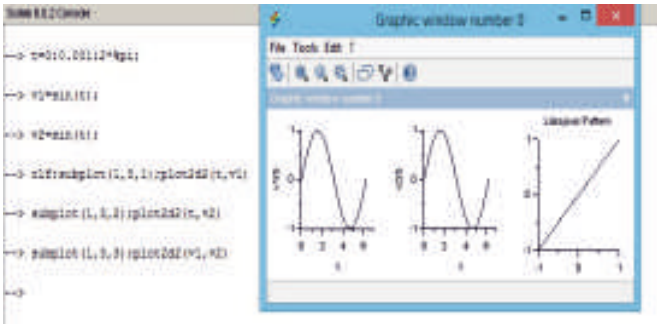

FIG. 2: SciLAB plotting of Lissajous pattern when $\theta = 0$.

2. $\theta = 90^{\circ} or\ {}^{\pi}/_{2}$

When$v_2(t) = \sin\left(t + {}^{\pi}/_{2}\right)$ Lissajous pattern will be a unit circle

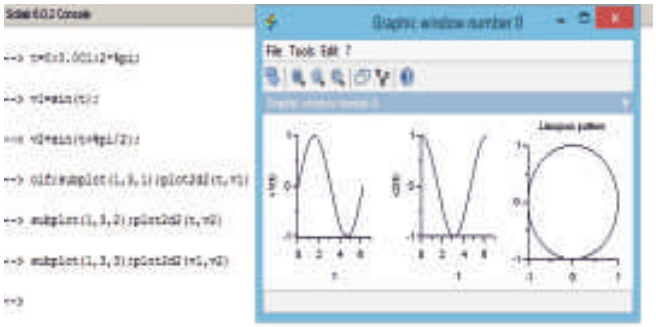

FIG. 3: SciLAB plotting of Lissajous pattern when$\theta = 90^{\circ} or\ {}^{\pi}/_{2}$

3. $\theta = 180^{\circ} or\ \pi$

When $v_1(t) = v_2(t) = \sin(t + \pi)$ Lissajous pattern will be a straight line with unit negative slope.

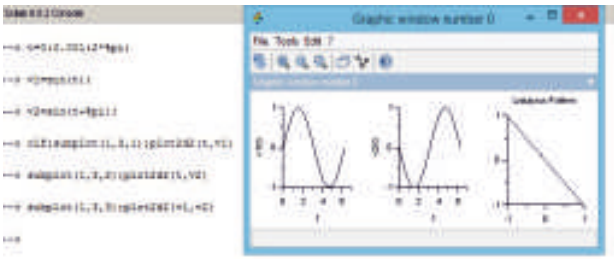

FIG. 4: SciLAB plotting of Lissajous pattern when$\theta = 180^{\circ} or\ \pi$

4. $\theta = 270^{\circ} or\ {}^{3\pi}/_{2}$

When$v_2(t) = \sin\left(t + {}^{3\pi}/_{2}\right)$ Lissajous pattern will be a unit circle.

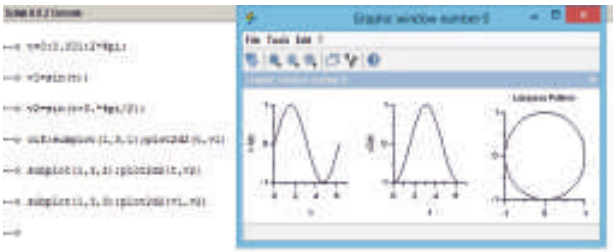

FIG. 5: SciLAB plotting of Lissajous pattern when$\theta = 270^{\circ} or\ {}^{3\pi}/_{2}$

5. $\theta = 45^{\circ} or\ {}^{\pi}/_{4}$

When $v_2(t) = \sin\left(t + {}^{\pi}/_{4}\right)$ Lissajous pattern will be anellipse.

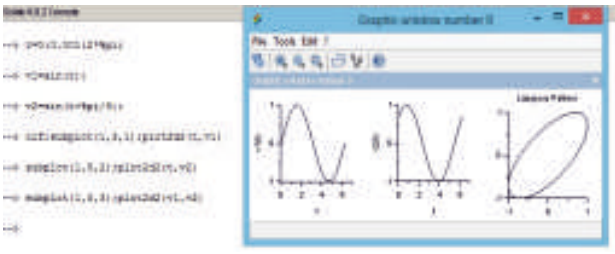

FIG. 6: SciLAB plotting of Lissajous pattern when$\theta = 45^{\circ} or\ {}^{\pi}/_{4}$

6. $\theta = 135^{\circ} or\ {}^{3\pi}/_{4}$

When$v_2(t) = \sin\left(t + {}^{3\pi}/_{4}\right)$ Lissajous pattern will be an ellipse.

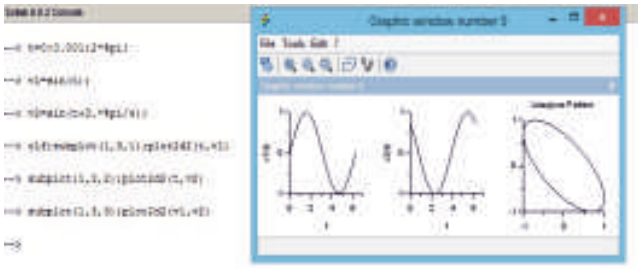

FIG. 7: SciLAB plotting of Lissajous pattern when$\theta = 135^{\circ} or\ {}^{3\pi}/_{4}$

7. $\theta = 225^{\circ} or\ {}^{5\pi}/_{4}$

When$v_2(t) = \sin\left(t + {}^{5\pi}/_{4}\right)$ Lissajous pattern will be an ellipse.

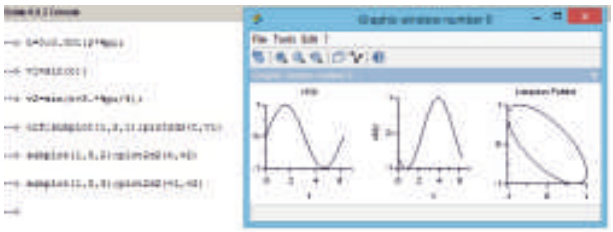

FIG. 8: SciLAB plotting of Lissajous pattern when$\theta = 135^{\circ} or\ {}^{3\pi}/_{4}$

8. $\theta = 315^{\circ} or\ {}^{7\pi}/_{4}$

When$v_2(t) = \sin\left(t + {}^{7\pi}/_{4}\right)$ Lissajous pattern will be an ellipse.

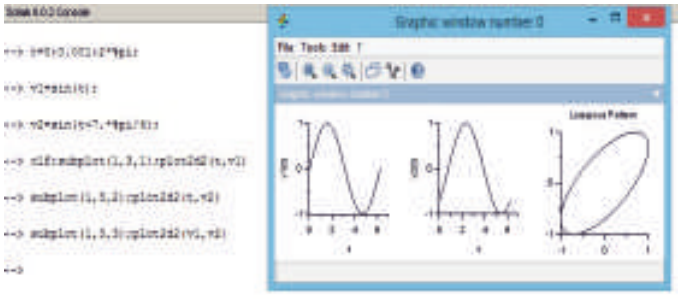

FIG. 9: SciLAB plotting of Lissajous pattern when$\theta = 315^{\circ} or\ {}^{7\pi}/_{4}$

Lissajous patterns seem to take the same form for different cases.For instance, for $\theta = 90^{\circ}$ or $\theta = 270^{\circ}$, both cases Lissajous pattern is unit circle. But the difference lies on the fact that plotting in first case is anti-clock-wise (positive direction) while clockwise (negative direction) in second case. This may be appreciated by plotting breached/breaked Lissajous patterns for varying$t$ from 0 to 6 (instead of 2π) as illustrated in Fig. 10.

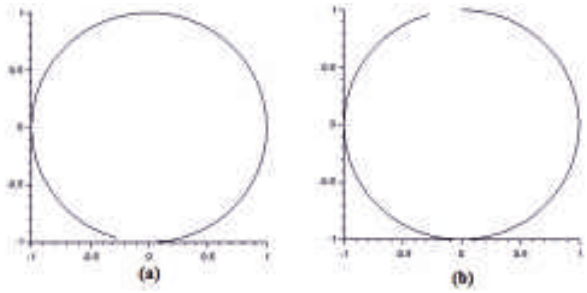

FIG. 10: SciLAB plotting of breached Lissajous pattern, for t = 0 to 6, when (a) $\theta = 90^{\circ} or\ {}^{\pi}/_{2}$ and (a) $\theta = 270^{\circ} or\ {}^{3\pi}/_{2}$.

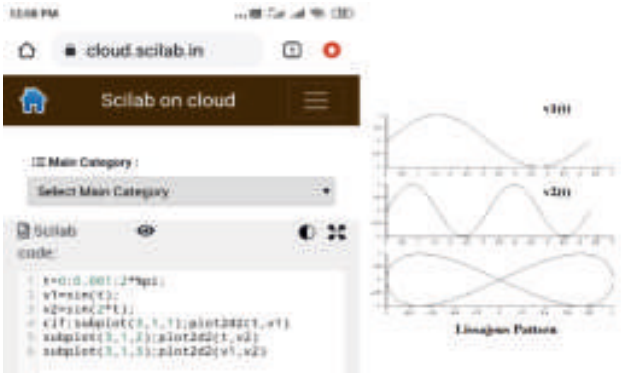

FIG. 11: SciLAB plotting on cloud, for Lissajous pattern when$\theta = 0^{\circ} and\ v_1 = \sin(t)\,;\ v_2 = \sin(2t)$

4. Signals with different frequencies

Let $v_1(t) = \sin(t)$ and $v_2(t) = \sin(2t)$*i.e.* both signals are in phase and second one has frequency half of first. Let us obtain the Lissajous pattern for this case by attempting cloud version of SciLAB at https://cloud.scilab.in/ on simple android smart phone Xiaomi Redmi 4, as shown Fig. 11.

A similar procedure could be used on the SciLAB console to obtain the Lissajous patterns presented in figure 12.

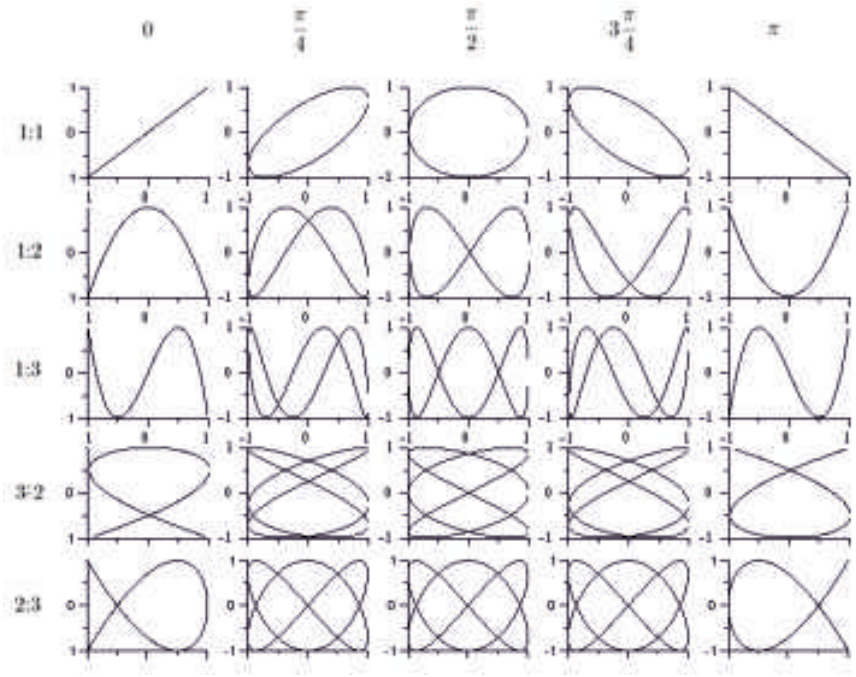

FIG. 12: SciLAB plotting for Lissajous pattern when$\theta = 0^{\circ}, 45^{\circ}, 90^{\circ}, 135^{\circ}, 180^{\circ}$ and sinusoid frequencies at ratios $1:1;\ 1:2; 1:3; 3:2;\ 2:3$

5. Conclusions

A plotting tool such as SciLAB console can assist with alleviating the initial pedagogy problems during the introductory lecture on Lissajous figures/patterns.In the chalk-talk learning process, the method was evidently an efficient way to communicate the concept behind the Lissajous pattern.A tool like this has proven useful in introducing Lissajous patterns to teachers who find drawing tedious figures difficult and time consuming.

SciLAB Instructions used

1. ***Semicolonssymbol ;*** *may also be used at the end of an instruction (in a file or in Scilab console).*
2. ***Colon symbol :*** *can be used to form implicit vectors*
    a. *j:k is the vector [j, j+1,...,k] (empty if j>k);*
    b. *j:d:k is the vector [j, j+d, ..., j+m*d].*
3. ***clf:*** *Clears and resets a figure.*
4. ***plot2d2:*** *2D plot (step function).*
5. ***subplot(m,n,p) or subplot(mnp)*** *breaks the graphics window into an m-by-n matrix of sub-windows and selects the p-th sub-window for drawing the current plot.*

References:

[1] Greenslade Jr, Thomas B. "All about Lissajous figures."*The Physics Teacher* **31**, 364-370, (1993).
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An Exercise in Patience and Passion -NAEST2021 A Student's Report

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Abstract

Experimentation forms the defining characteristic of Science - it is the tenet which gives Science its transparency by reproducibility of claimed facts, provides ground for innovation and improvement while stimulating curiosity and critical thinking in its participants. The universality and verifiability of physical laws and their precedenceover other philosophical dictums is the raison d'etre of those who have devoted their lives to finding the scientific truth. Such is its tenacity that Galileo's Leaning Tower of Pisa experiment in 1590 could be reproduced on the surface of the Moon by NASA Astronaut David Scott in1971.

Often, experiments have paved the way for further investigations into a nascent field, opening up new avenues for research. Newton's splitting of white lighting to its constituent colors in 1666 which resulted in his work 'Optics' (published 1704)formed much of the basis for the theory of Light for the next centuries. At the same time, deviations from expected results such as with the case of the Michelson-Morley Interferometer Experiment in 1887 contributed to the development of the principle of General Relativity by Einstein which forms a major part of Modern Physics. Thus, age nuine experimental work with a clear the or etical understanding can produce scientific consciousness amongst today's young learners and make a foundation to build tomorrow's great scientists.

