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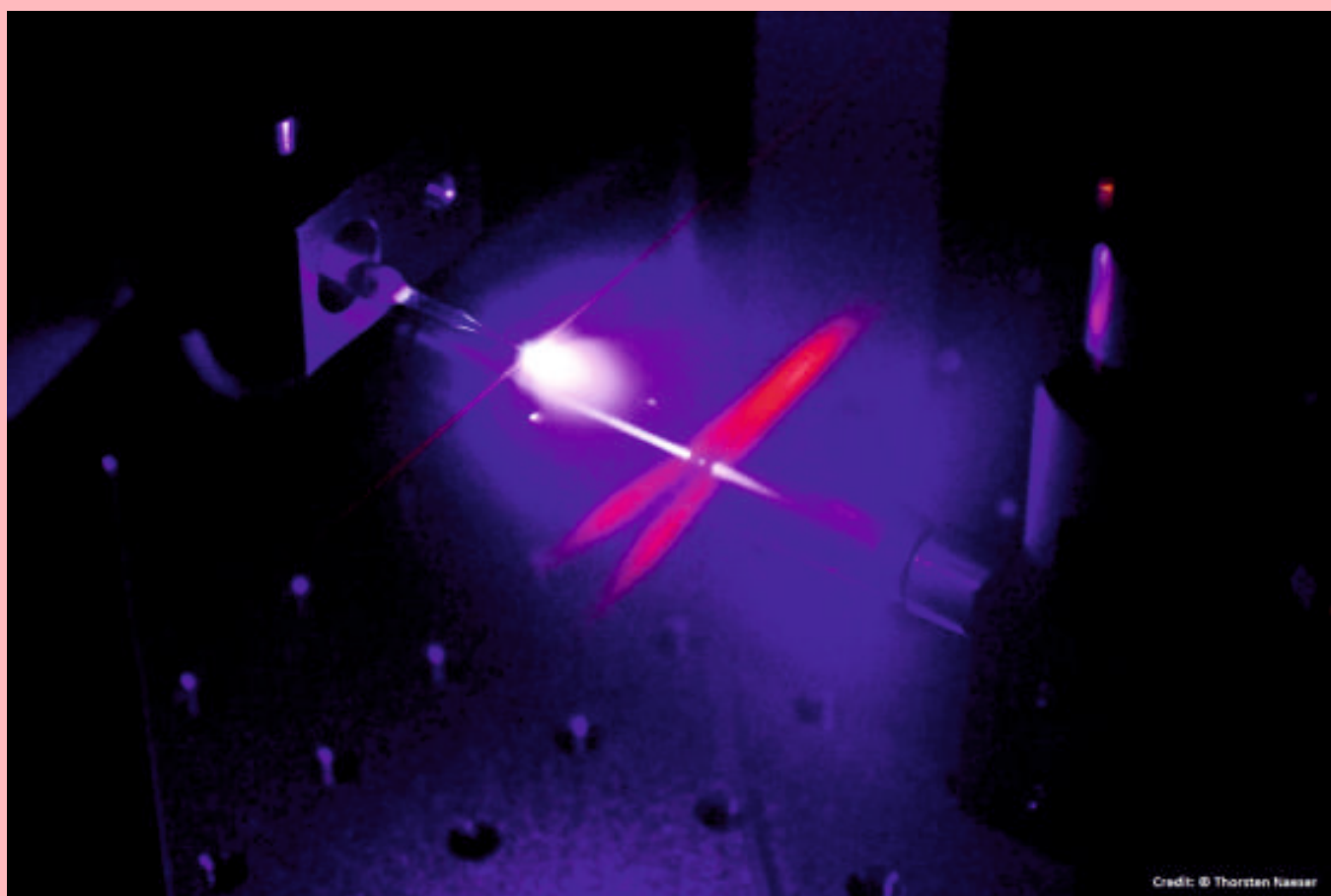
ISSN 2277-8950

THE INDIAN ASSOCIATION OF PHYSICS TEACHERS
A MONTHLY JOURNAL OF EDUCATION IN
PHYSICS & RELATED AREAS

VOLUME 13

NUMBER 8

AUGUST 2021



Credit: © Thorsten Naeser

Almost a century ago, Albert Einstein received the Nobel Prize for Physics for his explanation of the photoelectric effect. Physicists have now measured the influence of the band structure of tungsten on the dynamics of photoelectron emission. In a series of photoelectron spectroscopy experiments, the team used attosecond pulses of extreme ultraviolet light to probe the dynamics of photoemission from a tungsten crystal. The results revealed that electrons that interact with incoming photons take a little time to react to such encounters. This finding was made possible by the adoption of a new approach to the generation of attosecond pulses. In the longer term, the new findings could also lead to novel materials with electronic properties that enhance light-matter interactions, which would make solar cells more efficient, and improve switching rates of nano-optical components for ultrafast data processing.

(<https://scitechdaily.com/physicists-use-ultrashort-laser-pulses-to-probe-the-dynamics-of-photoemission/>)

PHYSICS NEWS

A framework to simulate the same physics using two different Hamiltonians

Researchers introduced a framework that could prove useful for simulating the same physics with two distinct Hamiltonians. In addition, they provide an example of an analog simulation and show how one could build an alternative version of a digital quantum simulator.

A Hamiltonian is a function or model used to describe a dynamic system, such as the motion of particles. Researchers set out to rethink the principles of quantum simulators and then realized that in addition to the Hamiltonian, the initial state should also be taken into account as an ingredient of quantum simulators. They defined a 'connector' operator and found that the same dynamics is observed from two different Hamiltonians if the initial state is an eigenstate of the connector. This result indicates that using the same Hamiltonian is not always a necessary condition.

Remarkably, the fact that a quantum simulator Hamiltonian can differ greatly from the Hamiltonian one wants to simulate could extend the scope of quantum simulation, as it means that one could create a simulator whose Hamiltonian does not agree with that of any systems existing in the world. These researchers' work could thus enable the design and realization of different types of quantum devices.

Read more at : <https://phys.org/news/2021-06-framework-simulate-physics-hamiltonians.html>

Original paper : Physical Review Letters (2021). DOI: 10.1103/PhysRevLett.126.160402

The fifth quartet: Excited neon discovery could reveal star qualities

All elements besides hydrogen and helium must have been fused inside the nuclear furnace of a star. The yield during these reactions of carbon-12, which has six protons and six neutrons, is increased by an unusual quirk in that 12 is divisible by 4. This means that given a little extra energy, the nucleons in carbon can form three alpha particles, consisting of two protons and two neutrons each, and these alpha particles can be condensed into the lowest-energy orbit in carbon-12. The existence of an alpha condensed state in heavier isotopes with atomic weights divisible by four, such as neon-20, has been theorized, but remained uncertain. These condensed states would provide a unique window into the world of nuclear physics. This is because the densities of most normal nuclei are very similar to each other, while the alpha condensed state would be an example of a low-density many-body system. Measuring the properties of protons and neutrons in such a dilute state would be very helpful for understanding the nature of low-density nuclear matter that exists on the surface of neutron stars.

Now, a team of researchers have provided experimental evidence that these excited states do exist in neon-20. By firing alpha particles at a neon gas, they observed that the decay products indicated the existence of specific energy states in the original nucleus. These matched very well with predictions of the 5α condensed state, in which the 10 protons and 10 neutrons are grouped into five alpha particles in the lowest-energy orbit.

Read more at : <https://www.sciencedaily.com/releases/2021/06/210624114331.htm>

Original paper : Physics Letters B (2021). DOI: 10.1016/j.physletb.2021.136411

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**BULLETIN OF
INDIAN ASSOCIATION OF PHYSICS TEACHERS**

<http://www.indapt.org> (ISSN 2277-8950)

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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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From the President's Desk.....The Silent Majority

Vol 13 Number 6-7, June - July 2021

On receiving the bulletin, first I glance through the content on the back cover page.

The first item "The Silent Majority" immediately caught my attention.

To know of the various activities done by so many members of IAPT and their RCs was thrilling, but the *tone* of the message was even more exciting.

The recognition of true workers of IAPT like Ved Ratnaji, C K Majumdarji, B N Chandrika, and Tushar Pandya, (the last two being my own dear friends) was satisfying.

More so, acknowledging the 'silent majority' was *the* reward!

A good word is always a source of motivation for further activities, for the well-being of the Physics community.

Sarmistha Sahu

Maharani Lakshmi Ammanni College
Bangalore

Corrigendum

In June –July issue

1. At page 248, the author Abha Khandelwal's address is: Department of Computer Science, Hislop College, Nagpur, Maharashtra
2. At page 264, A correction in minutes of the special EC meeting, in the item no. 2.1(C), is as follows.

(ii) *C. K. Majumdar Memorial Workshop by RC-19...*. It should be RC-15 and not RC-19.

Editor

Story of Cosmology...

With this issue we are starting a new series which will showcase the Philatelic Collection unfolding the mysteries of the Universe.

Brief History of Satellite Navigation with Reference to Navigation with Indian Constellations (NavIC)

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Abstract

Navigation is an act or process to find one's position or guide the different transport ways to reach the desired destination. It has been a concern of human beings since time immemorial. In old day's voyages through sea routes were more convenient because of its easiness to sail as compare to moving through land routes. During sea voyages in the beginning, star based navigation was the only navigating tool to guide followed by the compass as an assisting tool. Later cartography was introduced and used for navigation guidance. These ways of navigation became gradually obsolete with the introduction of satellite navigation systems in which satellites were used to locate one's spatial position with comparatively very high precision.

The principle of satellite navigation system include simple geometry in which three position co-ordinates of any location can be calculated using distances of three satellites from the position to be explored. Fourth satellite will take care of time parameter to be synchronised with all the satellites. First such system 'Transit' was introduced in 1950's by United States (US) for targeting submarine fired nuclear missiles. Navigation systems gained popularity 1995 onwards for both civil and military applications with GPS and GLONASS became fully functional. During the Kargil war, differential GPS was utilised to fix the GPS. Requirement of an Indian Navigation System was deeply felt after Kargil war where because any navigation system controlled by other nation cannot be relied under hostile situations. Hence, India decided to have its own indigenous navigation system with its first satellite IRNSS-1A in 2013. Different applications of satellite navigation include civil applications under Standard Positioning Service (SPS) and Restricted Services (RS) provided only to authorised users including military.

Introduction

In today's world, locate spatially has become the need of the day. To navigate within our territory with greater precision became necessary for all the countries in general and country like India in particular with its diverse terrains and topographies. Indian peninsula covers an area of about 3.287 million sq km with approximate east-west and north-south dimensions as 2933 km and 3214 km respectively. Both civil and defence applications for finding one's or other's location is gradually becoming inevitable for both civil and defence applications. This necessity is more deeply felt in India because of our neighbouring countries' activities.

In India, Self reliance in the field of navigation started in May 2006, when Indian government approved the project for our own independent navigation system. Indian

Regional Navigation Satellite System (IRNSS) with an operational name NavIC (Navigation with Indian Constellations). The name NavIC, a sailor, was coined by the Prime Minister Shri Narendra Modi. It has seven satellites to be used for real time positioning services across India and around region extending to about 1500 kilometers. The first launch of this autonomous Navigation Satellite System was successfully conducted on 1st July 2013 with IRNSS-1A as its first satellite. Out of seven satellites of this constellation, three are located in the geostationary orbit at 32.5° , 83° and 131.5° longitudes. The remaining four geosynchronous satellites are placed with the appropriate inclinations at a height of about 36000Km from surface of the Earth. All these four geosynchronous satellites will be moving to appear in the shape of '8'. Each satellite of IRNSS constellation is identically configured

The service area of this independent navigation system extends within India as well as the region up to 1500 kilometers from its boundary. The extended service area of NavIC is shown in Fig.1 as enclosed by the rectangle. NavIC will provide two types of services namely standard positioning service which will be available to all users and restricted services provided only to authorized users including military. The IRNSS system is expected to provide position accuracy better than 20 metres in primary service areas.