"An experiment is a question which scienceposes to Nature, anda measurementistherecording ofNature's answer."— Max Planck

Introduction

National Anveshika Experimental Skills Test is one such effort towards the holisticdevelopment of young physicists by instilling a much needed scientific temper andpassion for learning. Since its inception in 2014, it has been conducted on an annualbasis for students from the 9thgrade to MSc to display their prowess in experiments.Retired Professor at IIT Kanpur and Padma Shri awardee Dr. Harish Chandra Verma,along with the Centre for Continuing Education (CCE), IIT Kanpur and the NationalAnveshika Network of India (NANI)– auni tof Indian Association of Physics (IAPT) - brought together thousands of school and college students from across the country for a celebration of the love for learning and teaching in Physics.

Registration and Screening Test

NAEST 2021 marked the 8th iteration of the annual competition with registrations starting in early August 2021 with around 8000 students enrolling for the competition. A portal (*https://nani.hcverma.in/*) had been created for the dissemination of information regarding the contest and to act as a platform for interaction between theyoung minds. Videos demonstrating physics problems - rangingfrom the simple to the complex–were uploaded periodically to provide practice to the students. Additional resources (something Imadeuse of) were available on *https://*www.concepts-of-physics.com/index.php

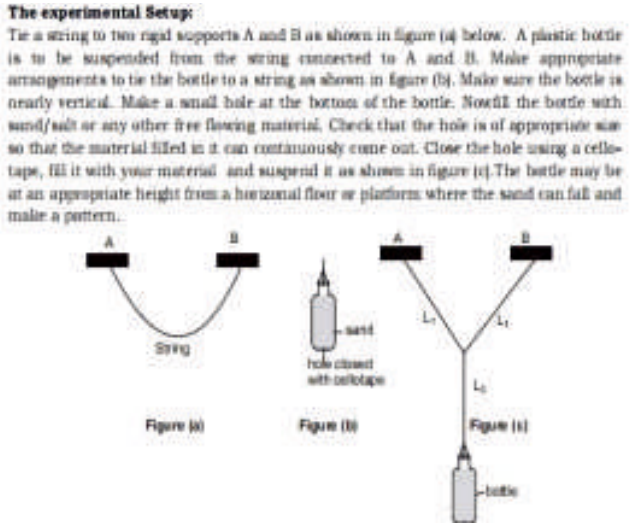
which included solved questions from previous iterations of the competition. The entire process was meticulously designed and care was taken by the coordinators to ensure that each and every student learned from the endeavor.

The Screening test, held in mid-September on the Code Tantra platform, involved short (~1min) videos of various experiments with questions requiring a proper conceptual understanding of the subject to answer. Around 1000 candidates were short listed from this round and were contacted by their respective local coordinators(onthebasis of domicile state) for the Prelims.

Prelims-An exam with a difference

The Prelims accentuated the uniqueness of the competition for it comprised performing experiments at home without the use of sophisticated instruments. The experiments were open-ended and allowed one to take help of family members, with room for one's own interpretation of the write-up. After the submission of details and a mock report sent by the Organizing Team, the stage was set to gauge the acumen and creativity of the students in doing experiments using the bare minimum.

The abstract and set-up of the experiments were ingeniously designed by Dr. H C Verma and his team precisely for the purpose of the competition. Taking place in October through November, the students were given around 5 days for each experiment, during which we had to plan out how to perform the experiment, take there adings, analyze and interpret the results, and reach our own conclusion. The experiments were so designed that we had enough flexibility to go out of and beyond the given write-up of the experiment. Setting up of the experimental apparatus required considerable creativity on the part of the students such as using kite-string for an experiment on coupled pendulums, set to observe the Lissajous patterns, observing circular diffraction pattern through a miniature circular slit in an opaque paper to mention a few.



A Sample Setup from the Prelims

Error analysis formed an integral part of the report writing and the experience teaches one the importance of random error analysis (Gaussian or otherwise), statistical error analys is, the convention of using significant figures, the loss of precision between different instruments and the limiting accuracy of readings by the least count. An example of this would be how, in measuring the time period, least count is taken as reaction time of a human (~ 0.1 sec) instead of the stopwatch (~0.01 sec). Moreover, the differences between theoretically obtained formulas and the practical application of the same were evident, such as in the case of a pendulum executing oscillations at angles of 30 degrees or greater where the time dependence formula of a simple pendulum given by $T = (L/g)^{1/2}$no longer holds true since that was derived for very small angles of oscillation.

Three such experiments were performed and on the basis of the reports submitted, around 25 students were selected in the Junior Category and 30 in the Senior Category. Thesemi-finals and finals were to be held at Shiksha Sopan Ashramin Kanpur.

About Shiksha Sopan

Shiksha Sopan Ashram, a modern day temple of learning, is located around 16 km from Kanpur Central Station and 3 km from Pradhan Gate of IIT Kanpur. It is surrounded by beautiful pastoral lands, with a pleasant, slightly chilly climate and magnificent sunsets. Shiksha Sopan acts as a beacon of hope for the local community and the organization conducts multiple events for the underprivileged children of the are a, evenproviding scholarships for the meritorious.

The Ashram consists of a Main Building which has several labs with well-equippedinstruments, a modern-day classroom with a projector and seating capacity of around fifty, computer laboratories, and soon. The Residential Building houses several dormitories and adjoint toilets for visiting students and the Guest House (under construction) has a cafeteria on its ground floor and further accommodation facilities. Additionally, all the building shave solar panels installed for renewable power generation.

The Ashram also has an herbal garden, a cowshed for fresh milk and land for organic farming for fresh vegetables and an open-air classroom. Thus, in every sense of the word, the Ashram is amarvel and an experience one cherishes and yearn store turn to.

The final component of the competition was held in two batches - 30thDec '21 to 1st Jan '22 for the Junior Category and 3rd Jan '22 to 5th Jan '22 for the Senior Category.

The finals saw the culmination of a four-month long effort and hard work for the students - most of whom were the toppers from their respective zones. The event saw individuals from across the country with candidates hailing from Kerala in the South to Himachal Pradesh in the North, from West Bengal in the East to Rajasthan in the West, arriving at one place united by their shared passion for Physics. The presence of such a diverse body of participants is a testament to the inclusive and pluralistic nature of the competition. An interaction and experience such as this broadens one's world view and dilutes misconceived notions of prejudice, in stead fostering a camaraderie built not on economic or ethnic lines but on lines of co-existence, of mutual respect and understanding.

Professor HC Verma examining a student's work.

A student performing an experiment in the finals

Most of us were beyond overjoyed to interact with Dr. H C Verma in person who ledthe entire endeavor from the front. The routine was quite hectic and

intensive butrewarding nonetheless. The events saw us rise at the break of dawn. The semi-finalstook place from the morning to night on the 3rdof January with more sophisticatedexperiments on RC circuits, a wave machine and on chromatic aberration in lens. The participants were rigorously invigilated and every step was evaluated by a cadre of experienced in vigilators including the unassailable Dr Verma him self. The same principle as outlined in the Prelims was at work in the semi-finals and finals, andcandidateswere rewarded for their a stute observations and conceptual application.

Prof Khandekar conducting a Workshop

Acknowledgment

The experience I have garnered over the course of these five months has offered mean insight into the world of Physics and this exercise has proved to be an enriching, enjoyable experience. We students tend to study the subject with our noses buried inour textbooks, failing to observe the magic that surrounds us. These experiments have opened my eyes to the omni presence of Physicsin my environment.

The finals also incorporated a Workshop on 'The Joy of Physics' and talks by Prof Sameer Khandekar (Prof of Mech. Engineering at IIT Kanpur), Mr. Manish Jain and Mr. Amit Bajpayee (SGM-Anveshika Coordinator) who impressed upon the students the need to think critically in solving problems while giving us a glimpse of their domains in the subject.

The participants might have been strangers before, but they parted as old friends, with memories to cherish for a lifetime. While all of us might have been in a competition, no one bore ill will and the evenings involved the spirited singing of bhajans and sprightly sharing of anecdotes as we mingled freely and earnestly. We might have come from different backgrounds and institutes but none of that hinde redour interactions as learners of to dayand teachers of tomorrow.

I would like to express my gratitude towards the organisers at IAPT and NANI for putting together these very interesting experiments, and to the invigilators and local coordinators for always being available to help and guide participants.

I would like to thank Prof. Verma for inspiring countless students, instilling in them a love for the subject, and for conducting an event like NAEST which allows us to truly appreciate Physics and all that itentails.

I also thank my college professor, Dr. Vivek Verma for his inspiring pedagogy and incessant words of wisdom. This endeavour would have been impossible without the constant love and support of my parents. To them, I say a heart felt thank you.

Anveshika Webinar

Organized by : HRDC-UGC – Hyderabad central university

Platform : google-meet **Date:**4 Feb 2022 **Time:**2.00-5.15 pm

No. of teachers: 56 **Event**: Faculty Induction Program II

Topic: Constructivism-A pedagogy of learning by self-doing.

Resource Person: Sarmistha Sahu

Teachers of all faculties are gathered by the HRDC centre almost every month for 21 days and two sessions are allotted to the resource person.The theme being constructivism, participants observe

some pictures, analyse it and conclude the meaning of Constructivism.The resource person keeps the participants agog with question, comment, and explanation, wherever required.

Then a small Physics activity is done with their full participation, answers, suggestions, hypothesis, and decisions about the outcome of the event. Most of the teachers participate in this interaction and use the pedagogy in their style, for teaching Management, Commerce, English literature, Chemistry, Botany,…. and many others. When, they have realised the use of Constructivist approach in their classroom, they suggest what they would like to do, to initiate their topic to their students, and suggest different styles of teaching their student to make their teaching interesting! That satisfies the motive of the session partly.Brainstorming happens in full scaleand lightens up the discussion.

After a short break of 15 minutes, we recollect to observe five short videos with kids being trained by a physical instructor, the constructivist way! Each video is interspersed with heart touching discussions, elaborated on the video to suit their classroom teaching. And most of the ideas come from differentfaculties. There's plenty to observe, discuss and come out with novel strategies of teaching PG, UG and research students.

Organized by:HRDC-UGC – Osmania University

Platform: google-meet**Date:**12 Feb 2022**Time:**2.00-5.15 pm

No. of teachers: 40**Event**: Faculty Induction Program III

Topic: Construct ivism-A pedagogy of learning by self-doing.

Resource Person: Sarmistha Sahu

The process was the same as above but the teacher reactions and comments, their learning is unique to this group of teachers. Some quotes of what they said and did are highlighted here to give a sense of what happened in this event…

Dr Moin Uddin, English teacher said, “Quiz on the drama for my students to learn by participation.”

A management teacher, Dr Jagdeesh Ranga enumerated a role-play that he had done in class, for the benefit of all.

Mr Basudev explained, “Differentiation' with curvature of a road as an example”.

Dr Venkatachalapatti would like to explain micro-economics by giving a task to the students -study the price rise in SPO2 units in the pandemic.

Case studies of “Jio- 1 GB free internet” was undertaken by Mr Ranga's studentsto understand costing.

Reading and story-telling-narrating and listening, will be adopted by Dr Rajkumar of the English Department.

Many such methodology was suggested, some are already implemented in their classroom some others are being planned after the session– tiny projects and problems to solve. Constructivist approach was introduced very successfully.

Sarmistha Sahu

Report (RC-07)
IVthPRL-IAPT Dr. Vikram Sarabhai Lecture

Date: February 11, 2022;**Time**: 2.00 to 4.30 pm, **Mode**: online

Speaker: - Prof. Abhijit Chakraborty, Professor and Division Head,

Astronomy & Astrophysics Division, Physical Research Laboratory, Ahmedabad

Topic: "Challenges and limitations of detecting exoplanets"

The annual *PRL-IAPT Dr. Vikram Sarabhai Lecture* programme is a flagship activity of Regional Council RC-07 (Gujarat) now. It was initiated with a lead support from Prof. Anil Bhardwaj, Director Physical Research Laboratory Ahmedabad, in the year 2019. The lecture programme this year, as also in 2021 was held online, on Feb 11, and was conducted by Prof. D. Pallam Raju, Dean PRL.

In his opening remarks Prof. Anil Bhardwaj was happy to mention that this year it was a special occasion in view of the 75th year of the legacy of PRL established in 1947, and also the 75th year of our Independence. "The lecture topic is also special, as the first discovery of an exoplanet in India was made by Prof. A. Chakraborty and team of PRL." He said. Prof. A. Chakraborty

He welcomed all those who joined the event on the WebEx and on you tube channel. Responding to this, Prof. K. N. Joshipura, Immediate-past General Secretary of IAPT, thanked PRL Director and others for the consistent support received from them in organizing this important outreach activity. He outlined the initiatives and programmes of IAPT, and greeted PRL as an institutional member this year. "IAPT is currently celebrating the birth centenary of its founding father D. P. Khandelwal." he added. Prof. P. C. Vinodkumar, Head Department of Physics, Sardar Patel University Vallabh Vidyanagar and President RC-07, gave a brief introduction of the Invited Speaker, who in turn was happy to recall his own associations with Prof. Vinodkumar.

In his lecture, the invited speaker Prof. Abhijit Chakraborty provided a detailed account of the discovery of the exoplanets from the Mt. Abu Observatory of PRL, and highlighted the underlying challenges and limitations.

Since the discovery of the first exoplanet (by Swiss astronomers) in 1995, a worldwide search for the exotic object is going on and about 4000 exoplanets are known today, each one of them being quite different from the others and from the planets of our solar system as well. The speaker beganby explaining how planets revolving round a star are very difficult to detect since they are quite faint as against the host star. For instance, Sun-Earth brightness contrast is 10 billion times, and Sun-Jupiter contrast is a billion times. Therefore, a large number of detections have come from mainly two indirect methods, (1) the radial velocity (RV) method, and (2) the transit photometry method, the third one being gravitational lensing. The centre of mass of the star-planet system is very much closer to the star itself, and hence as the planet revolves round the host the star, the star itself wobbles slightly. This forms the basis of the radial velocity method, employed by the PRL team. On the other hand, if the exoplanet happens to undergo a transit along the disc of the host, then a slight decrease in the intensity of the star-light can be 'seen' if the planet's orbital plane lies along our line of sight, and this is the central idea behind the transit photometry method. Astronomical survey work has been carried outin search of exoplanets by several space missions like *KEPLER* in the recent past, and *TESS* at present, while the future mission is named *PLATO*. The RV method is the only ground based method that provides the mass of the exoplanet, an important parameter. It is very interesting to also know whether the exoplanet is in the host star's habitable zone i. e. a comfortable space around the star, neither too hot nor too cold (i.e. the condition favourable for liquid water) for life to exist on the exoplanet.

Prof. Chakraborty highlighted the search project called *PRL Advanced Radial-Velocity Abu-sky Search*, PARAS effectively started in 2012, and gave details of the spectrograph instrument, pointing out to the difficulties involved. He also explained the subtle features of the stellar spectra. The task here, as he said, is to detect the minute Doppler shift in a spectral line caused by the wobbling of the star. Moreover, to stay at the forefront of knowledge it becomes essential to improve the precision for the RV measurements. There could be misleading possibilities in this regard; say the observed features may not be due to an exoplanet, but something else! Discounting for all this, the exoplanet discovery has to be established clearly, and supported through independent observations.

….And that was done…! The PRL team discovered first a sub-Saturn like planet (labelled as *K2-236b* situated about 600 light years away in the constellation Cancer) and then a 'hot-Jupiter'exoplanet (TOI 1789b situated about 729 light years away in the constellation Leo), and providedthe estimates of their masses. The Speaker also outlined about the new telescope PARAS-2 being built at Mt. Abu, and mentioned about the facilities available worldwide. It becomes crucial to take utmost care of the optics as well as the subtle aspects like maintaining temperature and vacuum etc in the sophisticated instrumentation. In the background of complications arising out of flares, magnetic cycles as also the gravitational res-shift etc, a fairly large number of data are required to be obtained over a period of about two years (initially) in order to ascertain good enough statistics. A project of this magnitude requires a huge support from the funding agency and the administration, and therefore Prof. Chakraborty heartily thanked the ISRO/DOS together with the present Director Prof. A. Bhardwaj and the past Director of PRL. Prof. J. N. Goswami. The speaker also happily acknowledged his team members and collaborators. The lecture was an excellent exposition of the exciting journey leading to the discovery of the exoplanets.

Next, the question-answer session was conducted by Prof. Pallam Raju. The speaker answered interesting questions, for example, (i) what time would it take to confirm the discovery of an exoplanet and what are the factors affecting this time span? (ii) Whathappens if the exoplanet is not along our line of sight? (iii) Can we find an exoplanet on which some kind of life would exist? (iv) Can we share a few simpler elements of the observed data with Physics students in order to promotetheir study projects? etc. There were also technical questions on the RV method and the instrumentation involved in the entire discovery project.

Moving further, Prof. Pallam Raju invited Prof. P. K. Ahluwalia, President IAPT for his special remarks on the occasion. Prof. Ahluwalia greeted *PRL@75*, and recalled Dr. Vikram Sarabhai's ideas on self-reliance,*Atmanirbharta*,in India's scientific progress. He added, “Excitements on discoveries such the one described in this lecture can be shared further with students through interactive talks and podcasts etc. Highlights of the state-of-the-art equipment developed in this discovery can also be conveyed to students and teachers.” IAPT can be a link again between the PRL scientists and the young students and teachers, by floating a quiz based on the lecture, he said. The President also appreciated the annual lecture –programme activity of the Gujarat regional council RC-07. Finally, Principal, Dr. Pruthul Desai (P T S Science College Surat), Secretary RC-07, thanked in great appreciation, Director Prof. A. Bhardwaj, Prof. Pallam Raju and the distinguished speaker Prof. A. Chakraborty – the discoverer of the discovery – as also the WebEx panel members, and others.

On behalf of PRL, Dr. Vishal Joshi coordinated the YouTube+Web Ex for Q&A, and the WebEx Meeting Host was Dr. Bhushit Vaishnav.

Now, as per the tradition of the RC-07, an article based on this lecture, to be written by the speaker himself, will be published (in English) in the annual magazine *PragaamiTarang* – 2022.For the previous three lecture-articles the links to this magazine are also available.

K. N. Joshipura
IAPT RC-07)

Activity Report (RC01- Delhi & Haryana)

Activity 1
Lecture : 15 Jan 2022
Venue : **Zoom Platform**
No. of Participants (Registered): 900
YouTube link: https://youtu.be/FtrG2H-5Trg

IAPT RC-01 organised online lecture on "**The Ten Beautiful Experiments in Physics"** by **Prof Ajoy Ghatak** (Meghnad Saha Professor, The National Academy of Sciences of India, Prayagraj (Allahabad) (Formerly Professor @ IIT Delhi) on 15th January 2022 via Zoom link. It was also live on You tube and Facebook. The details of the link and participants are as follows:

Prof Ajoy Ghatak beautifully explained in detail the 10 beautiful experiments in Physics like Foucault's Pendulum, Rutherford experiment, LIGO interferometer etc in detail as given in his text book and accentuated the importance of these experiments in field of Physics.

Dr S.K. Singhal, Treasurer, introduced IAPT and its activities to the audience and Dr Yogesh Kumar, Secretary, welcomed the distinguished guests and the participants. Dr Seema Vats, President, introduced the eminent speaker Prof Ajoy Ghatak and highlighted his expertise in field of optics to the audience. He is also the recipient of Shanti Swaroop Bhatnagar Award.

Distinguished guests like Prof K.N. Joshipura and Prof C.K. Ghosh obliged the webinar with their gracious presence. The Q &A session was carried out by Dr Yogesh Kumar and programme ended with vote of thanks proposed by Mr Surjan Singh, Vice President. The programme was coordinated by Dr. Poonam Jain, EC member. The whole programme was accomplished under the guidance and supervision of Past President Prof V.P.Srivastava.

Activity 2

Details of the event ae as follows:

Inaugural Lecture -29th Jan 2022

Venue : Zoom Platform

No of Participants (registered): 436

You tube Link: https://youtu.be/7h8OjPHTbBY

The Online Perennial Series on **"Investigatory Physics Projects using Arduino" by Prof H.K.Sahajwani** (Former Dean (Academics), IEC college of engineering and Technology, Greater Noida) was inaugurated by Chief Guest Prof P.K. Ahluwalia, President IAPT. His inspiring words spell bound the audience and he encouraged the whole team of RC01 for taking an initiative to enlighten the students and teachers about Arduino and its usefulness in conducting physics experiments. Dr O.P. Sharma, EC nominee, IAPT introduced the chief guestand his achievements to the participants. We were blessed with gracious presence of Prof. Rekha Ghorpade, Secretary IAPT.

Prof H.K. Sahjwani beautifully explained the procedure to download Arduino on PC/Laptop/Computer and then stepwise explained the programming details of Arduino. He also made audience aware of different sensors that can be clubbed with physics experiments to carry out the measurements. He stressed on the importance of Arduino in this pandemic era to carry out online experiments for students at school level and at college level.

Activity 3

Inaugural Lecture -5th Feb 2022

Venue : Zoom Platform

No of Participants (registered): 600

You Tube link : https://youtu.be/-OTyHTu90Tg

Second lecture on ""**"Investigatory Physics Projects using Arduino (Part -2)" by Prof H.K. Sahajwani** (Former Dean (Academics), IEC college of engineering and Technology, Greater Noida) was organised on **5th Feb 2022 at 11:00 AM.** We had the honour of

having the gracious of presence of Prof P.K. Ahluwalia all through the lecture. Prof H.K. Sahjwani explained in detail five physics experiments based on Arduino. The list of experiments is as follows:

1) Make your own function – Musical Scale
2) DC Motor and Tangent Law
3) Distance measurements by Ultrasonics and its applications
4) g by IR Sensor
5) Demo of PWM Pins

The Q &A session was carried out by Mr Surjan Singh, and programme ended with vote of thanks proposed by Dr S.K. Singhal. The programme was coordinated by Dr Poonam Jain and Dr Yogesh Kumar welcomed the distinguished guests and the participants on behalf of whole team of RC-01. Prof V.P. Srivastava and Dr O.P. Sharma are the pillars of strength and guiding force for the EC Team RC-01.

Seema Vats
President RC-01

Minutes of the Joint Executive Council Meeting

A Joint Executive Council Virtual meeting of the Outgoing (2019-21) and Incoming Members (2022-24) of IAPT was held on 21.01.2022, from 6pm to 8.30 pm.

Following members attended the meeting:

Sr. No.	Name and The Post
1	Prof. Vijay Singh, Immediate Past President
2	Prof. K. N. Joshipura, Immediate Past Gen. Secretary
3	Prof. Ranjita Deka, Vice President-East Zone
4	Prof. S. A. Masti, Vice President-West Zone
5	Prof. Ravi S. Bhattacharjee, Vice President-North Zone
6	Prof. P. Nagaraju, Vice President-South Zone
7	Prof. H. C. Verma, Vice President-General
8	Prof. O. P. Sharma, EC Member RC-01
9	Prof. Pawan Kumar, EC Member RC-03
10	Prof. Sunder Singh, EC Member RC-04
11	Prof. S. B. Mane, EC Member RC-08
12	Prof. Pradip Kumar Dubey, EC Member RC-09
13	Prof. S. K. Patel, EC Member RC-10
14	Prof. M. S. Jogad, EC Member RC-12
15	Prof. Makhanlal Nanda Goswami, EC Member RC-15
16	Prof. Dilip Kumar Bisoyi, EC Member RC-16
17	Prof. Shyam Ranjan Kumar, EC Member RC-20
18	Prof. Miskil Naik, EC Member RC-21
19	Prof. V. Rajeshwar Rao, EC Member RC-22
20	Prof. U. S. Kushwaha, Chief Editor, Bulletin
21	Prof. Sanjay Kumar Sharma, Resident Secretary
22	Prof. D. C. Gupta, Treasurer
23	Prof. Manjit Kaur, outgoing VP North Zone
24	Prof. Anil Kumar Singh, Outgoing EC Member RC 04
25	Prof. Viresh Thakkar, Outgoing EC Member RC 07
26	Prof. Jerome Das, Outgoing EC Member RC 13
27	Prof. Saswati Dasgupta, Outgoing EC Member RC 15
28	Prof. Kishor C. Das, Outgoing EC Member RC 16
29	Prof. Swapan Majumdar, Outgoing EC Member RC 18
30	Shree Vinod Prajapati, Secretary, Kanpur Office
31	Prof. H. C. Pradhan, EX-Officio Member, Outgoing EC
32	Prof. Bhupati Chakrabarty, EX-Officio Member, Outgoing EC Invitees:
33	Prof. M. L. Ogalapurkar
34	Prof. B. P. Tyagi, Chief Coordinator, Examinations
35	Prof. P. D. Lele, Coordinator, NCICP/RO-IAPT Elections
36	Prof. S. C. Samanta, Convener, DPK BCCC.
37	Prof. S. K. Joshi, Coordinator, NCEWP
38	Prof. Vijay Soman, Coordinator, NSEJS
39	Prof. P. K. Ahluwalia, President
40	Prof. Rekha Ghorpade, General Secretary

Initiating the meeting General Secretary Prof Rekha Ghorpade, requested President Prof. P. K. Ahluwalia to chair the meeting. Thereafter she welcomed both the outgoing and incoming EC members for sparing their valuable time to attend this meeting at a short notice. Prof. Rekha informed the members that the notice of less than 20 days between notification and the day of meeting in virtual mode is desirable since it does not involve dead time to prepare and for actual travel. It was also informed that in a virtual meeting mandatory period of 20 days would have unnecessarily delayed the taking over by new EC and its constitution. Thereafter, agenda items were taken one by one for discussion and approval as detailed below:

1. **Reading of the minutes of the last meeting and getting those approved (vide January 2022 issue of IAPT bulletin; page no. 24 to 27 from outgoing GS Prof K. N. Joshipura).** Minutes of previous General body meeting were assumed to be read and were approved unanimously.
2. **Statement of Prof. Vijay Singh Past President (2019-21)**.

   Immediate past President Professor Vijay Singh wished all success for the new EC. He said that inspite of the pandemic; many programs and meetings were organized by IAPT opening new ways to reach out to IAPT's audience.

I. He informed that the General Body in its last Meeting has passed the amendments to the constitution and two copies of it have been passed on to Central Office of IAPT at Kanpur and are ready for passing these to the Office of Registrars Societies for further necessary action and completing the process. He urged that this may be completed at the earliest

II. Prof Vijay Singh was hopeful that the Asian Physics Olympiad (APhO) would be successfully held in Dehradun from May 22, 2022.

III. He also desired that IAPT should sign the IUPAP's *International Green Statement* as has been done by many other bodies of the country to show concern against climate change.

IV. He also asked the new EC to support the bid of *Indian Physics Association (IPA)* for hosting an *International Conference on Women in Physics*.

V. He also cautioned that IAPT finances are not in good condition and they could not help much in this regard. He desired that this matter must be given urgent attention and discussion.

VI. He also informed that after notifications in January and February 2022 bulletins, only those who ask for printed copies would be sent hard copies and others would get it as soft copies in their mail. He hoped that this would also save a large sum of money for the IAPT. This course of action was mandated by the EC and Annual General Body meetings in November 2021 at Indore.

3. **Statement by Prof. K.N. Joshipura, Past General Secretary (2019-21)**

   Prof KN Joshipura, outgoing General Secretary expressed his good wishes for the new EC and said that this handing over of responsibilities is like a relay race in which those who get tired hand over the baton to the more active members. He also reminded that President of the IAPT is also an executive member of IPA.

4. **Statement of Prof. P.K Ahluwalia, President IAPT (2022-24)**

   Professor P K Ahluwalia, President, IAPT thanked the previous EC and acknowledged the work done by it and the Kanpur office. He put on record thanks to Prof. Vijay Singh, Prof. K N Joshipura and all the EC members for keeping the activities going on, in difficult times and using pathways of Internet to evolve new methodology. He commended the work of NANI and Anveshika. He also commended the work done by Prof BP Tyagi, Coordinator National Standard Examinations and NGPE team coordinated by Dr. Anil Singh for the conduct of laboratory examination online in an exemplary manner. He also informed that he would attend the coming IPA meeting on January 26. Prof Ahluwalia was very positive about the future of IAPT and promised that with the kind inputs by the honorable members, it would leap forward. He also promised that he and Prof Rekha Ghorpade (General Secretary) would meet all the RCs within the coming month. He has already held separate meetings with three RCs and shared their enthusiasm in taking IAPT work forward.

5. **Completion of Election Process of Central EC and RCs for the term January 1, 2022 to December 31, 2024 and to admit the RC representatives to EC, whose nominations have reached RO, IAPT elections, after the**

deadline.

I. Prof. Ghorpade announced the names of nominations proposed by different RCs for their representatives to new executive council after the due date. All the names were accepted for inducting them as members of EC by the members present. The list is already published in the February 2022 issue of IAPT bulletin.

II. To form RC in Kerala where past RC has not initiated the election process. Since no nominations were received from Kerala, RC- 14, it was decided that some of the active members from Kerala should be contacted for suitable nominations. It was also reported by GS that RC14 Kerala has also not formed their Regional Council for this term. It was decided that the President and GS would persuade the formation of RC-14 and take appropriate action forward in this direction.