Fig.1 Coverage of NavIC *Courtesy: Wikipedia*

History of Satellite Navigation

The first generation navigation system called 'transit' was introduced in 1950's by United States for targeting fired nuclear missiles. Though 'transit' sufficed the then requirements of geodesy and civil marine navigation but it was recording the coordinates once in few hours. It was Doppler's shift measurement of the signal broadcast of a satellite in a well defined orbit that was used to estimate the position. The satellite was kept near the earth's surface (approx. 1100 kilometers) in a polar orbit and user has to wait about hundred minutes between successive satellite passes to determine position. This navigation system was in use from 1967 to 1996, when it was decommissioned. The results of this navigation system were two dimensional and were not reliable for fast moving vessels. Integrated efforts of both US Air Force and Navy, proposed a joint project to address all military requirements by the mid 1960's and construction of Navstar GPS (Global Positioning System) was initially approved by US department of Defence in late 1973. It was primarily designed to provide all weather real time spatial coordinates anywhere on the earth for use in navigation. Soviet Union's (now Russia)

GLONASS(Global'nayaNavigationnayaSputanikovaya Sistema) was developed during 1970's. In the beginning of 21st century, European Union, China and India also planned to develop their navigation systems. United States used GPS during the Persian Gulf War in early 1991. Till 2010, there were more than a billion users of GPS worldwide. Only a very small fraction of users were from military for which this was primarily aimed.

Requirement of an independent Indian navigation system was deeply felt after the Kargil War because any nation cannot rely on a navigation system controlled by other nations under hostile situations. It took about seven years to launch first satellite IRNSS-1A of India's indigenous independent navigation system NavIC after its approval from the government. Seventh and last satellite of this navigation system series was launched on 28th April 2016.

Unlike 'transit', the Global Navigation Satellite System (GNSS) is based on a very simple principle in which, position coordinates (x,y,z) of any location can be determined with the distances from known objects. Then distances from three satellites whose positions are known, enable us to solve equations for three unknown variables x, y and z. Requirement of fourth satellite is for time synchronization. Detailed history of GPS and detailed treatment of performance and applications can be found in the references.

Principle and Working

Civil applications of satellite navigation started with concept of GNSS which initiated Navstar GPS in United States and GLONASS in USSR (now Russia). The first satellite of GPS was launched in 1978 and became fully functional in 1995. Though, USSR conducted the first launch of his GLONASS in 1982 but became fully functional in the same year 1995. Like GPS, GLONASS offers two levels of service. The Channel of Standard Accuracy (CSA), available to all civil users, shall provide horizontal position accuracy of 60 m with 99.7% probability, and vertical position accuracy of 75 m with 99.7%probability. The Channel of High Accuracy (CHA) shall be available only to the authorised users. Navigation through satellites is generally carried using geostationary and geosynchronous satellites. A satellite

navigation system uses satellites for geo-spatial positioning. Idea of geostationary satellite originated from an article published in a magazine *Wireless World* by Arthur C Clarke in 1945. The first navigation system 'transit' by US Navy became operational in 1964 and was named as Navy Navigation Satellite System (NNSS). This system was based on the principle of Doppler shift with the use of five low altitude polar satellites. Each satellite broadcast two narrowband signal at 150 MHz to 400 MHz. In this, at a time, only one satellite was covering the position and it was taking 10 to 15 minutes to compute planar position of stationary or slowly moving objects.

The orbit [ephemeris](#) and clock corrections were uploaded twice each day to each satellite from one of the four Navy tracking and injection stations. The receiver on ground then calculate the position of at any point of time. Use of two carrier frequencies was taking care of errors caused by refraction in ionospheric refractions. This improved the positional accuracy of Transit system. This transit has also synchronized world clocks with 50 microsecond accuracy. Though, at that point of time, it had just few civilian Applications.

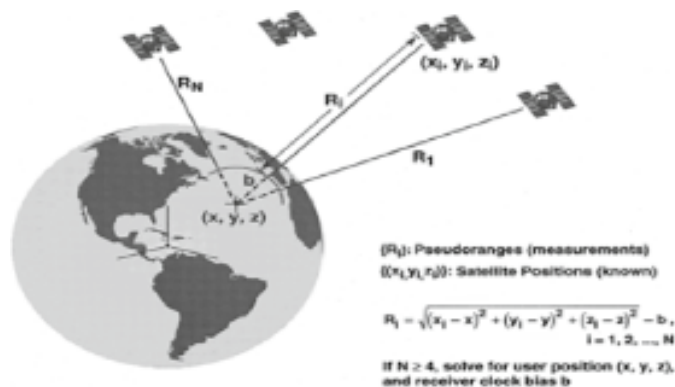


Fig.2 Basic principle of a GPS

In GPS, coordinates of any position can be calculated using the distances to objects whose positions are known. The situation can be modeled using simple analytical geometry. The distance of unknown position is measured from known locations of satellites. The distance between the user and satellite is measured in terms of transit time of the RF signals from the satellite to user. To measure time of the signals with precision and high accuracy, now we are using ultra stable atomic clocks. The orbital speed of geostationary satellite is about 4 Km/s, even then location

can be measured with an accuracy of few meters. The satellite's atomic clock are maintained in synchronism by monitoring the signals from network of tracking satellites and estimating the correcting parameters for each clock and keep the message updated. In order to measure true transit time of a signal from satellite to receiver, both clocks (on satellite and receiver) must be synchronized. Use of simple quartz oscillator at receiver does this synchronization beautifully by biasing themselves. The bias in the receiver clock at the instant of measurement affects the transit time of all the satellites equally. Hence, bias of receiver clock becomes fourth unknown to be measured. Therefore, total four satellites are required for finding spatial location of any point with four unknown parameters; three position coordinates and fourth time bias parameter. Each distance from three satellites, can be related to three position coordinates to be determined by the equation. Hence three different distances will give three equations, which will enable us to calculate x, y and z coordinates of the unknown position. This simple technology can be used to provide information about unknown position to any number of users simultaneously. The present GPS system became operational in 1995, though first satellite was launched in 1978. A detailed mechanism of the system along with applications can be found in the references.

In January 1996, GPS constellation of 24 working satellites became fully operational. The GPS and Russian GLONASS with 15 operational satellites are different with reference to data output format and time keeping systems. These two systems are also different in signal structure and handling. GPS satellites share the same frequencies but differ in individual codes, and GLONASS satellites share the same code but differ in frequencies. herefore now a day's GPS-GLONASS integrated receivers are available in the market with comparatively better positional accuracy. Fig. 2 shows basic block diagram of GPS. China has also developed its own navigation system called BeiDou Navigation Satellite System. The European Union navigation system 'Galileo' will be fully operational by 2020

GNSS has three segments, space segment, control segment and ground segment. The space segment consists of satellites along with inter satellite links. Every satellite is filled with an atomic clock and

transmitter. The control segment has three parts, master control stations, monitor stations and ground control stations. The ground segment or user segment means earth stations through which a customer connects himself with space segment. Precise measurement of time and time interval is the core of GPS technology and atomic clocks are the best time measuring device available with an accuracy of up to 10^{-15} s. Each satellite of navigation system, carries a pair of Cesium and Rubidium atomic clocks. Frequency ability of these clocks over a day is about one part in 10^{14} and one part in 10^{13} respectively. This means an error of 1 to 10 nanosecond can accumulate in a day (10^5 s) if left uncorrected. Actually these clocks are synchronized with the signals from network of tracking stations, estimating the correction parameters for each clock to upload corrected parameter values of navigation message broadcast by each satellite. Clocks in satellite and receiver are synchronized to measure transit time of a signal between a satellite and receiver. However, receiver's clock bias at the instant of measurement affects the transit time for all the satellites equally, hence even a quartz oscillator clock does the needful at the receiver. The receiver clock bias thus becomes fourth unknown to be estimated, in addition to three position coordinates. A user therefore, needs minimum four satellites in view to estimate 4-dimensional position including time.

Each signal from satellite consists of three elements named carrier, a unique PRN (pseudo random noise) spread spectrum code and binary data message. The GPS signals received on earth are extremely weak because approximately 50% of the antenna power of satellite is used for civil applications and other 50% is for restricted services applications. The satellite antenna is designed to spread the RF signal roughly and uniformly over the earth's surface. Power enhancements in satellite signal are under modernization so that civil uses can be made more robust.

Applications of Satellite Navigation Systems

A satellite can perform designated tasks including some dedicated military applications. In the

beginning, satellite navigation system was introduced by department of defence, primarily for US military to provide precise position, velocity and time of anything as desired. Civil applications were not explored in detail and civil uses of GPS were limited to a purposefully degraded subset of signals. However, over a period of time, civil uses of GPS grown at surprising rate and now GPS mainly has civil applications with of course important applications in the field of defence and security. GPS technology is used in managing the disasters and emergency services, astronomy, radio occultation for weather and atmospheric applications, mining, cartography, automated vehicle driving, robotics etc.

The different civil applications today were not visualized in the beginning. Hence, we can say that many other applications may be available to us in future. GPS has found applications in research and development, transport navigation, civil aviation, maritime trade, surveying and mapping construction, earth sciences, power systems, telecommunication, agriculture and many more other recreational activities. GPS is now becoming the integral part of life across the globe this will become an essential portable infrastructure in days to come.

Some particular civil applications of IRNSS other than restricted defence and security applications include marine navigation, road transport management, integration with mobile phones, mapping and geodetic data collection, terrestrial navigation for hikers and travelers and visual and voice navigation for drivers etc.

Conclusions

With advancements in the field of navigation, satellite navigation contributed remarkably. Though, initially satellite navigation was introduced for restricted defence applications only but in due course, civil applications became more popular and useful. Satellite navigation systems are operated

System	BeiDou	Galileo	GLONASS	GPS	NAVIC	QZSS
Owner	China	European Union	Russia	United States	India	Japan
Coverage	Global	Global	Global	Global	Regional	Regional
Coding	CDMA	CDMA	FDMA & CDMA	CDMA	CDMA	CDMA
Altitude	21,150 km	23,222 km	19,130 km	20,180 km	36,000 km	32,600 km 39,000 km
Period	12 h 38 min	14 h 5 min	11 h 16 min	11 h 58 min	23 h 56 min	23 h 56 min
No. of Satellites	28	26	24	30	07	11
Status	To be completed by 2020	To be completed by 2020	Operational	Operational	Operational	Operational
Precision	10m (Public) 0.1m (Encrypted)	1m (Public) 0.01m (Encrypted)	4.5m – 7.4m	5m (no DGPS or WAAS)	10m (Public) 0.1m (Encrypted)	1m (Public) 0.1m (Encrypted)

independently without telephonic or internet needs. Summary of different global navigation systems are given in the table above. (courtesy: Wikipedia).

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Dr Manoj Kumar Srivastava completed his Post-graduation and Doctorate in Physics from University of Lucknow. Presently, he is serving as Assistant Professor at Army Cadet College, Indian Military Academy, Dehradun. He has interest in science Communication and Popularisation.

OBITUARY

Professor M I Savadatti



08.01.1932 - 09.06.2021

Prof M I Savadatti, was born in Aminbhavi, on 8th January 1932. He completed his education in Karnatak College and Karnatak University, Dharwad. Later, he joined Department of Physics, as faculty. He served as HOD, Dean, and

Syndicate member (9 years). His contributions to Karnatak University and growth of Physics Department are notable. He was Vice-Chancellor of Mangalore University, for two terms (1989-95). As a member of UGC (1996-99), he was instrumental in getting a UGC Regional Center at Bangalore. Prof Savadatti was President of Physics section of Indian Science Congress (1989-90).

He was founder Vice-Chairman of Karnataka State Higher Education Council, Bangalore – an apex body to plan and monitor the activities and policies relating to higher education in the state. As a founder Vice – President and later as President of Karnatak Rajya Vijnan Parishad - a voluntary organization for spreading science and scientific temper- he contributed significantly to the cause of science popularization in the state.

Prof Savadatti had travelled widely, had visited several countries (UK, USA, Hungary, Japan ...) in various capacities – Commonwealth scholar, research physicist,

Cultural Exchange programme, international conferences and so on. He had participated in Commonwealth Vice Chancellors' Conference (Nov.1993).

Prof Savadatti was responsible for the establishment of Advanced Laser Laboratory in the department of Physics, for advancing lasers from physics to materials processing in engineering, laser microprocessing for semiconductor industries. His efforts made it possible for interdisciplinary applications of lasers from physics to engineering and from engineering to medicine: laser ablation of cardiovascular plaque for fluent flow of blood in vessels, laser ablation of brain tumor, laser Clotting of torn retina for diabetic retinopathy to restore sight to blind people.

Prof Savadatti was recipient of many awards, such as Rajyotsava Award, and Sir. M. Visweswaraya Lifetime Achievement Award. He was awarded D. Sc.(Hon.) by Karnatak and Belgaum Universities.

His family members and friends have established DR. MIS Vidyavardhak Samsthan in Dharwad.

He is survived by his wife, two sons and a daughter.

May God bless his family & May his soul rest in eternal peace.

M S Jogad

EC member

Kalaburagi, Karnataka

A Scientifically Magnificent Decade that Began Two Hundred Years Back

Bhupati Chakrabarti

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chakrabhu@gmail.com

Abstract: *Two hundred years ago the scientific activities were not institutionalized in a big way. There were individuals working independently but not in isolation. The decade that began with 1820 proved to be scientifically a great one for the contributions from individual stalwarts mainly from Europe. It was not only physics or mathematics but other branches of science and technology were enriched during this decade. An attempt has been made to underline some of the path breaking works done in the realm of physical science during this decade. The huge impact of the most of these breakthroughs in the understanding of today in various branches of science and the development of technology is amazing.*

Introduction

As a student of physics we had been always fascinated with the extremely bubbling decade that started in November 1895 with the discovery of x-ray and continued till the end of 1905, the Annus Mirabilis for Albert Einstein. A cursory look at the discoveries, scientific breakthroughs and particularly the emergence of bold new ideas that took place during that decade bears the testimony of that period. We now know those breakthroughs not only changed our understanding of many phenomena of physics and the physical world but they also paved the way for large number of modern technological innovations. Interestingly, at that time physics and chemistry had already emerged as two distinct disciplines, scientific research activities had got some organized shape through their partial institutionalization. Nobel Prize has been instituted in the middle of the decade and the communication among the scientists had improved a lot. Since the most of the major works of that period have been acknowledged later on through the Nobel Prize and other decorations they drew special attention of the general public as well. Unfortunately the people who worked in another such a marvelous decade, more as individuals than as groups are known to the physics and scientific community in a big way but often not much beyond that. We are going to take a journey through this decade that began exactly 200 years back in 1820. In these discussions biological sciences have not been included because as a student of physics with very

limited background of biology the author might not have been able to do justice in elaborating the breakthroughs in biology that took place during this decade. However one can easily understand if we really bring in those path-breaking works from the realm of biology the decade will no doubt look even richer.

1820: The decade begins with a giant step

First sensational event took place in Copenhagen where the Danish Professor Hans Christian Oersted (1777-1851) in April while imparting the lessons of current electricity was performing some experiments before his students. Current electricity was barely 20 years old and the source of this electricity was still the modified form of Volta's pile which Alessandro Volta developed and for the first time could show the electric current. Yet the deflection was observed in a compass-needle kept beneath the current carrying copper wire drew the attention of the Professor. He like a veteran experimentalist not only repeated the experiment but sent the current in different directions, kept the current carrying wire both above and below the needle, changed the needle i.e. controlled all the parameters in the experiment and could conclude that flow of current gives rise to the magnetic field that in turn influences the magnetic needle.

Oersted actually had a Ph.D in philosophy and was very interested in the subject. However in the earlier life he was compelled to look after the medicine business of the family and that made him inquisitive about chemistry as

well. In fact now all of us know he discovered electromagnetism the true link between the electricity and magnetism through his experiments but his interest was not confined to this area either. Of course in 1820 he was doing physics only and could develop an instrument that would measure the current by checking the deflection of a magnetic needle. And do you know the name he gave to this instrument? He called it amperemeter, because he felt so far the electromagnetism is concerned Ampere's involvement both in theory and experiments were much intense than his own. This is a typical example of the true spirit of science. And he then went on to discover the element aluminum by applying electrical techniques.

That brings in the French scientist Andre Marie Ampere (1775-1836) in the scenario. Ampere came to know about the work of Oersted from another French scientist Francois Arago (1786-1853) after a couple of months. Francois Arago was an astronomer, a physicist, an explorer and had a very adventurous life. He was involved in various scientific explorations and that sometimes led him to difficult situations. Arago after he came to know about the work of Oersted showed a very important thing in 1820 itself. While producing a magnetic field by sending a current through a copper wire Arago felt that iron is not an essential component in magnetism though that was a time-long idea. Highlighting the fact that iron is not an integral part of magnetism was a very significant discovery at that time and helped to develop the understanding in this new field of electromagnetism



Hans C. Oersted **Francois Arago** **Andre Marie Ampere**

Ampere felt if the current carrying wires can produce magnetic field then the two magnetic fields produced by two currents passing through two wires kept side by side must interact with each other. Not only that he also developed the mathematical equation for the force between the two wires and offered a compact law now we know as 'Ampere's swimming rule'. Ampere was actually a chemist, mathematician and physicist rolled into one.

His work in chemistry already led to the discovery of an element fluorine that he had done before his work on electromagnetism. Ampere's work in electromagnetism had a huge impact that on the subsequent theoretical work of James Clarke Maxwell (1831-1879) who was actually born after this eventful decade was just over. While connecting all the phenomenological observations into a neat theory Maxwell gave us a set of four equations. The foundations for these equations lied in the works of Carl Friedrich Gauss (1777-1855), Faraday and Ampere. Yet only the fourth one is not simply Maxwell's equation like the other three but Maxwell-Ampere equation. This was also a work of 1820. The first galvanometer was also made this year by Johann Salomo Christoph Schweigger, (1779-1857) a German instrument maker once again being influenced by the discovery of Oersted. The SI unit of electric current is named after Ampere while the unit of magnetic field in cgs system is oersted (Oe). The last one however is virtually not in use now.

1820: The year was not meant for only Physics only

In the very same year i.e. in 1820 the Royal Astronomical Society was established in England. The people behind this initiative included Sir John Herschel (1792-1871) an astronomer and the son of well-known astronomer Sir William Herschel who discovered the planet Uranus in 1781. William Herschel (1738-1822) nearly 82 years old at that time became the first President of the Royal Astronomical Society. However he passed away in 1822. Among the other persons involved in the establishment of the Royal Astronomical Society was Charles Babbage (1791-1871).

There was more in store for 1820. French mathematician and physicist Jean August Fresnel (1738-1827) designed a special type of lens for the use in the light houses. This was in a way an offer to solve an important practical problem. At that time light houses were extremely important guides for the navigation in seas. The light coming out from a lighthouse helped the seamen to navigate safely and it was always felt earlier a ship gets to see the light from a lighthouse more it is comfortable to move in the sea. That demanded that the light produced from the oil lamps in the lighthouses should pass through

suitable lenses to provide an intense parallel beam of light. We should not forget that those were the days when sea routes were still the most important for modes for travel and trade and electric lamps were yet to emerge. Fresnel could design a lens that still bears his name and that proved to be much more effective in the lighthouses for production of a strong parallel beam of light that could reach longer distances. It was a great breakthrough for the seamen. Interestingly now in the online shopping sites one may get a so called 'gift item' that is advertised as 'mobile phone photo viewer'. This is nothing but a Fresnel lens made from good quality plastic and if it is placed before a mobile phone screen one can see the enlarged photos or videos that appear on the screen. This in the process helps simultaneous viewing of the photos and videos by say about 3-4 people. The product pack in most of the cases refers it as a 'Fresnel lens'

1821: A year that was no less scientifically productive

In 1821 the Catholic Church for the first time officially announced that the Copernican view of the solar system may be taught in the schools. This came more than 300 hundred years after Copernicus conceived the idea and nearly 275 years after its announcement. No doubt this was a significant victory for science and rationality. In the same year German physicist Thomas Johannes Seebeck (1770-1831) was first to observe thermoelectricity and gave us what is known as Seebeck effect.



Augustin J. Fresnel Seebeck was a Russian-German physicist who could show that an emf develops from an arrangement if the two junctions of a contraption made with two dissimilar materials now known as thermocouple are kept at two different temperatures. No doubt this was also inspired by the works of Oersted and Ampere. Since the flowing current leads to the development of magnetism, physics community started thinking of other effects of current electricity. Michael Faraday (1791-1867) in a paper reported that he has discovered what he called 'electromagnetic rotation'. Faraday actually constructed the first two electric motors and following the works of

Oersted and Ampere.

In astronomy the groundwork for the discovery of the eighth planet of the sun began in an unusual way in 1821. The farthest known planet at that time was Uranus that was discovered by British-German astronomer William Herschel in 1781 through a telescope. Interestingly Uranus was the first planet to be discovered from the earth using a telescope. French astronomer Alex Bouvard (1767-1843) in 1821 used the observational data of the Uranus both before and after 1781 to plot an orbit for the planet. He found that the earlier positions did not agree with the later positions calculated on the basis of the observations in two periods. This led him to put forward a view about the possible existence of another planet beyond the Uranus that is causing the perturbations to the orbit of the Uranus. His view gradually gathered momentum and from 1830s with more similar inputs about the deviation of the orbital path of the Uranus from the expected one triggered the serious search for the planet beyond the Uranus. Based on this conjecture telescopic observations were geared up for the search of a planet beyond the Uranus. And finally the planet Neptune was discovered in 1846. Neptune proved to be the first planet the existence of which was theoretically predicted and it was done in 1821.

1822-1824 More ideas emerge

In 1822 Charles Babbage came up with his Difference engine which is considered as a precursor to the present computers. It was however, a cumbersome device, that Babbage turned into an efficient instrument. In the next decade, Babbage conceived of a different different engine that had striking similarity with modern day computer but it could never be built. Jons Jakob Barzelius (1779-1848) was the leading chemist and he not only brought out a scientific publication but also discovered the element silicon. Barzelius also isolated the element zirconium from its earlier known oxide. Justus von Liebig (1803-1873), Friedrich Wohler (1800-1882) and Joseph Louis Gay-Lussac .

(1778-1850) each found that the chemical formula of some compounds may be the same but their chemical properties may differ. This was the first indication of the



J.J. Barzilius



Frederich Wohler



Jean J B Fourier



Micheal Faraday

existence of chemical isomerism.