III. Nomination of co-opted members

Prof Ahluwalia proposed the names of Prof Bhupati Chakraborty (West Bengal), Prof Anil Kumar Singh (UP) and Prof G Venkatesh (Bengaluru) as co-opted members to new EC. After some deliberations all three names were accepted by all the members.

IV. Remarks of Prof P.D. Lele on the Election process

Prof PD Lele, Returning Officer, called upon IAPT to make the next elections online. He expressed his disgust for the cumbersome procedure of ballot papers. He also suggested to find some means to encourage young members, acknowledge them with some document /certificate for participating in elections.

Members expressed thanks to Prof. Lele and his team for meticulously completing the task and appreciated the detailed article written by him the IAPT Bulletin.

6. Update about activities of Prof. D P Khandelwal Birth Centenary activities

Report On activities **on the Centenary celebrations of DP Khandelwal birth anniversary** was read by Prof Subhas Samanta. He listed many works completed successfully. He expressed his inability to bring out the biography and complete works of DP Khandelwal. He hoped that this work could be achieved if some of the students of DP Khandelwal could be contacted. **(Annexure 1: Detail report of DPK BCC activities).**

Prof Ahluwalia thanked Prof Subhas Samanta for his sincerity and hard work and referred to him as an elder, not just his seniors in IAPT.

Prof Ghorpade, announced that *five vice presidents appointed from different zones and one general Vice president had been asked to form groups of their respective RCs* for the DP Khandelwal Centenary celebrations.

7. Information about APhO to be held in Dehradun and matters concerning that

Prof Ravi Bhattacharjee told the EC that India is hosting APhO in Dehradun this year in On line mode. Already 30 countries have agreed to participate in this. He expressed his apprehensions about the financing of the program. President and Secretary informed IAPT had signed the necessary documents to release its share of funds. He also announced that a fully furnished laboratory is functional in a college for APhO and listed many activities for training rural students, teachers from schools and colleges

8. Report on conducting NGPE under COVID Shadow.

Prof B.P. Tyagi, Coordinator, National Standard Examinations, informed that the enrollment to all the examinations like NSEP and NGPE have fallen compared to previous years due to pandemic. However, NGPE is still doing a good job seeing the challenges of its conduct during pandemic He also announced that NGPE scheduled for January 23, 2022 has been postponed. New date will be informed later. He also informed that a complete report of NGPE will appear in the IAPT Bulletin soon.

9. Discussion on roadmap to carry forward agenda emerging out of election process of the Presidential candidates Posts.

President Prof. Ahluwalia presented his plan for the next three years through a ppt **Agenda Emerging from IAPT elections (Annexure-2).**

He said that this plan has evolved from the democratic process of elections for the post of president. The main points of this plan were

1. Reaching the unreached
2. Empowering the Regional Councils (RCs)
3. IAPT fellow program

He discussed many programs which he proposed

to undertake in order to increase the resource pool of IAPT to take it to the rural India. He proposed podcasts, Mock tests using Moodle platform to be followed by Discussion videos in the classroom mode etc. particularly targeting rural students and tier 3 and tier 4 cities. He also dwelled on his idea of interviewing and writing about the role models in physics in India who have contributed to physics as discipline of study and research in India and have been excellent teachers. He proposed that about 100 such eminent persons from schools, colleges, Universities be identified and they be taken through all possible modes to inspire physics students and make their biographies available on the IAPT website. He also expressed his concern about the loss of interest by teachers in experimental physics in schools and colleges. He also called for the preparation of an annual calendar of activities by RCs to express their commitment in the month of January every year and post it on IAPT Website.

Another major program that he advocated is for MOUs with various institutions, schools, and colleges to create expert resource pool from those institutions and be partners in IAPT activities. He exhorted members to come forward with their suggestions by sending an email to the secretary.

10. Guidelines to carry out long term activities and short-term activities at RC level as a process of their rejuvenation and making them biggest stakeholders in IAPT activities: A group for preparing such guidelines in consonance with the Mission and Vision of IAPT was proposed to be drawn.

11. Any other item with the permission of the Chair

I. Award for best performing RC and IAPT fellows of IAPT:

A proposal sent by Prof. Upender Singh Kushwaha, Chief Editor, IAPT bulletin was put before the members. He presented the reasons for need of such a proposal. He proposed that different RCs should vie with each other and the best RC, should be awarded based on some objective criteria. Some of the points to be considered were new members enrolled, NSEP and NGPE enrollment, meetings organized, library subscriptions of the bulletin, reach out programs to secondary and other students and visits by members to middle and secondary schools etc. He said a citation and enhanced grant might be given to the RC getting this honor. This proposal was contested by many members on various points like undesired competition, big and small RCs cannot be tested on the same criteria etc. However, in the end, Prof Ahluwalia, President IAPT proposed to accept it in principle and termed the idea of enhanced grant as an incentive instead of competition winning award. He also said that there should be two or three annual prizes in this category taking care of small states and bigger states. It was resolved that a group of members (similar to DSM award committee) may be formed to work on the rules, regulations and evaluation and award.

II. Regional Level Workshops for Teacher in Regional Languages: Prof S. B. Mane, EC member, RC-08, suggested to form policy in detail and conduct workshops for teachers who are active in their regions, preferably in their regional languages.

III. Prof. Ahluwalia informed the members that an urgent agenda item has been received from Prof Akhilesh Tiwari, Department of applied sciences, IIIT Allahabad that the Face book group created and administered by him with a membership of around 800 be accepted as the official Face book page of IAPT. Item was approved.

IV. Prof. Ghorpade informed the members about enhancement of institutional membership subscription of IAPT Bulletin for three years to Rs 25000 from Rs 10000 for a year (currently available) and life membership for an individual from 1500 to Rs 2000 from April 2022. She also said it will provide a little more financial help to IAPT to carry out its projects.

V. Prof. M. S. Jogad, EC Member RC12 requested the members that RCs MOUs with Science Centres run by Central or State Governments whichever is possible.

Prof. Ghorpade congratulated the members for completing the agenda and participating in the deliberations. In the end General Secretary proposed a vote of thanks to the chair and the members.

Rekha Ghorpade — General Secretary

P. K. Ahluwalia — President

PEE KAY JAIPURIA & CO.
CHARTERED ACCOUNTANTS
Acharya Kuti, 1st Floor, 26/53, Birhana Road, Kanpur – 208 001
Telephone: (0512) 2315178, email: peekayjaipuria_co@rediffmail.com

FORM NO. 10 – B (See Rule 17 – B)

AUDIT REPORT UNDER SECTION 12A(B) OF THE INCOME TAX ACT – 1961 IN THE CASE OF CHARITABLE OR RELIGIOUS TRUST OR INSTITUTIONS

We have examined the Balance Sheet of INDIAN ASSOCIATION OF PHYSICS TEACHERS, KANPUR as at 31st March, 2021 and the Income and Expenditure Account for the year ended on that date, which are in agreement with the books of accounts maintained by the said trust or institution.

We have obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purpose of the audit. In our opinion, proper books of accounts have been kept by the Head Office and the Branches/Regional Councils /Sub Regional Councils of the above named trust/institution so far as appears from our examination of the books and proper returns adequate for the purposes of Audit have been received from Branches not visited by us, subject to the comments/notes given below: -

as per "Annexure AR –10B"

A) That the accounts as shown under the heads "Advances due from" and under the head "Balances with Regional councils/ Centers / Offices" in the Balance Sheet are being operated by the In-charge and/or the authorized signatories of Respective Regional Councils/ Centers / Offices and same represents the total outstanding Balances due from the respective Regional Councils / Centers / Offices. The aforesaid due outstanding Balances includes Cash on Hand, Advances, etc and may also include Bank Balances, if any, being maintained by them which are stated to be in the name of trust or institution as well as may be in the name of the in charge/authorized signatory for the purpose of the institution.

B) That the following periods accounts and/or utilizations of grants have been incorporated by us which have been audited by other chartered Accountants and received by the head office during the year: -

1. *Regional Council-04 Uttar Pradesh* for period 2020-21 which have been audited by Sharad Nigam & Co., Chartered Accountants, Kanpur, Uttar Pradesh.
2. Regional Council -07 Gujarat for period 2019-20 & 2020-21 which have been audited by Rajendra Natverlal Shah & Co., Ahmedabad, Gujarat.
3. Regional Council -11 Andhra Pradesh for period 2019-20 & 2020-21 which have been audited by Poosarla Satyanarayana Chartered Accountant, Vizianagaram, Andhra Pradesh.
4. Regional Council-12 Karnataka for period 2020-21 which have been signed by Prasant Bijaspur & Co. Chartered Accountant, Kalaburagi, Karnataka.
5. Regional Council-15 West Bengal for period 2020-21 which have been audited by Sharad Nagam & Co. Chartered Accountant, Kanpur Uttar Pradesh.
6. Regional Council-18 Tripura, for the period 2020-21 which have been audited by Saikat Datta & Associates, Chartered Accountants, Agartala, Tripura.
7. *Regional Council-20 - Jharkhand* for the period 2020-21 which have been Audited by Goenka Patodia & Co. Chartered Accountant, Ranchi, Jharkhand.
8. Regional Council-22 Telangana for the period 2020-21 which have been audited by Pasunuri Raghuveer Chartered Accountants, Hanamkonda, Telangana.

C) That the following periods accounts and/or utilizations of grants have been incorporated by us which have been signed (without any report thereon) by other Chartered Accountants and received by the head office during the year: -

1. Regional Council-01 Delhi & Haryana for period 2020-21 which have been signed by Mohit G Gupta & Associates, Chartered Accountants, Noida Uttar Pradesh.
2. Regional Council-02 Punjab & Jammu Kashmir for period 2020-21 which have been signed by Gupta Rajnesh Kumar & Co. Chartered Accountants, Ludhiana, Punjab.
3. Regional Council-03 Chandigarh & Himachal Pradesh for period 2020-21 which have been signed by A. Kumar Verma & Co. Chartered Accountants, Chandigarh.
4. Regional Council-05 Uttarakhand for period 2020-21 which have been signed by Saurabh Kishan & Co. Chartered Accountant, Dehradun Uttarakhand.
5. Regional Council-06 Rajasthan for period 2020-21 which have been signed by Ajay Kumar Vijay Vergia & Associate, Chartered Accountants, Jaipur , Rajasthan.
6. Regional Council- 08 Maharashtra for period 2020-21 which have been signed by Sushant Phadnis & Co., Chartered Accountants, Shahupuri Kolhapur, Maharashtra.
7. Sub Regional Council-08 B Mumbai for period 2019-20 & 2020-21 which have been signed by S. N. Bhat & Co., Chartered Accountants, Mumbai Maharashtra

8. Sub Regional council-08 C Pune for period 2020-21 which have been audited by M.G. Kuldudharan Certified Auditor , Pune Maharashtra.
9. Sub Regional Council-08 D Kolhapur & Sangli for period 2020-21 which have been signed by Amol Madiwal & Associates. Chartered Accountants, Kolhapur, Maharashtra.
10. Regional Council-09 Madhya Pradesh for period 2020-21 which have been signed by Swapnil Jain & Co. Chartered Accountants, Indore, Madhya Pradesh.
11. Regional Council -10 Chhattisgarh for period 2019-20 & 2020-21 which have been signed by Rajendra Prasad Chartered Accountants, Bilaspur , Chhattisgarh.
12. Sub Regional Council-12 A Bangalore for period 2020-21 which have been signed by K. Muralidhara & Co. Chartered Accountants, Tumkur, Karnataka.
13. Regional Council-16 Odisha for period 2020-21 which have been signed by Chinmay Nanda & Associates, Bhubaneswar, Odisha.
14. Regional Council -17 Assam for period 2019-20 & 2020 – 2021 which have been signed by Rupesh Goel & Co, Chartered Accountants, Guwahati, Assam.
15. Regional Council -21 Goa for period 2019-20 which have been signed by Patil Manicrao S Chartered Accountant Margao Goa.

D) That the accounts and/or receipt and payment in respect of following branches have been incorporated by us which are un audited and taken from the statements submitted by the respective in-charge and received by the head office during the year: -

1. Chandigarh, Branch
2. Bangalore, Branch
3. Nagpur, Branch
4. Pune, Branch
5. Dehradun, Branch
6. IAPT-Nani, Centre

E) That like earlier year grant received, if any, from any Government Departments to the extent they were utilized during the period have been shown in the Income & Expenditure Account and Expenditure incurred against receivable grant has been carried forward for adjustment there of on receipt of grant.

F) That as the income of the respective Endowment Fund and/or Corpus Fund is to be utilized for the purpose specified by the respective fund's/Corpus creators, hence to the extent the received income is utilized the same has been shown as contribution from respective Funds/ Corpus. The income and expenditure account and balance utilized during the year under review have been disclosed in the Balance Sheet only.

G) Interest earned on investment made for Endowment Fund created under the name and style as DD Pant, Sultan Chand Trust, Omega Trust, Murli Laj Chugani is being accounted for on receipt basis. Utilization thereof for the purpose mentioned by the creators thereof and sundry expenses incurred if any there for are being accounted for on actual payment basis.

H) Interest earned on investment made for corpus Fund created under the name and style as ISRO, INFOSYS, PRL, DAE, Students Education Edu, Dinabandhu Sahu Memorial, Pragaami Tarang Gujarati Publication, Shilpa Nandkumar & Midnapur College CSC D.P Khandelwal is being accounted for on receipt basis. Utilization thereof for the purpose mentioned by the creators thereof and sundry expenses incurred if any there for are being accounted for on actual payment basis.

Subject to above,

And also, non incorporation of receipt and / or application of fund received/ applied Regional Councils for

Financial Year 2019-20 & 2020-21 in respect of Regional Council-13 Tamil Nadu and Regional Council-14 Kerala, & For Financial year 2020-21 in respect of Regional Council-21 Goa and Regional Council -19 Bihar & For F.Y 2020-21 in respect of Anveshika Centre Kanpur.

In our opinion and to the best of our information, and according to information given to us, the said accounts subject to above give a true and fair view:

I. In the case of Balance Sheet of the State of affairs of the above-named Trust Institution as at 31st March, 2021 and

II. In the case of Income and Expenditure account of the excess of Income over Expenditure of the trust/society/institution for the accounting year ended on 31/03/2021

The prescribed particulars are annexed hereto.