Michael Faraday as we know was a very established and reputed scientist and both a chemist and a physicist rolled into one. He used to work in both the fields virtually simultaneously. And possibly it is difficult to find which field he enjoyed more. His laws of electrolysis were possibly more exciting for the chemists, but his work on electromagnetic induction not only a very important breakthrough in the field of physics but we know how technology could use it in shaping up the modern world. No doubt the scientific community remembers him much more strongly for his contributions in electricity and magnetism but his works in chemistry is equally remarkable. In 1821 Faraday produced first two electric motors and in 1822 his contribution in chemistry was the preparation of so called fluid chlorine. He cooled down gaseous chlorine to liquid and studied its properties for the first time and once again this work had very important impact in industrial chemistry

One single mathematician has kept this block of three years memorable forever. He was Jean Joseph Fourier (1768-1830) who published his work in French and that translated into English reads 'Analytic theory of heat'. This work went on to show that a complex function (that may be a signal) may be analyzed as a combination of sine and

cosine functions with their phase part depending on a base frequency and on the simple multiples of that frequency. Now this is known as Fourier analysis of the signals and all know this is not only a pure mathematical exercise but how extensively it is applied in physics and in technology.

A very important contribution came once again from Andre Marie Ampere. He developed a theory connecting electricity and magnetism and he felt that this interconnection is caused by very small electrical charges in the bodies. He possibly proposed or predicted the existence of what now emerged as electrons but his contemporaries were not in a position to accept that. But 1824 a new star emerged in the horizon who published in French, a book the title of which in English was 'On the motive power of fire'. Here he showed that when heat passes from high to low temperature work is done. He also gave a clear cut definition of work and there was some hint of second law of thermodynamics and internal combustion engine in his work. The young French was none other than Sadi Carnot (1796-1832). And his work, we know, is one of the foundations of thermodynamics.

1825-1827 Chemistry widens up its horizon along with mathematics and physics

Very well-known mathematicians worked and made huge progress in the area with so many novel ideas during this special decade. Most of these work are primarily appreciated and well understood by the people with training in mathematics yet all the students of science know the names of these stalwarts and we should put on record the names of these mathematicians. This list includes Niels Henrik Abel (1802-1829), Sophie Germain (1776-1831), Jean Joseph Fourier just to name a few. Karl Friedrich Gauss (1777-1855) in 1827 introduced the subject of differential geometry. German mathematician August Ferdinand Mobius (1790-1868) who is well known for the strip named after him, published his book that translates into English goes like 'Barycentric Calculus'. This was probably first book to use homogeneous coordinates. Some other mathematicians might have tried it earlier but Mobius could come up with the total idea.

During these three years more significant breakthroughs took place in chemistry. Barzilius isolated chemical



Nicolus Abel



George Simon Ohm



Robert Brown



Jean J B Fourier

element titanium from its oxide, Carl Jacob Lowig (1803-1890) discovered bromine when he was barely 21 years old. However Lowig did not publish his 1825 work till its rediscovery in the next year by another equally young chemist Antoine Jerome Balard (1802-1876). Once again two stalwarts better known as physicists contributed in chemistry in a big way. Michael Faraday isolated benzene by fractional distillation of whale oil. If you take a look at the chemistry books you will find the name of Oersted as the discoverer of the element Aluminum. He turned into a chemist in 1827 and used electric current for this discovery. Basically Oersted used his knowledge of physics to discover aluminum through several steps. This switching between chemistry and physics was much more evident with Michael Faraday and he was the real ambidextrous person so far the chemistry and physics were concerned.

A very important contribution in physics and chemistry was made by botanist Robert Brown (1773-1858) in 1827. Using a microscope he could see that the tiny suspended particles are moving in a liquid. He studied this motion under different conditions of temperature, density and under low or bright light to find that the motion goes on. We now know this Brownian motion after one hundred years turned out to be the first concrete indication that molecules do exist. And in less than 80 years of time a theory for this was provided by a young physicist Albert Einstein (1879-1955) making the phenomenon a very

useful one cutting across the disciplines. However, the most important work during this period for physics was possibly done by Georg Simon Ohm (1789-1854) when he came up with a publication in his native German. Translated in English this read 'The galvanic circuit investigated mathematically' and it contained the first statement that eventually emerged as one of the most familiar laws of physics; Ohm's law. We know the SI unit of electric resistance is named after Ohm

1828-1829: Last phase of the decade is no less interesting

Technically the decade had its end with 1829 since we started from 1820. In 1829 the British mathematician George Green (1793-1841) in his publication 'Essay on the application of mathematical analysis to the theories of electricity and magnetism introduces the name theorem that bears his name, the Green's theorem. But this work of a mathematician has been proved much more useful for the physicists. During this period there was a very curious happening in the world of mathematics.



Evariste Galois

Evariste Galois (1811-1832) the short lived extraordinary brilliant mathematician presented a paper introducing the group theory before the French Academy of Science. But the referee Augustin Louis Cauchy (1789-1857) did not provide his observations on it. Some felt Cauchy had lost this paper. Galois again submitted a second version of group theory in 1830 this time the referee was Joseph Fourier. Fourier unfortunately died in that year itself and the paper of Galois could not be detected in the papers of Fourier. Galois was an extraordinary genius and was well ahead of his time. His worked baffled many top grade French mathematicians at that time. His actual contributions could come to light only after his sad death. when he was yet to complete 21 years of age.

Physics students are quite familiar with Coriolis force, a force that causes a deflection of a moving body due to earth's rotational motion. The idea was put forward by French physicist Gustave-Gaspard Coriolis (1792-1843) in 1835 but he actually was responsible for a much more

used term in physics and he coined it in 1829. He was first to think up the term kinetic energy that physicists are using all along after that. The first American contribution in physics in this decade came from Joseph Henry (1797-1878) who showed that if copper wire is wrapped into coils and a current is sent through this then a greater magnetic field is produced compared to what was obtained with straight wires. He also showed that powerful electromagnet may be produced by wrapping insulated wire over an iron core. It is quite natural that all these findings ultimately led to the identification of inductance and SI unit of that got its name from Joseph Henry. Incidentally apart from Serbian-American Nicola Tesla (1856-1943) then Joseph Henry is the only American whose name has been used as a unit of a physical quantity in SI system.



Gaspard G de Coriolis



Joseph Henry

The term technology was first introduced by Jacog Bigelow (1787-1879) in his book 'The elements of technology' and the first electromagnetically driven clock was made. In chemistry Barzelius came up with the discovery of yet another element and this time it was thorium. Interestingly in 1829 the first hint of periodicity of the properties of elements came to light when the German chemist Johann Wolfgang Dobernier (1780-1849) came up with the proposal of triads indicating similarity between of a few sets of three elements. With whatever elements known at that time he noticed that the return of similar properties of elements in a periodic fashion. No doubt this was the stepping stone that led to the development of periodic table of elements.

Losses in the decade and a postscript

During this decade the entire scientific community got depleted through the demise of several stalwarts of mathematics and science. Some of them were active and not so aged even by the standard of that period. Jean

Baptiste Joseph Fourier, Alessandro Volta (1745-1827), Augustin-Jean Fresnel, Ernest Florens Friedrich Chladini (1756-1827), Pierre Simon de Laplace (1749-1827), Humphrey Davy (1778-1829), Thomas Young (1773-1829), Neils Henrick Abel are just to name a few who passed away during the decade. Some of them had contribution in the decade itself before their demise.

The post script is intended to point out the developments that took place soon after the decade was over and brought in some sort of completeness in some of the major scientific discoveries and breakthroughs. Michael Faraday came up with the discovery of electromagnetic induction in 1831 and a cycle was complete. Oersted first showed the electricity can produce magnetism and now Faraday could show that changing magnetic flux can give rise to the development of emf. Seebeck effect also got so to speak its corollary when Jean Charles Athanase Peltier (1785-1845) in 1834 could show that electric current flowing through a thermocouple can produce warming up of one of its junction while the other junction gets cooled. Moreover it was found that this absorption and evolution of heat depends on the direction of the current. Esvarteis Galios submitted his third paper on group theory to French Academy of Science in 1831 and this time it was rejected by the referee who was Simon Poisson (1781-1840). And Galois lost his life in 1832 fighting a duel in Paris. He was not even 21 and he kept just about 100 pages of write up with one of his friends through which the world of mathematics came to know about his genius and the group theory that he developed. The genius of Galios could be appreciated by the community of mathematicians only after his sad demise at such a young age.

In chemistry Barzelius in 1830 could firmly establish the existence of chemical isomerism that was first accidentally discovered by Justus von Liebig Friedrich Wohler and Joseph Louis Gay-Lussac in 1822. Within first five years of the nt decade Emil Lenz (1804-1865), through his law governing the direction of the induced current brought in some sort of completeness to Faraday's laws of electromagnetic induction. Interestingly the first of the Joule's laws of electrical heating that came in 1840s is now acknowledged as a contribution not only from James Prescott Joule (1818-1889) but also from Emil

Lenz and it is now Joule-Lenz law. The new decade had its share of glory but one had to wait till the middle of the last decade of that century i.e. nineteenth century to have another real magnificent decade, particularly for physics.

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2. Various entries from en.wikipedia.org

OBITUARY

Professor M K Agarwal



24.08.1938 - 07.05.2021 Prof M K Agarwal was born on August 24, 1938 in a well to do hospitality business family of Mount Abu, Rajasthan. But he carved a different path of academic as his profession. He was Professor of Physics at the PG Department of Physics, Sardar Patel University. He started his research in the field of diamond in the early 1960s. By availing Commonwealth Fellowship, he trained himself in the field of single crystal growth, characterization and applications at England in mid 1970s.

On his return back, he set-up a full fledged laboratory for the single crystal growth and characterization at the department. The department went on to lead in the field of single crystal growth in 1980s and 1990s. He was head of the department from 1983 to 1991. During his able headship, the department diversified to varied topical research fields by drawing funds from different agencies. He was an excellent teacher and human being. He remained an active IAPT member all through his life time. Under his leadership the 2nd IAPT convention was held at the Sardar Patel University in November 1988. Unfortunately he contracted COVID -19 and breathed his last on 07th May 2021. The Physics fraternity lost a teacher, researcher and an active member. May his soul rest in eternal peace.

Sunil Chaki
Sardar Patel University
Vallabh Vidyanagar
Gujarat - 388 120

IAPT AFFAIR

DATE EXTENDED FOR ESSAY SUBMISSION (NCEWP-2021)

In view of the current Covid-19 pandemic situation, it has now been decided to **extend the essay submission deadline to 25th September 2021**. It is applicable for both 'Teacher' and 'Student' categories. Rest of the details/information for NCEWP, that appeared earlier in the bulletin and was also published on the IAPT website, remains unchanged.

SK JOSHI
Coordinator NCEWP-2021
E-mail:joshisantoshk@yahoo.com

Virk International Symposium

It is a matter of pride and happiness that an International Symposium has been named after one of our esteemed colleagues, Prof. Hardev Singh Virk, founder member and former President of IAPT. Now in his 80th year, Prof Virk retired from Guru Nanak Dev University, Amritsar in 2002.

“Virk International Symposium On Physics, Technology and Interdisciplinary Research for Sustainable Development ” is being organized as a part of SIPS 2021 International Conference going to be held in Phuket(Thailand) from November 28- December 2 2021.