For **PEE KAY JAIPURIA & CO.**
CHARTERED ACCOUNTANTS
Firm Registration No. 001335C

RADHA KANODIA
PARTNER
M.No.073806
Place : Kanpur
Date : 12-02-2022

Working Note Annexed to Annexure to from 10 (B) for the year ended 31st March, 2021 In the Matter of Indian Association of Physics Teachers

Gross Receipt		23378612	
Less Grant Received & Utilized		1073541	
Balance Net Receipts		22305071	
Less: 15% of Net Receipts		3345761	
To be Utillised			18959310
Total Application		20234581.69	
Less Depriciation	102232		
Less Fixed Asset W/o	0		
Less Grant Exp.	1073541	1175773	
Revenue Application		19058809	
Capital Application for Purchase of fixed asset			
	135550	135550	
Total application for Current Year			19194359
Capital Application Flat Kanpur			0
(+) Short Utilization / (-) Utilization in respect of earlier year			-235049

BALANCES WITH REGIONAL COUNCIL / CENTRE / OFFICE

Regional Council-01 Delhi Haryana	52902.00
Regional Council-02 Punjab, Jammu & Kashmir	2415.00
Regional Council-03 Chandigarh & H.P	39268.00
Regional Council-04 Uttar Pradesh	37772.00
Regional Council-05 Uttarakhand	6810.00
Regional Council-06 Rajasthan	428338.00
Regional Council-07 Gujrat	21253.00
Regional Council-08 Maharastra	27543.50
Sub regional Council-08 B Mumbai	31743.00
Sub Regional Council-08 C Pune	8803.84
Sub Regional Council-08 D Kolhapur Sangli	6506.50
Regional Council-09 Madhya Pradesh	27578.00
Regional Council-10 Chattisgarh	22999.97
Regional Council-11 Andhra Pradesh	5628.00
Regional Council-12 Karnataka	2133.10
Sub Regional Council-12 A Bangalore	3759.51
Regional council-13 Tamil Nadu	125838.15
Regional Council-14 Kerala	38601.00
Regional Council-15 West Bengal	194786.00
Regional Council-16 Orissa	20421.40
Regional Council-17 Assam	16216.32
Regional Council-18 Tripura	59052.00
Regional council-19 Bihar	1183.00
Regional Council-20 Jharkhand	5545.60
Regional Council-21 Goa	332704.66
Regional Council-22, Telangana	31464.24
Bangalore Office	0.00
Chandigarh Office	36888.95
Dehradun Office	3216172.14
Speed Post Office, Nagpur	105681.00
Nagpur Office	642554.00
Pune office	207547.66
NANI-IAPT Kanpur	125487.52
Anveshika Kanpur	10393.64
	5895990.70

INDIAN ASSOCIATION OF PHYSICS TEACHERS,KANPUR

Statement of Fixed Assets as at 31st March-2021

FIXED ASSETS Schedule "A"

Particulars	Rate	WDV as on 01-04-2020	Addition More than 180 days	Addition Less than 180 days	Deduction	Total	Depreciation of the Year	WDV as on 31-03-2021
		Rs	Rs	Rs	Rs	Rs	Rs	Rs
COMPUTER (KANPUR)	40%	40537.14	0.00	56400.00	0.00	96937.14	27495.00	69442.14
FURNITURE (KANPUR)	10%	181202.58	0.00	0.00	0.00	181202.58	18120.00	163082.58
ELECTRIC ITEM (KANPUR)	15%	14742.72	0.00	0.00	0.00	14742.72	2211.00	12531.72
MOBILE KANPUR	15%	9032.53	0.00	20000.00	0.00	29032.53	2855.00	26177.53
FURNITURE (DEHRADUN)	10%	14276.79	8000	0.00	0.00	22276.79	2228.00	20048.79
PRINTER (DEHRADUN)	40%	752.88	0.00	0.00	0.00	752.88	301.00	451.88
COMPUTER (DEHRADUN)	40%	36304.64	39250.00	0.00	0.00	75554.64	30221.00	45333.64
COMPUTER (CHANDIGARH)	40%	133.17	0.00	11900.00	0.00	12033.17	2433.00	9600.17
FURNITURE (CHANDIGARH)	10%	7296.14	0.00	0.00	0.00	7296.14	730.00	6566.14
FURNITURE (RC-17)	10%	6112.81	0.00	0.00	0.00	6112.81	611.00	5501.81
PRINTER (BANGALORE)	40%	30.00	0.00	0.00	0.00	30.00	12.00	18.00
COMPUTER (BANGALORE)	40%	3713.22	0.00	0.00	0.00	3713.22	1485.00	2228.22
FURNITURE (BANGALORE)	10%	37332.28	0.00	0.00	0.00	37332.28	3733.00	33599.28
PRINTER (NAGPUR)	40%	3188.60	0.00	0.00	0.00	3188.60	1275.00	1913.60
FURNITURE (NAGPUR)	10%	6305.50	0.00	0.00	0.00	6305.50	631.00	5674.50
MOBILE (NAGPUR)	15%	4201.00	0.00	0.00	0.00	4201.00	630.00	3571.00
MOBILE (DEHRADUN)	15%	48407.00	0.00	0.00	0.00	48407.00	7261.00	41146.00
TOTAL		**413569.00**	**47250.00**	**88300.00**	**0.00**	**549119.00**	**102232.00**	**446887.00**

INDIAN ASSOCIATION OF PHYSICS TEACHERS,KANPUR
INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST MARCH-2021

EXPENDITURE	AMOUNT	INCOME		AMOUNT
Stationery, Conveyance,Postage		**SUBSCRIPTION,DONATION,**		
Telephone, Remuneration,Misc Exp.		Annual Member Ship	500.00	
Computer Maintenance,Office Rent		Student Membership	1750.00	
Legal Exp, Audit Fee		Donation	10000.00	
Electric Bill, Bank Charges	495355.15	Ministry of Tribal Affairs	85063.00	
Depriciation	102232.00	Institutional Membership	10000.00	**107313.00**
Bulletin Publication & Distribution		**Bulletin Receipt**		
		Contribution from DD Pant Fund	5000.00	
Printing , Postage,Telephone		Library Subscription	4000.00	
Address Pasting,Remuniration		Contribution from ISRO Corpus Fund	76000.00	
Software Maintenance,Misc.	264243.00	Contribution from DAE Corpus Fund	29000.00	
		Contribution from Infosys Corpus Fund	6000.00	
		Contribution from PRL Corpus Fund	2500.00	**122500.00**
		INTEREST		
		On Saving Bank Account	237941.00	
		On Fixed Deposited	1442693.00	**1680634.00**
ELCB Opening Stock of Books	109487.70	ELCB Receipt From Members	0.00	
		Books in Stock	109487.70	**109487.70**
NGPE- Exp.-2021	224290.00	**NGPE -2021**		
		Fee	523267.00	
		Contribution From Omega Endow Fund	2500.00	
		Sale of Raddi	8000.00	
		Old Q Paper	3000.00	**536767.00**
National Standared Exam EXP. 2020-21	16692375.38	**National Standared Exam 20-21**		
		Fee Received	18283160.00	
		Contribution from Murli Laj Chugani Fund	10000.00	
		Contribution from Sultan Chand Fund	3500.00	
		Q Paper Sale	20851.00	**18317511.00**
PM Care Fund Covid -19	141601.00	Donation Received Covid -19		141601.00
Kendriya Vidyalaya Workshop -2019-20	517761.00	Kendriya Vidyalaya Workshop Receipt		517761.00
Vigyan Prasar Workshop Exp.	558780.00	Vigyan Prasar Workshop Receipt		555780.00

EXPENDITURE	AMOUNT	INCOME	AMOUNT
Regional Council-01 Delhi & Haryana	2305.00	Regional Council-01 Delhi & Haryana	2584.00
Regional Council-02 Punjab & J K	0.00	Regional Council-02 Punjab & J K	138.00
Regional Council-03 Chandigarh,HP	0.00	Regional Council-03 Chandigarh,H P	1159.00
Regional Council-04 Uttar Pradesh	1500.00	Regional Council-04 Uttar Pradesh	899.00
Regional Council-05 Uttarakhand	6.00	Regional Council-05 Uttarakhand	329.00
Regional Council-06 Rajasthan	632534.00	Regional Council-06 Rajasthan	958025.00
Regional Council-07 Gujrat 2019-20 to 2020-21	178681.00	Regional Council -07 Gujarat 2019-20 &2020-21	136356.00
Regional Council-08 Maharastra	4479.00	Regional Council -08 Maharastra	20927.00
Sub Regional Council 08B Mumbai 2019-20 to 2020-21	70803.00	Sub Regional Council 08B Mumbai 2019-20 to 20-21	62515.00
Regional Council Sub -08 C Pune	25309.16	Sub Regional Counclil-08 C Pune	714.00
Regional Council Sub-8 D Kplhapur/ Sangli	300.00	Regional Council Sub-8 D Kplhapur/ Sangli	132.00
Regional Council-09 Madhya Pradesh	67500.00	Sub Regional Council -09 Madhya Pradesh	2096.00
Regional Council-10 Chattisgarh 2019-20 to 2020-21	2973.56	Regional Council-10 Chattisgarh 2019-20 to 2020-21	0.00
Regional Council-11 Andhra Pradesh 2019-20 & 2020-21	3000.00	Regional Council-11 Andhra Pradesh 2019-20 & 20-21	1535.00
Regional Council-12 Karnataka	7047.46	Regional Council-12 Karnataka	0.00
Regional Council-12 A Bangalore	1236.00	Regional Council-12 A Bangalore	1437.91
Regional Council-15 West Bengal	34140.00	Regional Council-15 West Bengal	8651.00
Regional Council-16 Orissa	1000.00	Regional Council-16 Orissa	600.00
Regional Council-17 Assam 2019-20 & 2020-21	82393.86	Regional Council-17 Assam 2019-20 & 2020-21	57262.00
Regional Council-18 Tripura	500.00	Regional Council-18 Tripura	2079.00
Regional Council-20 Jharkhand	1252.90	Regional Council-20 Jharkhand	422.00
Regional Council-21 Goa 2019-20	10846.70	Regional Council-21 Goa 2019-20	31396.00
Regional Council-22 Telangana	649.00	Regional Council-22 Telangana	0.00
Excess of Income over Expenditure Transferred to Balance Sheet	**3144029.61**		
Total Rs.	**23378611.48**		**23378611.61**

Significant Accounting Policies are as per Annexure "AP"

AUDITORS REPORT

In Terms of our Report of Even Data Attached Herewith

For PEE KEY JAIPURIA & CO

CHARTERED ACCOUNTANTS

Firm Registration No. :001335C

Sd	Sd	Sd	Sd
PARTNER : Radha Kanodia	**President**	**Secretary**	**Treasurer**

M No. 073806

Place : Kanpur

Date 12.02.2022

INDIAN ASSOCIATION OF PHYSICS TEACHERS

BALANCE SHEET AS AT 31ST MARCH-2021

LIABILITIES			AMOUNT	ASSETS	AMOUNT
CAPITAL FUND				**FIXED ASSETS**	446887.00
				Project Expenses to Nivim Nagpur	750000.00
[A] IAPT Life Members Fund				**INVENTORIES**	
As per Last Balance Sheet	6181227.00			ELCB [STOCK OF BOOKS]	109487.70
Add: Recd. During the Year	268500.00		**6449727.00**	SECURITY DEPOSITED	3000.00
				Univ. of Kota Under RC-06 Rajasthan	0.00
[B] GENERAL FUND				IAPT MEMBERS FUND CASH/ BANK	6649765.50
As per Last Balance Sheet	33984291.22			**FLAT KANPUR**	**4557500.00**
Add.Excess of Income over Expenditure	3144029.92	37128321.14		**CASH /BANK BALANCE**	20898202.04
Less Expenses				Tax deduted at soure	512116.00
Bulletin Printing	493898.00			Amount Adjusted Against Demand	268130.00
Student Activity	1838515.00			Accrued Intt. Central Bank of India, Dehradun	407533.00
Workshop Exp.	607617.00			Accrued Intt. Indian Bank Kakadeo, Kanpur	35831.00
office maintinace	53119.00	2993149.00	**34135172.14**	Accrued Intt. Indian Bank , Dehradun	140526.00
IAPT Building Fund as Per Contra			764817.50	IAPT Building Fund As Per Contra	759837.50
Advance:- Due To			521624.10	**ADVANCE DUE FROM**	539802.30
Audit Fee Regional Council-19 Bihar			1000.00	**BALANCE WITH REGIONAL COUNCIL/CENTRE /OFFICE**	5895990.70
Audit fee Sub Regional Council-08 D Kolhapur			200.00		
Parmesh Printer			44.00		
Schamatics Minining P Ltd Dehradun			328.00		
sharda Graphics P Ltd			2901.00		
ENDOWMENT FUND AS PER CONTRA				**ENDOWMENT FUND AS PER CONTRA**	
IAPT - DD PANT ENDOWMENT FUND			139739.60	IAPT-DD PANT FUND	138087.60
IAPT-SULTAN CHAND TRUST FUND			43390.00	IAPT-SULTAN CHAND FUND	43059.00
IAPT-OMEGA TRUST FUND			33085.00	IAPT-OMEGA TRUST ENDOWMENT FUND	32941.00
IAPT-MURLI LAJ CHUGANI FUND			130230.25	IAPT-MURLI LAJ CHUGANI ENDOWMENT FUND	129146.25
CORPUS FUND AS PER CONTRA				**CORPUS FUND AS PER CONTRA**	
IAPT- ISRO CORPUS FUND			1026822.00	IAPT-ISRO CORPUS FUND	1015699.00
IAPT-INFOSYS CORPUS FUND			105245.00	IAPT-INFOSYS CORPUS FUND	104130.00
IAPT-PRL CORPUS FUND			25372.00	IAPT-PRL CORPUS FUND	25084.00
IAPT- DAE CORPUS FUND			533705.00	IAPT- DAE CORPUS FUND	527251.00
IAPT-STUDENTS EDU. DEVELOPMENT CORPUS FUND			54350.00	IAPT-STUDENTS EDU CORPUS FUND	53952.00
IAPT- DENABANDHU SAHU MEMORIAL AWARD CORPUS FUND			521234.00	IAPT- DENABANDHU SAHU MEMORIAL AWARD CORPUS FUND	525070.00
IAPT- PRAGAANI TARANG GUJARATI PUB CORPUS FUND			1133109.00	IAPT- PRAGAANI TARANG GUJARATI PUB CORPUS FUND	1122234.00
IAPT-SHILPA NAND KUMAR CORPUS FUND			678362.00	IAPT-SHILPA NAND KUMAR CORPUS FUND	628249.00
IAPT- MIDNAPORE COLLEGE CSC D.P KHANDELWAL FUND			1846517.00	IAPT- MIDNAPORE COLLEGE CSC D.P KHANDELWAL FUND	1827463.00
TOTAL Rs.			**48146974.59**	**TOTAL Rs.**	**48146974.59**

Significant Accounting Policies are as per Annexure"AP"

AUDITORS REPORT

In Terms of our Report of Even Data Attached Herewith

For PEE KAY JAIPURIA & Co

CHARTERED ACCOUNTANT

PARTNER: Radha Kanodia

M No.: 073806

Place : kanpur

Date 12 Feb -2022

Sd
President

Sd.
Secretary

Sd
Treasurer

ANNEXURE - 1

Khandelwal Centenary Committee Activities

KCC activities started after the announcement in the first online meeting of the EC in June, 2020. It began with the dedication, of NGPE Part C 2020 held in August in hybrid platform, to Dr D P Khandelwal. Then on 1st October,2020 IAPT observed the birthday of Dr D P Khandelwal formally with the initiative of IAPT RC 10 and IAPT-Midnapore College Centre for Scientific Culture. Afterwards IAPT formed the Committee and its first meeting was held on 7&8 December,2020. In this two-day meeting the Committee chalked out the celebration programme. The report of this meeting appeared in the January 2021 issue of the Bulletin.