Our Heartiest Congratulations to Prof. H.S. Virk

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Starting from the High Energy Particle Physics , Prof Virk ventured into the interdisciplinary areas – here is a brief summary of his work :

Geochronology : using fission track (FT) dating he was successful in dating pegmatite minerals (chlorite ,garnet, zircon and quartz ...), meteorites, volcanic eruptions and ocean bottom spreading. Besides dating, Uranium content of the samples were also estimated,

Radiation damage studies: Using heavy ion beams from Carbon to Uranium , samples of glass , polymers and minerals were irradiated. Heating the irradiated samples under varying times and temperatures, radiation damage was studied leading to ‘ Modgil-Virk Model of Radiation Damage’ which was used by UC Berkely for their ‘ Space satellite Cosmic ray Experiment’. He also fabricated Ion Track Filters (ITFs)or micro-Membranes for use in environment pollution studies and filtration of cancer blood cells of cancer patients.

Radon studies and earthquake prediction : Radon is the most important (~ 50%) source of the naturally occurring radiation exposure for humans. A multi prong project using radon for pollution studies, hazard effects to population and correlation of Radon activity with micro- seismicity in the Himalayas was successfully executed. These radon studies have become a bench- mark now.

Nanotechnology : the group prepared Nanowires, Quantum dots, and Nanocrystals of nearly a dozen materials. The most important fabrication was that of Nanoflowers of exquisite beauty.

Current interest : Ground water pollution studies - Uranium and Heavy Metal contamination of potable water is leading to widespread cancer in the region of Panjab

SIPS 2020&2021 : an yearly event that is deeply science-focused and technology & engineering-oriented, organized since 2003 by the **not-for-profit corporation FLOGEN Stars Outreach** (www.flogen.org), which is dedicated to achieving sustainability through science and technology. It incorporates summit plenary lectures from well-known speakers that address the link between scientific, technology and engineering domains in the pursuit of sustainable development, as well as specific science, technology and engineering symposia that feature technical presentations with the same goals in mind.

To our readers

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Minutes of the special EC Meeting (online) held on Sunday July 25, 2021

A special meeting of the Executive Council (Central EC) of the IAPT was held online, on Sunday July 25, 2021, to discuss the ensuing IAPT elections and the formation of the new EC wef Jan 01, 2022. The meeting commenced at 3.00 pm, and continued till about 5.15 pm.

The members present in the meeting were as follows.

1. Prof. Vijay A. Singh, President
2. Prof. K. N. Joshipura, GS
3. Prof. Manjit Kaur, VP (N)
4. Prof. J. D. Dubey, VP (E)
5. Prof. A. K. Jain, VP (C)
6. Prof. P. N. Nagaraju, VP (S)
7. Prof. Arun V. Kulkarni, VP (W)
8. Prof. H. C. Verma, VP (General)
9. Dr. Oum Prakash Sharma, Member RC – 01
10. Dr. Anil Kumar Singh, Member RC – 04
11. Dr. Anand Singh Rana, Member RC – 05
12. Prof. R. K. Khanna, Member RC – 06
13. Prof. Viresh H. Thakkar, Member RC-07
14. Dr. S.B.Mane, Member RC-08
15. Dr. Pradeep Kumar Dubey, Member RC-09
16. Dr.S.K.Patel, Member RC-10
17. Dr. M.S.Jogad, Member RC-12
18. Dr. Jerome Das, Member RC-13
19. Prof. S.Sankararaman, Member RC-14
20. Dr. Saswati Dasgupta, Member RC-15
21. Dr. Kishore Chandra Dash, Member RC-16
22. Dr. Swapan Majumdar, Member RC-18
23. Dr. Himanshu Pandey, Member RC-19
24. Dr. Venugopal Reddy, Member RC-22

Ex-Officio Members

25. Prof. H. C. Pradhan, Immediate-past President
26. Prof. Bhupati Chakrabarti, Immediate-past General Secretary

27. Dr. B.P.Tyagi, CCE

28. Dr. Sanjay Kr. Sharma, Secretary IAPT

Co-opted Members

29. Dr. T.R. Ananthkrishnan
30. Dr. S. C. Samanta
31. Dr. Arundhati Mishra

The meeting started with a few words of welcome from the President Prof. Vijay Singh who emphasised on the basic purpose of the present special EC meeting, viz., to discuss the ensuing IAPT elections.

Item 1. The GS Prof. K. N. Joshipura said in his Initial remarks, “The last EC meeting was held online from 10 am to 1.30 pm, on Sunday April 18. There is a correction in the Minutes of the last EC meeting, published in the June-July combined issue p. 263 of our Bulletin. The WB RC was mentioned there as RC-19 by mistake; actually it is RC-15. I thank Dr. Achintya Pal Secretary RC-15 for pointing out this to me.”

Further the GS thanked Dr. Oum Prakash Sharma of Delhi for providing the online Google-meet platform for conducting this meeting. The GS suggested purchasing a platform like Zoom or Google-meet for our IAPT meetings.

He announced that President Prof. Vijay Singh had nominated Prof. P. D. Lele of Mumbai as the Returning Officer (RO) for the elections of the national EC. Prof. Lele has accepted this responsibility and has started working in the right earnest. A notification from the RO announcing the elections, and also the Minutes of this EC meeting would be published in the August issue of the IAPT Bulletin.

Item 2 (a). The President initiated the discussion on the IAPT elections-2021, and asked the GS to brief the EC about the efforts made so far in that direction. The GS said that he had contacted and mailed to the EC members, during June 15– 25, and separately to the RC presidents/Secretaries for their RCs, inviting suggestions. An online meeting of a smaller group of the senior EC members was held on July 4th for initiating the recommendations to various posts. The GS followed it up with phone calls, also for the recommendations from the Regional Councils. We thank all for suggestions received through emails and calls and also the RCs for their responses. We will proceed as per the guidelines of our constitution.

The GS then requested the EC to deliberate on the suggestions/recommendations from the outgoing EC for the various posts as follows.

1. President - 1
2. General Secretary- 1
3. Vice Presidents - 6

(One from each of the five zones + one from Any one of the zones, as a General VP)

* EC Members -22 (one from each of the 22 Regions i. e. RCs)

2 (b). Recommendations from the Regional

Councils RCs:

The GS reported about the recommendations received from the RCPresidents/Secretaries, as given in table-1, for the member-representative from the respective RC to the central/national EC, as well as the RO for the Regional/RC elections. These names were accepted by the EC in the present meeting.

Table-1, Recommendations from the RC Presidents/Secretaries for their member-Representative to national EC (Jan 01, 2022 to Dec 31, 2024), and their RO For the RC

Regional council no., And state(s)	Recommended name for the Member-Representative to national EC	Recommended name for the RO for the RC /Sub-RC elections
RC-01 Delhi, Haryana	Dr. Oum Prakash Sharma , L2006 Director, NCIED, IGNOU <oumsharma@gmail.com>	Shri R. S. Dass L6480 <rsgupta_248@yahoo.co.in> (Ghaziabad)
RC-02 Punjab, J & K, Ladakh	Dr. Mrs. Meenakshi Sayal, L3915 Jalandhar	Prof. Deepak Chopra, L4682 <deepakchopra67@gmail.com> Ludhiana
RC-03 Himachal Pradesh, Chandigarh	Dr. Pawan Kumar, L6218 Shimla <pawankumarsolan@gmail.com>	Prof. Arvind Kumar Taneja, L0257 # 672, Sector -7 Panchkula-134109 <arvind_davc@yahoo.co.in>
RC-04 Uttar Pradesh	Dr. Sundar Singh, L5287 Bareilly College, Bareilly	Dr. Anurag Saxena, L2954 DAV College, Kanpur <anurag_knp@yahoo.com>
RC-05 Uttarakhand	Prof. L. P. Purohit, L4471 HOD, Physics, Gurukula Kangri, Haridwar <lppurohit@gmail.com>	Dr B. P. Tyagi, L3413 <bptyagi@gmail.com> IAPT EXAM OFFICE, 15, Block 3, Rispana Road, Near DBS College DEHRADUN – 248001
RC-06 Rajasthan	Prof. R.K.Khanna, L1180 <rkkhanna.iitm@gmail.com>	Dr K.C. Swami, L4787 <kc_swami@yahoo.co.in>
RC-07 Gujarat, Daman, Diu, DNH	Dr. Chetan G. Limbachiya L4069 Head, Applied Physics Dept. Fac. Tech.&Engg. M. S. University , Vadodara -390002 <limbachiya.chetan@gmail.com>	Prof. Kiritsinh B.Zankat, L4132 Physics Dept. Govt. Science College, Gandhinagar-382020 <kbzankat@yahoo.com>

RC-08 Maharashtra SubRC-08B, Mumbai SubRC-08C, Pune SubRC-08D, Kolhapur	Dr. S. B. Mane, L 4075 Ex. Principal, At/Post: Islampur-Dist. Sangli < sbmane@yahoo.com > 	Dr. Satish Y. Chougule, L6560 K. N. P. college Walva < iaptelection21@gmail.com > Mrs. Kalpana P. Sule, L3131, Mumbai < kalpanasule96@gmail.com > Dr. U. S. Kakade, L6723, Pune Dr. Shashikant B. Patil L3360 < sbpatil62@gmail.com >
RC-09 Madhya Pradesh	Dr Pradip Kumar Dubey, L 5073 Retd. PMB GUJARATI Science COLLEGE,Indore < pkd@tatanagar.com >	Dr. S. B. Welankar, L 4620 568 DATTA NAGAR Near Rajendra Nagar ,RRCAT road Indore < sbw62@rediffmail.com >
RC-10 Chhattisgarh	Dr. S. K. Patel, L6857 < Skpatel281071@gmail.com > Rajnandgaon	Prof. UmakantShrivastava, L7126 < ukscvru@rediffmail.com > Bilaspur
RC-11 Andhra Pradesh	Prof. M. Krishnaiah, L1973 < profkrishnaiah.m@gmail.com > Tirupati	Dr. S. SanyasiRaju L1115 < ssraju lec@yahoo.com > VIZIANAGARAM
RC-12 Karnataka SubRC-12A, Bangalore	Dr. M. S. Jogad, L1581 Retd., School of Physical Science Central U. of Karnataka Kalaburgi < jogad1952@rediffmail.com > 	Dr. Aravind H. Dyama, L4378 < aravinddyama@rediffmail.com > Kalaburgi Dr. M K Raghavendra, L4052 < maigurraghavendra@gmail.com > Bangalore
RC-13 Tamil Nadu, Puducherry	Prof. Anandavadivel, L1812, < aanand@svce.ac.in > Sripermpudur - TN	Prof. G. Markandeyulu, L7966, IITM Chennai < mark@iitm.ac.in >
RC-14 Kerala, Lakshadweep	-----	-----
RC-15 West Bengal, Andaman Nicobar islands, Sikkim	Dr. Makhanlal M. Goswami L2510 Dept. of Physics Midnapore College (Autonomous) Midnapore, WB, 721101 < makhanlal@gmail.com >	Dr. MrinalKanti Chakrabarti L2430 (Retd)St Paul's C.M. College, Kolkata- 700009 < mk_chakrabarti@yahoo.co.in >