The first major activity of the KCC was KSSS on NSD, 28 th February, 2021 and 1st March, 2021with Dr T R Ananthakrishnan as coordinator. The report of the activities, the KCC had organized in the period upto 1st October, 2021, the 100th birth anniversary of DPK, has been reported in the November issue of the Bull,2021. Even after that Prof R Ghorparde coordinated webinar on the use of smart phone in physics experiments, Prof OSKS Sastri and Prof P K Ahluwalia together organized a weeklong Faculty Development Programme on Computational Physics. In the month of November IAPT organized NSSP under the supervision of Prof G Venkatesh and P Nagaraju in Bangalore and IAPT Annual Convention 2021 in Indore, led by Dr P K Dubey and Dr U Sharma; both the events were dedicated to DPK. Prof R Bhattacharjee has remained busy with planning and organizing APhO 2022, dedicated to DPK, in Dehradun.

It is true that KCC organized impressive activities but it still feels that RC level activities for paying tribute to DPK were not that significant. Moreover, due to pandemic reasons some proposed activities such as writing biography & commemorative volume and publishing collected works etc are unfinished.

So IAPT decided to extend the KCC activities up to the IAPT Annual Convention 2022.

In this extension period, the KCC has decided to organize activities at the RC level. For this purpose the KCC is in the process of organizing its Zonal Groups under the supervision of the present VP and the immediate past VP of each of the five Zones. The VP General, Prof H C Verma would coordinate the works of the five Zonal Groups. In fact he has suggested a road map for centenary related activities in the rural areas.

In this connection, it is to be mentioned KCC is planning to explore collaborative activities with Atal Tinkering Labs in schools. GOI has established 10,000+ ATLs at a cost of 2000+ crores of rupees. But the most ATLs do not have the expertise they need for proper utilization of the resources they have been given for acquainting our young learners with advanced technology. Again IAPT members rightly lament they have no fund to take up activities. It is true ATLs have enough material and financial resources but dearth of expertise and IAPT does not have fund. So, with collaboration between IAPT and ATL, miracles may happen in the realm of science education- DPK's dream of Model HS lab is realised. To begin with the RC01 and RC15 are thinking aloud to organize awareness webinars on Arduino hardware, the heart of ATL. The other RCs like 12a, 8, 4 and 17 may follow suit.

For analysing the data obtained from the Survey work a three- member group has been formed with Prof Ghorpade, Dr V Wagh and Dr K S Mann. It is expected the outcomes of the survey would be published very soon.

In the last one year or so a good number of commemorative articles have been authored by friends, students and relatives of DPK and have been published in the Bulletin. We expect more such write-ups would appear in the Bulletin. Prof Y K Vijay, with the help of the others, is engaged in compilation of these articles into a Volume so that interested people can use it for their talk on DPK. Finally, this would help KCC to publish the DPK Commemorative Volume.

We are not ambitious, but even to bring out an ordinary but appreciable Biography of DPK, we have still to do much research on his philosophy, outlook and lifestyle. We also have to find the people, the events, the works in which his footprints are impregnated. Most of his mainstream research articles are available from NDLI, IIT, Kharagpur. However, it is difficult to find his articles on physics education, different projects, physics curriculum and the books authored by him. From this august assembly, we appeal to everybody in finding these precious documents as well as biographical evidences and share them with KCC. This would help a lot for paying homage to this great man, Dr D P Khandelwal on the occasion of his Birth Centenary.

S. C. Samanta
Convenor

ANNEXURE - 2

Agenda Emerging from IAPT Elections

Virtual EC Meeting 21.01.22

PK Ahluwalia
President IAPT

Reaching the Unreached

- IAPT's thurstof activities should be spread in rural schools/colleges/Universities. Today, tools of Information Technology can help us achieve this dream very effectively and Qualitatively. For this we can undertake the task of developing 5 to 10 minute spoken tutorials of problem solving and create IAPT'S Physics Tutorial bank in all the major languages of region of operation of all Regional Councils and a master tutorial in English for each problem. We have very successful models to undertake this task.
- For each problem master tutorialcan be made in English, which can then be dubbed in language/s of the Regional Councils
- With a Tutorial Development workshop this plan can be initiated. It will be developed by well knit team of volunteers in the country drawn from each region with the help of three core central teams.

learning enhancement initiative of IAPT

- This is a proposal for using Digital Platforms for Qualitative Improvement of Performance of students by conducting IAPT's**Moodle's Multilingual Question Bank and Mock testing as an year long activity for conducting 20 online Mock Tests.**
- Just for registration purpose we can have some nominal fee of say Rs. 5 per test i.e. at a cost of Rs100 per year. It will also open a similar window for IAPT as national Standard examinations do, particularly for rural/small city students who have no access to quality testing and preparation for entrance tests. These tests can help IAPT identify core areas of physics curriculum where students havelearning gaps and provide them feedback to overcome such gaps.
- We can set up teams to focus on schools (upto10th, 11th and 12 classes),UG students andPG students separately to implementthis plan.

IAPT Fellow Program

- This will include both **Young Fellows and Senior Fellows**. This can be implemented through a search Committee especially made for this purpose by inviting nominations or by inclusion of eminent names by the search Committee itself.
- The purpose of Young Fellows is to include enterprising persons who have demonstrated their activities gelling with the Mission and Vision of IAPT.
- This can help bring in more young people whose involvement is a must to carry forward the work of IAPT.
- Fellows can be given a citation and an IAPT Medal, named after **Prof. DP Khandelwal** as a symbol of gratitude for their dedication and work.

Empowering Regional Councils

Regional Councils of IAPT are the hubs of activities of IAPT and make the backbone of all its initiativesand agenda.

Strengthening of these hubs is the only way to strengthen IAPT both in offline and online mode. With lot of discussion with fellow members following 7 point programme of IAPT to energize Regional and sub-regional Councils emerged.

Empowering Regional Councils

1. Our Constitution has put Regional Councils as the

key initiators of the work on ground: academic, organizational and resource creators by shaking hands with stakeholders and finance supporters. Innovative ideas are needed to strengthen these vital links for keeping network of the association strong enough to deliver the goods.

2. For this, we need to have **academic/work calendar** of the RC's, ready by 30th of January each year and **made public as a commitment** to set the work rolling. In these calendars common links can also be identified to run programs nationally, region wise and at the local level with a **reach to fund providers both Government and Private.**

3. One of the ways to strengthen work at the local level can be through **adoption of near by schools/ institutions by volunteers of IAPT** as has been talked in almost every national policy since independence. This can be spearheaded by a team at national level in a coordinated manner.

4. **Indifference to laboratory work**. I am afraid to add that the new generation of teachers who are entering profession have come out of the system with the notion that experiments are of no importance and the prevailing system delivers the marks whether you do some thing or not. It is not lack of resources it is the lack of attitude on the parts of the teachers which requires a change. IAPT at Regional council levels must address this behavioural problem with the kind of programs being run in JNCASR, Bangalore which was shared in the Hyderabad Symposium as a wonderful pilot study.

Empowering Regional Councils

1. Regional Councils must shake hands with HBCSE, IITs, IISERs and NITs and District science Centers to become part of their **out reach Programmes by signing MOUs with them by IAPT** offering itself as human resource provider along with the faculty of these institutions.

2. To motivate Regional councils and sub regional councils, **it is proposed that we create a competitive spirit among the Regional Councils and they must be awarded cash prizes as an incentive to work further and motivation to other regional councils.**

3. To conduct such Programmes both human resources and financial resources are needed. *In the last two years we have witnessed a financial crunch at the central level and initiation of decoupling of Physics olympiads from National Standard Examination of Physics and taking over of its conduct by HBCSE. Not a making of IAPT but we will have to think about its impact and ways to overcome it and continue to run our own national standard examinations as a grass root activity of IAPT and not see it only as selecting students for physics olympiads, a good aim but not an end in itself.* My humble proposal is to continue this as a **flagship examination**to raise the quality of physics at crucial stages of learning.

IAPT examination

- The National standard examination has been a great idea of Prof Khandelwal. At that time, in the absence of an all India examination, it was the need of the hour. It served the students community in helping to compare with national standard. Subsequently it became the first round of selection for Olympiad team. It gained popularity and numbers. It is one of the most successful programmes of IAPT. There is a need to relook at it. There is a plethora of exams at all levels mostly based on MCQs. However, there are no exams that evaluate the twenty first century skills useful in physics. There is a need to orient our NSEs in this direction.

From Prof. Venkatesh's Mail

Acknowledgements

Prof. Venkatesh

All the IAPT members who contributed a lot in getting to this agenda

A Humble Tribute to Late Prof. D.P. Khandelwal

Rabindranath Chattopadhyay
Asst. Teacher(Physics), Haripal G.D.Institution,712403,Hooghly,W.B.,India

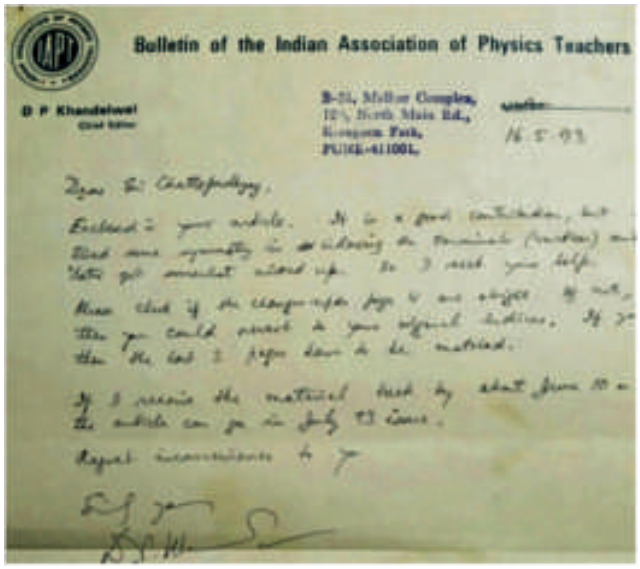
It is my own perception perhaps Prof. D.P. Khandelwal was the first person in India , as I do not know about other countries in this context ,who planted truly the seeds of pure Physics-Education in the country. As we all know ,as of course told by many great men of our country such as Sri Aurobinda , Swami Vivekananda that the proper education is which promotes an all-round well-being of 'self' that can be achieved through devotion ,dedicationand drive all of which must be interconnected towards a fixed 'eye-of-the-fish' target. And the term 'all-round well-being' inherently is contended with not

ego-centric individual but with echoing assembly of motivated persons. Not allpersons have the charisma of being something like a 'great attract or' who being at the centre has the capability of propagating the pulse of influence equally in all directions. Prof. D.P. Khandelwal was a person of that charisma.

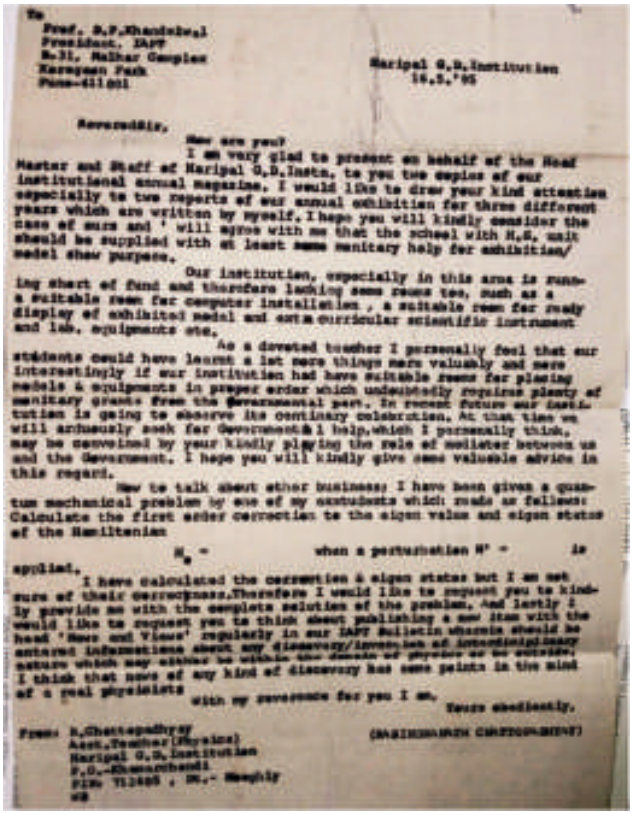
Involvement, passion for a positive outcome, sympathetic anthropophiliac and centophiliac

judgment and appreciation in direct or indirect interactions are the fundamental virtues of a great teacher all of which were embedded in the character of Late Prof. Khandelwal. I feel myself fortunate to have favour from him and he Along with others like Prof. A.W. Joshi, Prof. V. Srinivasan , Prof. H.R.Anand,

Prof. A.S. Nigavekar was my pen-teacher. I communicated many articles and letters on various matters of academic interest to him almost all of which were responded elaborately with much love and affection by such a busy person like him. I am attaching here with copies of some such letters, which may reveal the truth of my words;


Bulletin of the Indian Association of Physics Teachers

D P Khandelwal


Haripal G.D.Institution
16.3.'95

Prof. D.P.Khandelwal
President, IAPT

Reverend Sir,

How are you?

I am very glad to present on behalf of the Head Master and Staff of Haripal G.D.Instn, to you two copies of our institutional annual magazine. I would like to draw your kind attention especially to two reports of our annual exhibition for three different years which are written by myself. I hope you will kindly consider the case of ours and I will agree with me that the school with H.S. unit should be supplied with at least some sanitary help for exhibition/ model show purpose.

Our institution, especially in this area is running short of fund and therefore lacking some rooms too, such as a suitable room for computer installation , a suitable room for ready display of exhibited model and extra curricular scientific instrument and lab. equipments etc.

As a devoted teacher I personally feel that our students could have learnt a lot more things more valuably and more interestingly if our institution had have suitable rooms for placing models & equipments in proper order which undoubtedly requires plenty of sanitary grants from the Governmental part. In recent future our institution is going to observe its centinary celebration. At that time we will arduously seek for Government& l help,which I personally think, may be canvonised by your kindly playing the role of mediator between us and the Government. I hope you will kindly give some valuable advice in this regard.

Now to talk about other business; I have been given a quantum mechanical problem by one of my sextudents which reads as follows: Calculate the first order correction to the eigen value and eigen states of the Hamiltonian

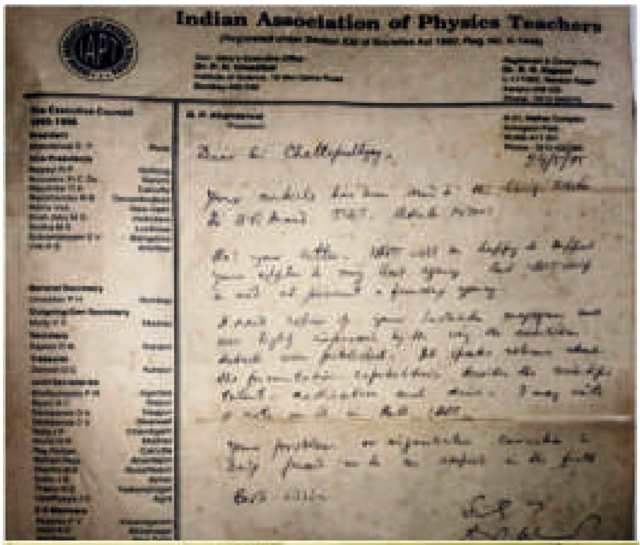
H_0 = when a perturbation H' = is applied.

I have calculated the correction & eigen states but I am not sure of their correctness.Therefore I would like to request you to kindly provide me with the complete solution of the problem. And lastly I would like to request you to think about publishing a new item with the head 'News and Views' regularly in our IAPT Bulletin wherein should be entered informations about any discovery/invention of interdisciplinary nature which may either be within the domain of physics or be outside. I think that news of any kind of discovery has some points in the mind of a real physicists

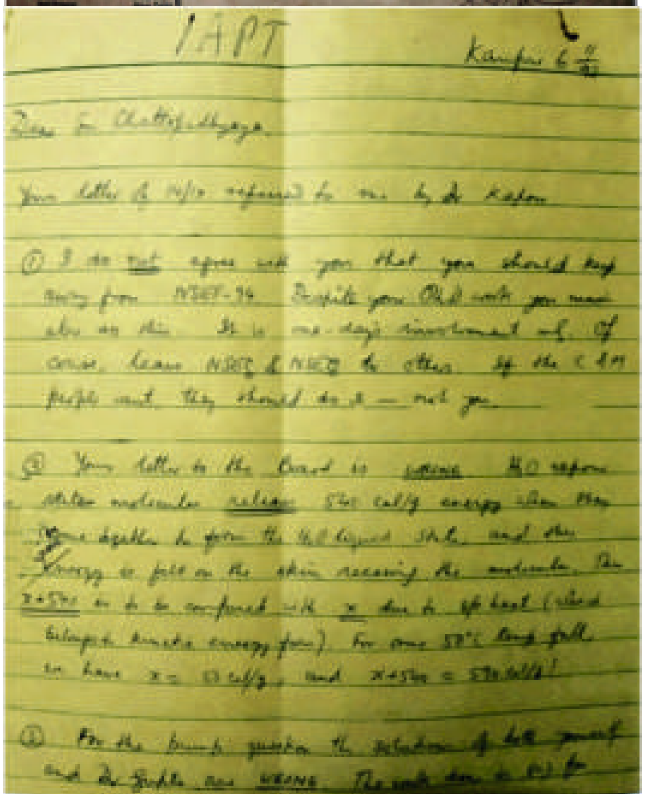
With my reverence for you I am,

Yours obediently,

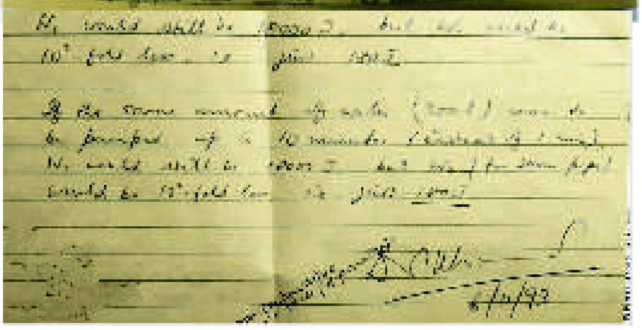
From: R.Chattopadhyay
Asst.Teacher(Physics)
Haripal G.D.Institution
P.O.-Khanakhanali
PIN: 712405 , Dt.- Hooghly

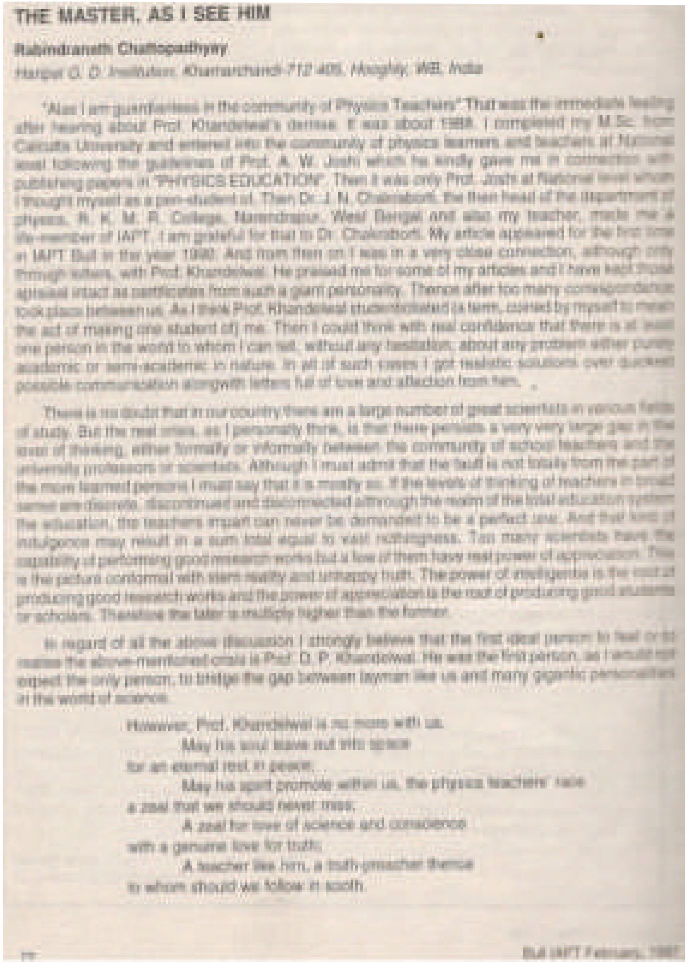


Indian Association of Physics Teachers



IAPT





THE MASTER, AS I SEE HIM

Rabindranath Chattopadhyay
Haripal G. D. Institution, Khamarchandi-712 405, Hooghly, WB, India

"Alas I am guardianless in the community of Physics Teachers" That was the immediate feeling after hearing about Prof. Khandelwal's demise. It was about 1988. I completed my M.Sc. from Calcutta University and entered into the community of physics learners and teachers at National level following the guidelines of Prof. A. W. Joshi which he kindly gave me in connection with publishing papers in "PHYSICS EDUCATION". Then it was only Prof. Joshi at National level whom I thought myself as a pen-student of. Then Dr. J. N. Chakraborti, the then head of the department of physics, R. K. M. R. College, Narendrapur, West Bengal and also my teacher, made me a life-member of IAPT. I am grateful for that to Dr. Chakraborti. My article appeared for the first time in IAPT Bull in the year 1990. And from then on I was in a very close connection, although only through letters, with Prof. Khandelwal. He praised me for some of my articles and I have kept those appraisal intact as certificates from such a giant personality. Thence after too many correspondence took place between us. As I think Prof. Khandelwal studentkilised (a term, coined by myself to mean the act of making one student of) me. Then I could think with real confidence that there is at least one person in the world to whom I can tell, without any hesitation, about any problem either purely academic or semi-academic in nature. In all of such cases I got realistic solutions over quickest possible communication alongwith letters full of love and affection from him.

There is no doubt that in our country there are a large number of great scientists in various fields of study. But the real crisis, as I personally think, is that there persists a very very large gap in the level of thinking, either formally or informally between the community of school teachers and the university professors or scientists. Although I must admit that the fault is not totally from the part of the more learned persons I must say that it is mostly so. If the levels of thinking of teachers in broad sense are discrete, discontinued and disconnected all through the realm of the total education system the education, the teachers impart can never be demanded to be a perfect one. And that kind of indulgence may result in a sum total equal to vast nothingness. Too many scientists have the capability of performing good research works but a few of them have real power of appreciation. This is the picture conformal with stern reality and unhappy truth. The power of intelligence is the root of producing good research works and the power of appreciation is the root of producing good students or scholars. Therefore the later is multiply higher than the former.

In regard of all the above discussion I strongly believe that the first ideal person to feel or to realise the above-mentioned crisis is Prof. D. P. Khandelwal. He was the first person, as I would not expect the only person, to bridge the gap between layman like us and many gigantic personalities in the world of science.

However, Prof. Khandelwal is no more with us.
May his soul leave out into space
for an eternal rest in peace.
May his spirit promote within us, the physics teachers' race
a zeal that we should never miss.
A zeal for love of science and conscience
with a genuine love for truth.
A teacher like him, a truth-preacher thence
to whom should we follow in sooth.

77 Bull IAPT February, 1997

(8)

However great rank as a scientist a person holds his greatness is always referred to his Humanity. Affinity to and association with inferiors through any kind of dedication are basic elements of that Humanity. The superior sometimes need to devote some times and labour for that. No person ,begging pardon if anybody feel it exaggerated I have the experience of in my life is parallel to Late Prof. D.P. Khandelwal in these regards.

It is my great fortune that the Birth-Centenary-Celebration committee has given me the opportunity to express my view with gratitude and respect to that great soul of Prof. D.P. Khandelwal. Mypranama to his soul rests in peace in his heavenly abode.

D P K Blessings to me

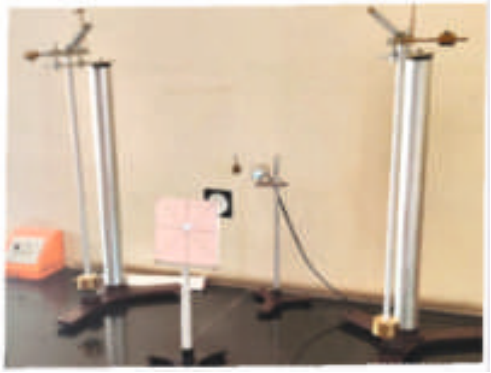
Y K Vijay, (Retd) University of Rajasthan, Jaipur

President IAPT RC-6

I had opportunity to learn basic concepts of physics during golden time, 1977- 78, when Prof D P Khandelwal (DPK), was at the University of Rajasthan, Jaipur as a visiting professor on invitation of Prof. Babulal Saraf(BLS), to optimise the contents of the book, Physics Through Experiment Vol. II, Mechanical Systems.

I passed MSc from Kota (1975) and joined PhD program in the group of Prof. Saraf. During that time a museum was set up in Vigyan Bhawan, main building where several mechanical models were displayed on Oscillations, waves, Air Track, Mechanical Transmission line etc. While moving in the corridor of the building, we used to watch a very sincere, dedicated person, taking data on these setups and plotting graph writing comments. We learned, he was DPK from Kanpur. Many times, we enjoyed discussions amongst DPK, BLS and Prof S Lokanathan, in the staff room on tea table. A few things, I still remember and like to share here.

1. A mechanical resonance setup, he used to adjust the time period of a bar pendulum by sliding mass up and down. Another similar bar pendulum, was coupled with a string and mass system. The response of energy transfer was observable on Lissajous figure. I had a notion that the energy transfer is maximum when time period of both are same and they move in same phase, but it was wrong. It was only during that time I learnt that, the energy transfer is maximum when the phase difference between driver and driven system is 90 degrees. DPK justified and explained using the Lissajous figure, as illustrated in figure 1.

(a) 

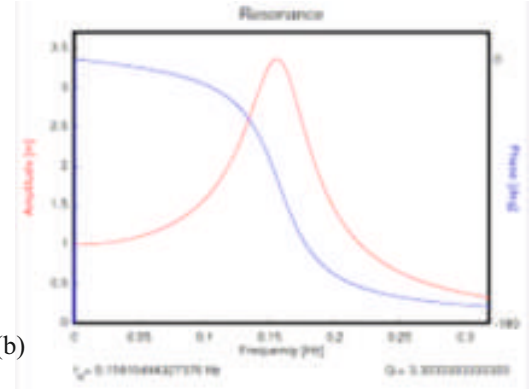
(b) 

Figure 1. Shows the DPK typical data of bar pendulum, time period 1.6 sec. At resonance, one gets circle

2. Coupled Oscillator system, always fascinated every one due to energy transfer time and coupling strength. DPK suggested, can you connect a driver to a coupled oscillator system to get independent resonance peaks, corresponding to two steady states. It was difficult to set up using simple pendulum or bar pendulum. Later a setup using two strip oscillators, mounted on one pillar was developed and it was coupled to another maintained strip oscillator. It demonstrated the same idea given by DPK, he was very happy to see it, as I share the picture of 1991.

Figure 2 Coupled strip oscillator system demonstrated at IAPT Teaching Aid Contest 1991.

3. Potential Energy diagram: DPK explained and demonstrated different potential energy diagrams on a linear Air Track, which was developed at CDPE, University of Rajasthan, Jaipur. He verified most of the data reported in the book Lab Manual. He explained combination of gravitational and magnetic potentials. In another teaching aid contest organized by IAPT, where Dr. V C Sahni of BARC Mumbai, was invited as chief guest, DPK appreciated the importance of anharmonic oscillations through modified bar pendulum.

Figure 3. A picture with Dr. V C Sahni, at IAPT Teaching aid contest, 1990

.

DPK encouraged several IAPT members to develop innovative experiments and emphasized quality teaching and confidence building amongst teachers.

Figure 4 Teaching Aid Contest at Ruparel College, Mumbai, 1990

WE at the IAPT RC-6, developed an Innovation Hub Science Gallery, with the theme: Science for Everyone, Play Enjoy and Learn, developed over 50 working models to learn fundamental science principles. During the last five years, over 30 such innovation hubs are established all over the country as one of the main objectives of IAPT as DPK imagined during 1980-84.