RC-16 Odisha	Dr. Dilip Kumar Bisoyi, L1274 < dkbisoyi@nitrkl.ac.in >	Prof. Lambodar Prasad Singh L3376 < lambodar_uu@yahoo.co.in >
RC-17 Assam, Arunachal Pradesh	Dr. Akhilesh Chandra Das, L4037 < akhil2das@gmail.com >	Shri Pranab Kumar Das, L5491 < dassone22@gmail.com >
RC-18 Tripura, Meghalaya, Mizoram, Manipur	Dr. KALIPADA ADHIKARI L5203, < adhikarikalipada@gmail.com > Agartala	Shri MALAY BHAUMIK, L7822, < mbhaumikblg54@gmail.com > Bishalgarh
RC-19 Bihar	Dr. Himanshu Kumar Pandey, L4869 < himanshukrpandey@gmail.com > Patna	Dr RakeshKumar Singh, L4473 Head Dept. of Nano-Technology, A. K University, Patna < rakeshsinghpu@gmail.com >
RC-20 Jharkhand	Dr ShyamRanjan Kumar, L7222 Dept. of Physics, NIFFT, Hatia Ranchi, Jharkhand < srk.niff@gmail.com >	Dr. S. N. Tiwary, L0575 St. Xavier's College Ranchi < shreemantiwary@yahoo.com >
RC-21 Goa	Dr.MiskilNaik, L3460 < miskilko@gmail.com > Dhempe College of Arts & Science, Miramar, Goa	Prof. E.S. Kannan, L7819 BITS Pilani-KKB Goa Campus Zuarinagar, Goa
RC-22 Telangana	Dr. V. Rajeshwar Rao , L3871 < drvrr_kitss@rediffmail.com > Prof. of Physics, Kamala Institute of Tech. & Science, Karimnagar - 505468	Dr. R.L. N. Sai Prasad, LM 6083 Prof. of Physics, NIT, Warangal -506001 < rlnsaiprasad@gmail.com >

The President thanked the outgoing members of the EC for their efforts and contributions to IAPT. The recommended members will file nominations as required. Prof. Samanta and Prof. Tyagi made appropriate suggestions. Prof. Bhupati Chakrabarti emphasised that the central elections and the RC elections are two different exercises. The central-EC election notification will be announced first in the August Bul., and separately the process for the Regional Council elections could be started, with detailed announcements to come up in the Sept. issue of the Bulletin. At this stage several members including Prof. J. D. Dubey, Prof. A. K. Jain, Dr. S. B. Mane, Prof. A. V. Kulkarni Prof. B. P. Tyagi, Prof. P. K. Dubey, Dr. Oum Prakash Sharma, Prof. Manjit Kaur, Prof. M. S. Jogad, Prof. H. C. Pradhan, Dr. Anil Kr Singh, Prof.

Sankararaman and others participated in the discussion. A scanned signature in the nomination form would be valid and all such details will be duly finalized by the RO Prof. Lele. A committee comprising of Prof P.D Lele, Prof J. P. Gadre (Pune) who was the RO in the last EC elections in 2018, the GS Prof. Joshipura and Immediate Past GS Dr B. Chakrabarti was formed by the President for assisting Prof. Lele for finalising the modalities, in view of the present pandemic scenario.

The decisions on unfilled posts will be taken by the EC as and when appropriate.

2 (c) Recommendations from the current EC for the Office Bearers in the upcoming EC

Next the recommendations for the Office Bearers in the new National EC were taken up and again there was a

discussion. The President recalled the small group meeting that took place earlier this month and gave an outline of the proposals for the six Vice Presidents, thanking the two VPs who would be completing their two terms. At this stage, some of the members tentatively left the meeting as a good gesture, since their names were under discussion. The GS repeated the panel of the recommended names for the six VPs. Dr. S. B. Mane mentioned about a candidate's name for the VP West zone. Prof. Jogad, Prof. Arundhati Mishra and Prof. Sankararaman also joined the discussion.

After this, the EC considered the proposed names for the President and the General Secretary. Prof. Jogad put forward another name for the President's post and views were expressed by different members.

Recommendations from the current (outgoing) EC for the Office Bearers in the upcoming EC are shown in table-2.

Table-2 Recommended Office Bearers in the National EC for the new term

Jan 01, 2022 to December 31, 2024

Sr. No.	post	Recommended name and other details
1	President	Prof. P. K. Ahluwalia, L0326 Retd. Prof., Himachal Pradesh University, Shimla < pkahluwalia071254@gmail.com >
2	General secretary	Prof. Rekha Ghorpade, Mumbai; L3390 Retd., R. J. College Ghatkopar Mumbai < rekhaghorpade@yahoo.co.in >
3	Vice President, North Zone	Prof. Ravi Bhattacharjee, Delhi; L3291 Retd. S GTB Khalsa College Delhi < ravi_bhattacharjee@yahoo.co.in >
4	Vice President, Central Zone	Prof. A. K. Jain, Roorkee, L6190 Retd. Prof., IIT Roorkee < ashkumarjain@yahoo.com >
5	Vice President, East Zone	Dr. Ranjita Deka, L4345 Pragjyotish College, Guwahati, < ranjit_deka@yahoo.co.uk >
6	Vice President, West Zone	Prof. Arun Kulkarni, L4513 BITS-Pilani Goa Campus Goa < avk.bitsg@gmail.com >
7	Vice President, South Zone	Prof. P. N. Nagaraju, L2694 Indian Academy Degree College, Bengaluru- 560 043 < godhundi@yahoo.co.in >
8	Vice President, General	Prof. H. C. Verma, L0081 Retd. Prof. IIT-K, Kanpur < hcoverma@gmail.com >

4. Further about the election process

Some relevant information was provided by the GS in this context, as follows.

The central RO Prof. Lele would soon prepare the time schedule i.e. important dates for the election process for the national EC, along with all other relevant details.

The GS proposed that the actual procedure for voting - if required - may remain the same as that followed earlier.

Prof. B. Chakrabarti pointed out again that the RC level elections are different from the central EC elections, and the RC election procedure should start at a little later stage. The outgoing RC of the Region will recommend its new RC, put up notification in the Bulletin, and the nomination format will be essentially the same.

5. Any other matter from Chair or with permission from Chair

(i) Prof. B. P. Tyagi. CCE presented a few important issues about the NSEs which constitute a regular countrywide annual programme of the IAPT since long. Last year in the pandemic situation the exams were delayed and the enrolment was poor. For the current year the situation is not yet clear. Prof. Tyagi expressed concern that the NSE which is a flag bearing activity of our IAPT might lose its stature and relevance if we continue down the path adopted last year. There would be a meeting with the HBCSE and the National Steering Committee for the exams. The President has set up a special Committee to oversee and guide the CCE in his efforts, said Prof. Tyagi.

Prof. Tyagi also pointed out that our students of std. 10th are deprived of the NSE-JS exam because of the age criterion laid down internationally for the Olympiads. Therefore, he suggested starting a separate National Standard Examination for School Science mainly for class 10th students, to be conducted entirely by IAPT. He would be sending a note on this proposal to the GS. Dr. Mane made a good suggestion for forming a committee in this regard. Prof. Pradhan, who has been a Director HBCSE- Mumbai and a President of IAPT, also gave

some inputs. Relevant suggestions also came from Dr. Himanshu Pandey.

(ii) Regarding the next IAPT Convention, Prof. P. K. Dubey (RC-09), Indore, said that it would be possible to organize the Convention during 3rd/4th week of November or the 1st week of December, with due care to other IAPT programmes. The dates would be announced in consultation with the SVVV University Indore. The GS recalled the National Students' Symposium on Physics NSSP-2021 to be organized at Bangalore during Nov 12-14. Prof. Nagaraju VP (S) gave highlights of the (offline) NSSP-2021 and said that the brochure had been sent to members, also uploaded on our website. He requested for a good participation from students all over India. He along with the President recalled that the NSSP was being nicely organized regularly at the Department of Physics Punjab University, Chandigarh under the leadership of Prof. Manjit Kaur and Prof. C. N. Kumar all these years.

(iii) Prof. S. C. Samanta wanted to apprise the EC about the activities of the DPK BCC committee, but he could not join the meeting. Prof. B. Chakrabarti requested the GS to send e-mails to all the RC Secretaries to appoint a Coordinator in their RC for carrying out the survey of the Lab education in Physics, as proposed by the DPK BCC Convener Prof. Samanta.

(iv) Dr. S. B. Mane (RC-08) and Dr. M. S. Jogad (RC-12) requested for release of some funds to their RCs to enable them to pay for the auditing charges etc. The GS said that he would consult the Kanpur office in this regard.

With all the points discussed adequately, the meeting came to an end with thanks to the Chair.

K. N. Joshipura
General Secretary

National Revision Workshop in Physics

Nurturing Students during Pandemic

(May 29- June 4, 2021)

A one-week “**National Revision Workshop in Physics: nurturing students during pandemic**”(NRWP) was organized in an online mode by RC -04 (Uttar Pradesh) in association with Bareilly College, Bareilly; Christ Church College, Kanpur; Ewing Christian College, Prayagraj and Govt P G College, Badaun during May 29-June 4, 2021. It received around 700 registrations from UG & PG students and faculty members from across the country. Students from Ewing Christian College, Prayagraj; Govt. P G College, Badaun; Bareilly College, Bareilly; DAV College, Muzaffarnagar participated in large numbers besides students belonging to other states like Maharashtra, Karnataka, Punjab, Chandigarh etc. The workshop turned out, quite successful in achieving its objectives of revising the important sections of undergraduate Physics. The inaugural session, chaired by Prof. B P Tyagi, Chief Coordinator, IAPT exams, started with Saraswati Vandana and was blessed by Prof. Vinay Kumar Pathak, Vice- Chancellor, CSJM University, Kanpur. Delivering his keynote lecture on, “**Nuclear fission-physics, technology and stories**”, IAPT general secretary, Prof. K N Josphipura enlightened the audience in a very informative and interesting manner. The inaugural session was conducted by RC-04 secretary & organizing secretary of NRWP-2021, Dr Sundar Singh while the



Prof Vinay Kumar Pathak

welcome address was delivered by the president & convener of NRWP-2021, Dr R K Dwivedi. Vote of thanks was proposed by Dr Sanjeev Rathore, organizing secretary of NRWP-2021 & executive member, RC-04. Dr Sanjay Kumar Sharma, secretary IAPT, through his

active support and able guidance helped RC-04 executives in the successful organization of the workshop.

The workshop had a total of 07 technical sessions comprising of 11 invited lectures. On the opening day Dr Anil Kumar Singh, National Coordinator, NGPE & convener of NRWP-2021 delivered a lecture on “Fundamentals of Semiconductor Electronics: Transistors”. was highly appreciated by the participants. Prof Ashok Kumar Singh from Lucknow University; Dr Akhilesh Tiwari and Dr Pramod Kumar of IIIT Prayagraj; Dr R K Dwivedi of Christ Church College, Kanpur; Dr T N Surya from Vardhman College, Bijnour; Dr Devesh Kumar Tyagi of DAV College, Muzaffarnagar; Dr Dharmendra Pandey of PPN College, Kanpur; Dr Avinash Chandra Yadav from Govt P. G. College, Shahganj (Jaunpur); and Dr Kamlesh Kumar Sharma from Invertis University, Bareilly delivered lectures through PPT on zoom platform in various technical sessions. Long interactive sessions followed each of these lectures.

The special attraction of the workshop was the experimental demonstration session on June 1, entitled “The visualization of physics” by Dr R. K. Mitra, of Montfort College College, Lucknow, former secretary, RC-04.

The valedictory function, held on June 4, was presided over by Prof. S. C. Samanta, convener DPKBCC committee, who threw light on some of the important events in Professor D P Khandelwal's life. The Chief guest was Dr Amit Bhardwaj, Director Higher Education, Uttar Pradesh. He appreciated the efforts of RC-04 in



Dr Amit Bhardwaj



Dr Rajesh Gangwar

successfully organizing this workshop for the benefit of students and said that teachers should involve themselves in carrying out activities keeping in mind the larger interests of the society. Guest of honor, Dr Rajesh Gangwar, Joint Director, council of

science & technology, Uttar Pradesh, highly appreciated the efforts of the organizing team of NRWP-2021. IAPT Treasurer Dr D C Gupta, RC-04 Treasurer, Dr A P Srivastava, and the members of RC-04 Dr Shraddha Gupta, Dr Aparna Dixit, and Dr Anita Shukla contributed significantly in the successful organization of the workshop. The workshop ended with the vote of thanks proposed by Dr Dwivedi.

R K Dwivedi

Sundar Singh

Report (Ammani Anvashika)

Anvashika Webinar

Organizer: Bhavan's Adarsh Vidyalaya, Kochi

Anchors: Ms Hridya K Pand, Ms Devika

Platform: Zoom Meeting **Date:** June 21, 2021

Time: 1.30 pm to 4 pm

No. of students and teachers: 503 **Class:** XII

Topic: ENOPCYC event- Lenard-Einstein-Millikan, the trio and Photoelectricity

Resource Person: Sarmistha Sahu, Maharani Lakshmi Ammanni College, Bangalore

Adarsh Vidyalaya Organised this program for all the Std XII students of their 7 sister concerns and all the Physics teachers were invited. To enthuse the science students and motivate them to a better scientific endeavour, they inaugurated the month long(21 June to 20 July 2021) activities for Einstein Nobel Prize Centenary Celebration.

The entire program was managed by students of X, XI and XII and teachers of BAV facilitated it. A *professional* video story of 'Einstein's life and work' was presented by an amateur Std XI team. An innovative rubic-cube art of 'Einstein and Photoelectric effect' was showcased by a smart, creative child Advait of Std X. No amount of praise is enough for the work that he displayed in a record

time!

Chairman, Mr C A Venugopal C Govind's talk, to the teachers of science, was apt and motivating. The visionary in him elevated the spirit of teachers to take the students from science to science-thinking to science-temperament and finally emerge as great researchers and efficient scientists!

The director Mr E Ramana kutty advised the students to follow the path of science. The Physics department, led by Ms Jyothi Pradeep and Principal Mr K Sureshmade the event alive.

The technical session was a demonstration of do-it-yourself, detector for photoelectric effect and a presentation of the experimental work done by predecessors in late 1800's, the bold hypothesis of Einstein and his predictions, and Millikan's tiring experimentation to prove Einstein wrong, but at the end, concluded with total agreement with the novel idea of the particle nature of light.

Interaction with the students was limited because of the sheer number of students. The feedback from teachers was encouraging.

Sarmistha Sahu

Workshop “Online Experiments for Classical Mechanics Lab : Video Capture Using Mobile Phones and Analysis Using Tracker Software”

Date: July 17, 2021

Resource Person: Prof. O.S.K.S. Sastri , Department of Physics and Astronomical Sciences, Central University of Himachal Pradesh

Number of Participants: 36

Venue: Through Google Meet

Co-ordinator: Dr. Amit Goyal

The IAPT-RC3 organized a one-day online workshop on the topic “Online Experiments for Classical Mechanics Lab: Video Capture Using Mobile Phones and Analysis using Tracker Software” on 17th July 2021 through Google meet.

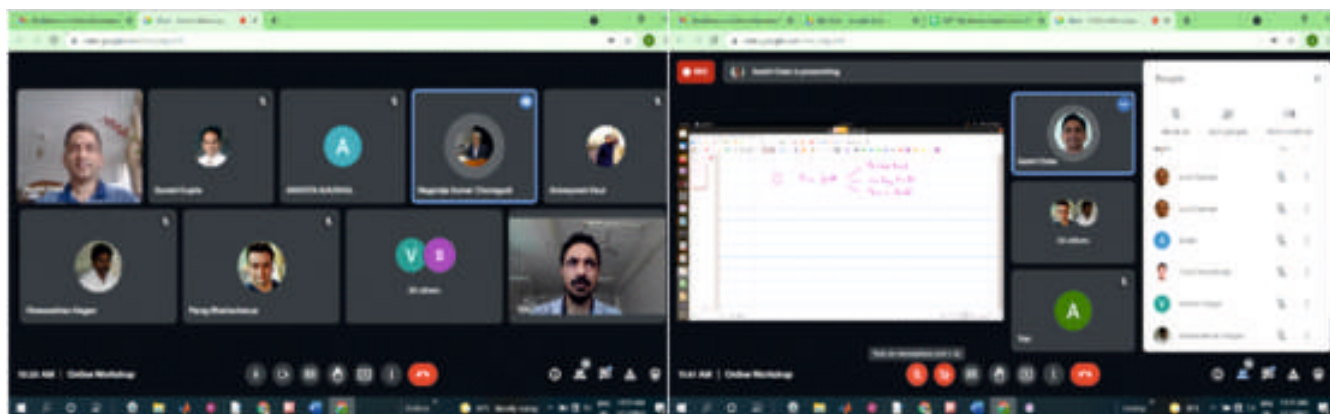
The workshop with hands on session highlighted the utility and methodology for the usage of the 'Tracker' software for online classical mechanics experiments. The following key aspects were emphasized while using this software:

- Creating good quality videos.
- Tracking the videos created.
- Performing analysis of the Experiments.

The resource person gave a detailed description for the process of recording the live videos using mobile phone and the subsequent analysis of such recorded videos using computers or laptops. The resource person elucidated the entire process by using the example of simple pendulum and experiment with ball thrown upwards. Prof. Sastri also explained the procedure to measure least count, setting the calibration and axis in analysis part. The software presents the recorded data along with graphical representation between two physical variables among spatial coordinates, time and kinetic energy etc. The results of such experiments can be further analysed using statistics, curve fitting or Fourier spectrum using this software.

The resource person also listed out the possible experiments that can be performed easily at home or in laboratory and analysed using Tracker software such as free fall motion, projectile motion, mass spring system etc. Towards the end of workshop, speaker gave the overview of coupled oscillator experiment. The session was very interactive and got very warm response from the participants.

Amit Goyal



Guidelines for the Contributors

The IAPT Bulletin invites for publication:

Articles, reviews and short notes on subject matter related to physics content and physics teaching at secondary, undergraduate and postgraduate levels. The write-up must offer some new insight into the topic under discussion. Mere reproduction of information available on the internet be avoided.

Letters and comments on matter published in the Bulletin.

Reports, news and announcements about important physics related IAPT activities/events in the country.

Articles, reviews and short notes

Research papers in specialised fields of mainstream physics may not be sent. Research journals catering to specific areas of physics already exist. However, reviews of recent developments in various fields are welcome.

All the matter should be sent by email to iapt@pu.ac.in. Acknowledgement via email will normally be sent within 10 days. Submissions received via post without soft copy may be considered provisionally, but if accepted for publication then soft copy must be provided. Authors should retain a copy of their write-up, rejected articles will not be sent back. Contributors should give their contact number as well.

The length of the write-up should not, ordinarily, exceed 6 pages of the Bulletin, including diagrams, photographs, tables, etc.

All matter received for publication is subject to refereeing. The editors reserve the right to abridge/alter the write-up for the sake of clarity and brevity

IAPT activity reports

The report must contain the following:

Name of the activity

Date/duration

Venue of the activity

Organising institute along with collaborators, if any

Sponsors, if any (IAPT, RC or any other funding agency)

Summary of the activity

Name of the coordinator/convener/organizer along with address, email and mobile number

Maximum two photographs, if available, may be sent separately via email, preferably of the activity or audience. Send the report soon after the activity (*not later than 2 months after the event*)

If you are sending reports of more than one activity in one issue of Bulletin, kindly send one consolidated report of all activities in a single communication.

ELECTION NOTIFICATION
INDIAN ASSOCIATION OF PHYSICS TEACHERS
EXECUTIVE COUNCIL Jan 01 2022 - Dec 31 2024

The election for the new EC for the term from **JANUARY 2022** to **DECEMBER 2024** is scheduled to be held in November- December 2021 for the following posts:

- | | |
|----------------------|---|
| 1. President | 1 |
| 2. General Secretary | 1 |
| 3. Vice Presidents | 6 (one from each of the five zones + one from any one of the zones as a General VP) |
| 4. Members | 22 (one from each of the 22 Regions) |

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

Nomination papers for the above posts are invited so as to reach the undersigned on or before **17 SEPTEMBER, 2021 (Friday)**. The proforma for the nomination is given below. Before filing nomination, the candidate is expected to ascertain that he/she satisfies the eligibility criteria as per the Constitution 7 d (ii) and the Bye-Laws, Rules and Regulations 12(a) of the IAPT Constitution. (*These clauses are reproduced for your reference in Annexure II.*) The website www.indapt.org may be accessed for full version of the constitution.

The nomination papers from the candidate duly filled in with all the details should reach the Returning Officer (RO) through (i) Speed Post or courier.- (ii) by hand (in a sealed envelope) or (iii) email (a neatly scanned copy/clear photo of duly filled in nomination paper). *Note that if a nomination paper (scanned /photo) is sent by an email, the original nomination paper whose scanned copy has been sent earlier should be sent by speed post/courier or by hand so as to reach the RO within SEVEN days from the last date. Therefore, such an original nomination paper should reach the RO latest by 24 SEPTEMBER, 2021 (Friday).*

**PROFORMA OF NOMINATION PAPER FOR
ELECTION TO THE EC
FOR THE TERM JANUARY 01, 2022 TO DECEMBER 31, 2024**

(PLEASE FILL IN CAPITAL LETTERS ONLY)

- (A) 1. NAME OF THE POST:**
2. **NAME OF THE CANDIDATE IN FULL:**
3. **LIFE MEMBERSHIP NO.:**
4. **POSTAL ADDRESS:**
5. **CONTACT NO. (LANDLINE AND MOBILE):**
6. **EMAIL:**

- (B) 1. NAME OF THE PROPOSER:**
2. **LIFE MEMBERSHIP NO.:**
3. **POSTAL ADDRESS:**
4. **CONTACT NO. (LANDLINE AND MOBILE):**
5. **EMAIL:**
6. **SIGNATURE OF THE PROPOSER:**

- (C) 1. NAME OF THE SECONDER:**
2. **LIFE MEMBERSHIP NO.:**
3. **POSTAL ADDRESS:**
4. **CONTACT NO. (LANDLINE AND MOBILE):**
5. **EMAIL:**
6. **SIGNATURE OF THE SECONDER:**

(D) DECLARATION BY THE CANDIDATE / NOMINEE:

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

Signature of the Candidate

Place:

Date:

Please note: If you do not have any landline number, please try to provide two mobile numbers.

IMPORTANT DATES:

LAST DATE (for nomination papers to reach RO by speed post/by hand/ by email) --- **17 SEPTEMBER, 2021**

LAST DATE (for original nomination papers to reach RO by speed post/courier by hand) --- **24 SEPTEMBER, 2021**

Scrutiny of nomination papers and intimation of valid nominations to the Candidates--- **27 SEPTEMBER, 2021**

List of valid nominations along with recommendations by the outgoing EC (vide Bye-Law 13, see Annexure II) will be published in the **OCTOBER 2021** issue of IAPT Bulletin.

LAST DATE of withdrawal of nominations by email --- **22 OCTOBER, 2021**

List of unopposed Candidates, contesting Candidates and proforma of ballot paper will be published in the **NOVEMBER 2021** issue of IAPT Bulletin.