He initiated Centres of Science Culture (CSC) at four places in the country during 1992-93, at Midnapore, Nagpur, Pune and Madurai, however till recent time only Midnapore centre could survive under the guidance of Dr.Samanta, who has been coordinator for the DPK Centenary year celebration.

On this very occasion, the 25th Innovation Hub was established at Midnapore Science College, Midanapore.

Figure 5.Dr.Samanta with his colleague at CSC to Innovation Hub up gradation in 2021

By sharing my memories, I feel obliged to IAPT authorities, who havegiven us responsibility to compile the biography of late Prof D P Khandelwal, with my colleague Prof. B K Srivastava. I owe it all to the DPK's blessings to me.

List of New Member from 01.01.2021 to 31.03.2022
Member from 13471-L8500 To 13699-L8698

OMNO	Membership No.	Name	City	Pincode
		DELHI		
13422	L8463	Rakesh Kumar Meena	New Delhi	110019
13519	L8541	Sanjeev Kumar Chamoli	Delhi	110007
13619	L8625	Surjan Singh	New Delhi	110018
13499	L8526	Shri Krishan Dahiya	New Delhi	110029
13505	L8530	Praveen Sankaran	New Delhi	110037
13506	L8531	Vaibhav Varun	New Delhi	110037
13533	L8547	Nitika Mangla	New Delhi	110044
13551	L8564	Dr. Savita Gaur J	Delhi	110054
13542	L8555	Monika Sindhwani	New Delhi	110056
13473	L8502	Priyadarshinee Ghose	New Delhi	110064
13651	L8657	Ish Kumar Gogia	Delhi	110085
13625	L8631	Dr. Sharmistha Lahiry	Delhi	110087
		HARYANA		
13594	L8600	Jaswant Belhara	Rohtak	124001
13662	L8666	Mr. Rahul	Morwala	127307
13637	L8643	Dr. Vikram Sagar	Panchkula	134112
13476	L8505	Hardev Singh	Kurukshetra	136119
		PUNJAB		
13536	L8550	Dr. Shalini Sharma	Mohali	140307
13634	L8640	Varinder Singh	Doraha	141421
1365	L0947	Dr. Saleh Mohd Alladin	Jalandhar	143516
13696	L8695	Gurpreet Singh	Jalandhar	144003
13502	L8528	Dr. Shishram Rebari	Jalandhar	144011
13657	L8661	Dr. Rajesh Singh	Hoshiarpur	144209
13683	L8682	Dr. Poonam Uniyal	Patiala	147001
13644	L8650	Dr. Prabhdeep Kaur	Longowal	148106
13544	L8557	Surinder Singh Gill	Firozpur City	152002
13471	L8500	Miss Nadia	Guruharsahai	152022
13472	L8501	Asma Bajaj	Guruharsahai	152022
13509	*2101	Kawaljeet Kaur Bindra	Muktsar	152107
		HIMANCHAL PRADESH		
13617	L8623	Dr. Amarjeet Singh	Shimla	171005
13584	L8597	Dr. Kirti Singha	Shimla	171009
13592	L2108	Monika Chandel	Shimla	171009
13570	L8583	Mandeep Singh Gandhi	Poonta Sahib	173025
13614	L8620	Gun Anit Kaur	Solan	173229
13532	L8546	Nisha Vaidya	Mandi	175001
13534	L8548	Gulshan Mahajan	Karsog	175011
13638	L8644	Dr. Raman	Kangra	176036
13583	L8596	Gourishankar Sahoo	Kangra	176206
13524	L8544	Dr. Jyoti Bhardwaj	Dharamshala	176215
13674	L8677	Shikha Awasthi	Dharamshala	176215
13667	L8671	Dr. Vimal Sharma	Hamirpur	177005
13672	L8676	Dr. Arvind Kumar Gathania	Hamirpur	177005
13626	L8632	Vikas Dhiman	Chintpurni	177110
		JAMMU & KASHMIR		
13521	L8543	Rakesh Singh Charak	Udhampur	182101
13633	L8639	Dr. Sunil Kumar Wanchoo	Katra	182320
13539	L8553	Dr. Rajau Kumar Pandita	Srinagar	190001
13517	L8540	Mohd. Zubair Ansari	Srinagar	190006
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13642	L8648	Dr. Meetu Luthra	Noida	201301
13516	L8539	Mohit Singh	Auraiya	206129
13676	L8679	Archana Singh	Kanpur	208015
13664	L8668	Neeraj Kumar Singh	Prayagraj	211002
13563	L8576	Dr. Upendra Kumar	Prayagraj	211015

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13508	S2201	Vasudev Sharma	Muzaffar Nagar	251002
13522	*2101	Abhay Sharma	lakhimpur Kheri	262902
13668	L8672	Dhananjay Gujar	Mathura	281004
13558	L8571	Manoj Kumar Singh	Mathura	281406
		UTTARAKHAND		
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13620	L8626	Devendra Kumar	Roorkee	247667
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13611	L8617	Shivani Pattnaik	Dehradun	248001
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13660	L8664	Rockey Choudhary	Dehradun	248001
13597	L8603	Dr. Vishal Chauhan	Dehradun	248002
13480	L8509	Dr. Santosh Dubey	Dehradun	248007
13510	L8533	Dr. Ashish Mathur	Dehradun	248007
13564	L8577	Dr. Rishi Dewan	Dehradun	248007
13572	L8585	Dr. Devendra Pal Singh	Dehradun	248007
13682	L8681	Dr. Neha Batra	Haridwar	249404
13632	L8638	Ashvini Kumar	Haridwar	249407
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13576	L8589	Amanpal Singh Clair	Jaipur	302004
13574	L8587	Tara Chand Badiwal	Jaipur	302029
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13552	L8565	Jitendra Kumar Bairwa	Dausa	303504
13475	L8504	Brijesh Kumar Singh	Ajmer	305817
13669	L8673	Himanshu Jain	Bhilwara	311202
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13631	L8637	Sardar Singh Rao	Udaipur	313001
13490	L8517	Patel Ram Suthar	Sri Ganga Nagar	335001
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13483	L8512	Dr. Mukesh . J. Keshwani	Rajkot	360003
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13553	L8566	Smita Bhupendrakumar Chhag	Veraval	362265
13554	L8567	Pradeepsinh Janaksinh Jadeja	Veraval	362265
13649	L8655	Kirtikumar Rambhai Patel	Mehsana	384002
13647	L8653	Prakrutiben Ganeshbhai Chaudhari	Patan	384265
13648	L8654	Rushiben Jaysinh Parmar	Patan	384265
13650	L8656	Niravkumar Hareshbhai Thakkar	Patan	384265
13698	L8697	Dhananjay Kanjibhai Dhruv	Bakrol	388315
13547	L8560	Parthesh Yogeshbhai Parekh	Surat	395005
13496	L8523	Neha Bhatnagar	Surat	395410
		GOA		
13628	L8634	Shravan Sadashive Marathe	Mapusa	403507
13684	L8683	Aryan Ritesh Nigam	Zuarinagar	403726
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13677	L8680	Kamlesh Vasntrao Chandekar	Navi Mumbai	400703
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13561	L8574	Siddarth Vinod Soni	Dahisar	401303
13546	L8559	S. Seshan	Palghar	401504
13663	L8667	Arjina Mukhtar Shaikh	Pune	411001
13575	L8588	Raosaheb Ganpat Salunke	Pune	411030
13494	L8521	Snehal Sayajrao Wagh	Pune	411038
13579	L8592	Lahu Hanmatrao Kothwate	Latur	413512
13599	L8605	Nilkanth Dattatray Vagshette	Udgir	413517
13600	L8606	Manoj Shripati Khandekar	Latur	413517
13489	‘L8516	Somshankar Virnath Rajmane	Osmanabad	413603
13670	L8674	Ashwini Bhagwanrao Salunkhe	Kolhapur	416004

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13641	L8647	Dr. Bharati Nandkishor Patil	Nagpur	440022
13640	L8646	Dr. Vikrant Yashwant Ganvir	Nagpur	440037
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13568	L8581	Dhanshree Dattatray Kothekar	Washim	445202
		MADHYA PRADESH		
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13512	L8535	Amika Birle	Khargone	451001
13513	L8536	Dr. Dinesh Chaudhary	Khargone	451001
13514	L8537	Lalit Kumar Bhatiniya	Khargone	451001
13515	L8538	Aishwarya Dilaware	Khargaon	451001
13609	L8615	Surya Prakash Jaiswal	Indore	452009
13665	L8669	Dr. Parasharam Maruti Shirage	Indore	453552
13658	L8662	Dr. Ekta Jain	Bhopal	462016
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13501	L8527	Ritesh Goel	Gwalior	474001
13565	L8578	Arvind Dhruve	Chhindwara	480001
13477	L8506	Ruchi Nigam	Jabalpur	482011
13478	L8507	Bhavana Singh	Jabalpur	482011
13479	L8508	Durgesh Nandini Nagwanshi	Jabalpur	482011
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13693	L8692	Manda Sai Prashanthi	Hyderabad	500028
13694	L8693	W.Jaya Selva Vinitha	Hyderabad	500028
13695	L8694	Dr. Seetha Mahalakshmi Y	Hyderabad	500028
13495	L8522	Manjula Rangachari Vuruptoor	Hyderabad	500035
13569	L8582	Dr.S.V.S. Nageeswara Rao	Hyderabad	500046
13525	L8545	Padmasree Gangula	Hyderabad	500059
13635	L8641	Dr. Jada Shanker	Hyderabad	501504
13571	L8584	Dr. P. Sangeetha	Hyderabad	502103
13493	L8520	Dr. Sreekanth Tirumala	Jatiyal	505501
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13596	L8602	Sunil Kumar Kathula	Ongole	523001
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13586	*2107	Mohita Chekuri	Eluru	534007
13587	*2107	K .C . Ch Srinivasa Rao	Eluru	534007
13588	*2107	K .B . S. Goapal	Eluru	534007
13589	*2107	K . Ananda Rao	Eluru	534007
13590	*2107	K . Ravi Kumar	Eluru	534007
13591	*2107	T. Suneetha	Eluru	534007
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13679	*2112	Kalyani Chalapaca	Eluru	534007
13680	*2112	Indira Pogula	Eluru	534007
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13690	L8689	Ram Prasad N	Mulbagal	563131
13686	L8685	Dr. Jayasheelan A	Tumkur	572103
13688	L8687	Mamatha M	Gubbi	572216
13687	L8686	Vishwalinga Prasad B	Uttara Kannada	581401
13666	L8670	Katta Kishore	Ballari	583103
13601	L8607	Manjuantha M	Koppal	583231
13602	L8608	Shri Sharanappa	Koppal	583231
13624	L8630	Shivaleela Basavaraj	Kalaburagi	585106

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13545	L8558	Dr. Pandian Elangovan	Chennai	600030
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13595	L8601	Dr. Gopalkrishna. M. Bhalerao	Kokilamedu	603104
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13531	*2105	Sathsivam Arjunan	Chennai	603112
13538	*2105	Suresh Kumar M	Chennai	603112
13526	*2105	Rafi Ahamed S	Cuddalore	607001
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13567	L8580	Dr. S. Anitha	Palani	624613
13612	L8618	S. Alaguraja	Madurai	625009
13653	S2211	Kairon Mubina M S	Kanchipuram	631502
13673	*2101	Kairon Mubina M S	Kanchipuram	631502
13675	L8678	Rangasamy Chittiar Murugesan	Erode	638476
13500	S2201	Kokila C	Coimbatore	641046
13503	S2201	Karthika C	Coimbatore	641046
		KERALA		
13646	L8652	Sri Arvind	Kozhikode	673612
13616	L8622	Dr. Rekha Sunil Roy	Ernakulam	682017
13523	S2204	Mohammed Saju	Kalamassery	682022
13486	L8513	Ison . V.Vanchipurackai	Kottayam	686574

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13681	S2212	Jeet Shannigrahi	Kolkata	700030
13603	L8609	Varun Goenka	Bidhan Nagar	700091
13685	L8684	Rinku Das	South 24 PGS	700148
13487	L8514	Kumarjit Chatterhee	Hooghly	712407
13541	L8555	Rahul Chandra	Burdwan West	713347
13661	L8665	Rupam Roy	Purba Burdwan	713405
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13618	L8624	Dr. Pijus Kanti Samanta	Purba Medinipur	721152
13578	L8591	Dr. Samit Kumar Roy	kharagpur	721302
13606	L8612	Tapan Kumar Pattanayak	Purba Medinipur	721636
13645	L8651	Dr. Soumya Sarkar	Siliguri	734001
13627	L8633	Sankar Shaw	Noth 24 Parganas	743166
		ORISSA		
13613	L8619	Dr. Mousumi Mohanty	Cuttack	753008
13498	L8525	Satrujit Mishra	Berhampur	761003
		ASSAM		
13492	L8519	Kubla Khan	Guwahati	781040
13643	L8649	Shubham Kumar	Guwahati	782402
		TRIPURA		
13550	L8563	Mukesh Upadhyay	Nirjuli	791109
13497	L8524	Nabaratna Bhagawati	Itanagar	791113
13507	L8532	Subrata Deb	Agartala	799001
		JHARKHAND		
13556	L8569	Dr. Shrawan Kumar	Daltonganj	822101
13656	L8660	Dr. Narayan Kumar	Dhanbad	828122
13555	L8568	Santosh Rajwar	Ranchi	834001
13488	L8515	Dr. Sumit Kaur	Ranchi	834002
		BIHAR		
1361	L0375	Anand Mahto	Vaishali	844101
13549	L8562	Vivek Kumar Anand	Saharsa	852202

The Story of Cosmology through Postal Stamps- 15

THE REVIVAL OF ASTRONOMY

GALILEO GALILEI (1564-1642)

Galileo Galilei was Italian polymath from Pisa, known as ***father of observational astronomy.*** He formulated the basic law of falling bodies, which he verified by careful measurement. He constructed a telescope with which he studied lunar craters and discovered four moons revolving around Jupiter and espoused the Copernican cause.

Portrait of *Galileo Galilei*

Leaning Tower of Pisa from where he demonstrated and proved his theory of free fall of a body

His ***theory of free fall*** was proved by shoeing that ratio of s to t2 during free fall is constant irrespective of mass of the body & constant is g

Souvenir sheet with Setanent Stamps -issued to commemorate International Year of Astronomy 2009, to mark 400 years of use of telescope by Galileo

It illustrates Galileo and his revolutionary book ***"Dia/ogo sora i messimi sistemi de mondo"*** (1632) the book favour Copemicanian theory led him being tried and banned by Roman Church. And famous quote ***"Eppur si muve"***

Another stamp depicts sketches of Solar system, phases of moon and constellations as drawn in his book

Europa issue /YA 2009

Sidereus Nunecius *-starry message*

Sketch of solar system by Galileo

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