Elections to the posts, if necessary, to be conducted through ballot papers to reach the RO --- **NOVEMBER- DECEMBER 2021 (Date will be declared later)**

Elections results to be declared (on the website) -- **20 DECEMBER, 2021. The results will be printed in JANUARY 2022 issue of IAPT Bulletin.**

P.D. Lele

Returning Officer, IAPT EC Elections 2021

Prof. P. D. Lele, Bldg. – A4 Flat No. 6, DUDHSAGAR CHS, AAREY CHECK NAKA, GOREGAON (EAST), MUMBAI 400 065.

Contact No.: 09409288348 email ID: pdlele@hotmail.com

ANNEXURE I---

(a) REGIONAL COUNCILS --

RC Nos. STATES and UTs COVERED

- 1 Delhi, Haryana
- 2 Punjab, Jammu-Kashmir, Ladakh
- 3 Himachal Pradesh, Chandigarh
- 4 Uttar Pradesh
- 5 Uttarakhand
- 6 Rajasthan
- 7 Gujarat, Daman & Diu
- 8 Maharashtra
- 9 Madhya Pradesh
- 10 Chattisgarh

- 11 Andhra Pradesh
- 12 Karnataka
- 13 Tamilnadu, Pondicherry
- 14 Kerala, Lakshadweep
- 15 West Bengal, Andaman & Nicobar, Sikkim
- 16 Orrisa (Odisha)
- 17 Assam, Arunachal Pradesh
- 18 Meghalaya, Mizoram, Tripura, Manipur, Nagaland
- 19 Bihar
- 20 Jharkhand
- 21 Goa
- 22 Telangana

(b) **ZONES–**

ZONE - REGIONAL COUNCILS (RCs) COVERED

North 1, 2 and 3 West 6, 7, 8 and 21 South 11, 12, 13, 14 and 22
East 15, 16, 17, 18 and 20 Central 4, 5, 9, 10 and 19

ANNEXURE II ---

CONSTITUTION

7. THE EXECUTIVE COUNCIL

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

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

BYE-LAWS, RULES and REGULATIONS

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

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



INDIAN ASSOCIATION OF PHYSICS TEACHERS

(Registered under Section XXI of Societies Act 1860, Regd. No. K 1448)

Membership Form (PLEASE FILL IN CAPITAL LETTERS)

To,
Secretary IAPT
Regd. Office
Kanpur-208017

Date.....

Dear Sir,

I/We wish to join IAPT as a

- 1) Life Member 2) Institutional Member 3) Annual Member 4) Sustaining Member 5) Student Member

I am remitting a fee of Rs.....through DD/Cheque no/Online transaction no.....

dt..... of.....Bank.

Name : First Name..... Middle Name..... Last Name.....

Qualification..... Sex..... Age.....

Institutional/Organisational Address

.....

.....

.....Town.....Pin.....

Mobile No.....Email ID

Mailing address (if different)

.....

.....

.....Town.....Pin.....

Mobile No.....Email ID

Sincerely yours

MEMBERSHIP & SUBSCRIPTION FEES

- (i) Life Membership : Rs. 1500/= (US \$ 450)
(ii) Annual : Institutional : Rs. 10000/= (US \$ 3000)
Library : Rs. 500/= (US \$ 150)

Individual : Rs. 250/= (US \$ 100)

Student : Rs. 250/= (2 Yrs.)

Single Copy : Rs. 25/=

The bulletin is sent free to Life Members of IAPT.

(For the offline mode the DD/ Multi City Cheque should be in favour of Indian Association of Physics Teachers, payable at Kanpur)

Details for online transaction of Life membership fee Rs. 1500

NAME : Indian Association of Physics Teachers

BANK : Indian Bank BRANCH: Kakadeo, Kanpur-208 005

ACCOUNT NUMBER: 20768203191

IFSC CODE: IDIB000K521

Please Email the scanned copy of the form (filled in Capital Letters) with the transaction number at our Email ID:iaptknp@rediffmail.com

Sanjay Kr. Sharma

Secretary, IAPT

Regd. Office : Flat No. 206, Adarsh Complex,

Awasthi Vikas-1 Keshavpuram, Kalyanpur, Kanpur-208017

sksharma777@gmail.com, Mob. : 09415404969

Indian Association of Physics Teachers

(Registered under section XXI of Societies Act 1860, Reg No. K - 1448)

Registered office: Flat No. 206, Adarsh Complex, Awasthika - 1.

Keshavpuram, Kalyanpur, Kanpur - 208017

8th IAPT National Student Symposium on Physics

Organized by

Regional Councils - RC 12 & 12 A

and

Department of Physics

INDIAN ACADEMY

Degree College - Autonomous, Bengaluru



November 12 - 14, 2021

D P Khandelwal Birth Centenary Year

In recent years, our country has taken a series of measures to induce the spirit of innovation and creativity into our Education system. Projects and dissertations have become an integral part of UG and PG curricula as per the new National Education Policy. To foster a culture of innovation and creativity among the young students, IAPT has instituted the annual National Student Symposium on Physics (NSSP) exclusively for the UG and PG students. The Symposium provides National forum to young students to present their new ideas and innovative work at an early stage of academic career. The yearly series started in 2013 in collaboration with the Department of Physics, Panjab University, Chandigarh. Eighth in the series, NSSP - 2021 will be held during November 12 - 14, 2021.

The format of the symposium consists of **invited talks by Subject Experts, Oral and Poster Presentations by the Students and a visit to Research Laboratories.**

The undergraduate and postgraduate students with Physics background can apply for the symposium latest by September 15, 2021. The Registration fee of Rs. 850/- for outstation students (includes hospitality and accommodation) and Rs. 500/- only for local students (excluding accommodation). The selected papers will be communicated by September 25, 2021 through our Website. Travel support (bus or sleeper class by train) will be provided to the selected papers (for one person per paper only). Application form and other details are available at the website www.indianacademy.edu.in



MORE INFO

For more information, contact

Dr. P. Nagaraju, Convenor, NSSP – 2021(M) 7019976835

Prof. B.S. Achutha, Coconvenor, NSSP – 2021 (M) 9945455277

Email: nssp21blr@gmail.com

Venue: Indian Academy Degree College -Autonomous, Hennur Main Road, Bengaluru - 560 043, Karnataka.

ABOUT IAPT: A voluntary organization of Physics Teachers, Scientists, Professionals and other interested in physics (science) education in the country. Indian Association of Physics Teachers (IAPT) was established in 1984 by dedicated physics teachers and visionary (Late) Dr. D.P. Khandelwal with active support from likeminded members with the aim of upgrading quality of physics teaching - learning at all level in the country. The Association operates through its 22 Regional Councils (RCs) grouped into 5 zones. There is a central Executive Council (EC) which coordinates all its activities.

The following are some of the important activities of IAPT

Publications

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

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

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

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

Examinations for students

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

NGPE (National Graduate Physics Examination): This is conducted for Undergraduate level students every year. Gold medalists of NGPE, may join DAE directly through interview without appearing in the entrance test. S N Bose National Centre for Basic Sciences, Kolkata allows direct admission to toppers in NGPE after an interview for integrated Ph.D.,programme. 5 Scholarships have been instituted to encourage students to take up Physics as a career.

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

For Teachers

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

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

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

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

Conventions: A 3-day National Convention is organised every year, since 1984 on some specific theme. Papers are presented by members and lectures are delivered by experts in the field.

ABOUT Indian Academy Degree College - Autonomous: Indian Academy Degree College-(IADC) was founded in the year 1994 with the vision to establish top notch educational institution to serve diverse educational needs of the society. Currently the institution has student strength of more than 3000. Indian Academy degree College became Autonomous from the academic year 2016-17. The College is reaccredited by NAAC, with 'A' grade and CGPA of 3.27. The College is also certified by TUV Rhineland ISO 9001:2008 and is recognized by UGC under the category 2(f) and 12(B). An important feature of Indian Academy Degree College-Autonomous (IADCA) is that it is always student centric in academic design and delivery, besides

giving a wide academic flexibility to the students. Many co-curricular and extracurricular activities have given impetus for the all round growth and development of students. Research initiatives and skill development programmes continue to help in student's academic progression and employment opportunities.

The College offers under graduate courses in Sciences (with different combinations), Commerce and Management studies, Computer science, Arts and Tourism studies.

It also offers M.Sc., (Applied Genetics, Biochemistry, Biotechnology, Chemistry, Computer Science, Mathematics, Microbiology, Physics), M.A (Economics, English), M.Com (Financial Analysis, International Business) and Master of Tourism Administration. There is also a School of Management Studies (MBA-Programme), College of Nursing and a Pre-University College run by the Indian Academy Education Trust. The Colleges have very good infrastructure, well qualified faculty, excellent laboratories and a good collection of Library books and journals. The College has good academic record in obtaining ranks and distinction in the Bengaluru University Examinations.

Important Dates

- Symposium Date November 12-14, 2021 (Friday to Sunday)
- Last Date for Submission of Abstracts September 15, 2021
- Notification of acceptance of Abstracts September 25, 2021
- Last Date for Submission of full Length paper /Registration October 20, 2021

Guidelines for Submission

The soft copy of the paper in MS-Word should be sent to the Email- nssp21blr@gmail.com

Paper Specification

Maximum Length	Extended Abstract about 2 pages
Margin	1" All sides
Font size & linespacing	Times New Roman-12, Justified & 1.5
Title Page	Title, Author, Affiliation, Contact Details, email, Phone number
Full length of the Paper	About 6 pages including diagrams, tables, conclusion & references.
If paper is accepted, the paper will be published in student journal of Physics - International Edition, ISSN 2319-3166.	



Payment Mode

The Registration fee can be paid through online. The details of the IAPT RC 12 A are as follows;



Name of The Account Holder	IAPT RC 12
Account Number	04752010003124
Name of The Bank	CANARA BANK
Branch Name	Malleswaram, Bangalore-560 055
Type of Bank Account	SB
IFS Code	CNRB0010424
MICR Code	560015232

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G Venkatesh Former Vice-President and Ex Chief Co-ordinator of Exams IAPT	K P Ramesh Dept. of Physics IISc., Bengaluru	C B Gandhigudi E C Member, RC 12 A Bengaluru

National Advisory Committee	National Organising Committee	Local Organising Committee
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S C Samanta Co ordinator Centre for Scientific Culture, Midnapur	K Madhu, Secretary, RC 14, Kerala	T Shivalingaswamy Former Vice-President RC 12 A, Mandya
H R Naren (Netherland)	S Sanyasiraju EC Member, RC 11, Andra Pradesh	Thipperudrappa Chairman Dept. of Physics, VSKD University

REGISTRATION FORM

The Participants can register in advance by sending this registration form.

Name:

Class, University/College:

Address for correspondence:



Mobile No: E- mail:

Tick One: I would like to

i) make ORAL presentation at the Symposium

ii) make POSTER presentation at the symposium

iii) only attend the symposium as participant

Participation category

i) Outstation Student ii) Local Student

I need travel support YES NO Accommodation required YES NO

Did you attend earlier NSSP (If yes, mention year/s)

Registration Fee - Online Payment Transaction ID

ATTESTATION

This is to certify that Mr./Ms.

is a Bonafide student of class of

..... Department/College/Institution.

Signature of the Participant

Date:

Place:

Signature of the Head of the Department/Principal with seal

NB: Additional copies of Registration form may be photocopied if required

PHILATELY as Teaching-Learning Medium

Philately is one of the most popular and family friendly hobby in the world. A postage stamp issued by a country, is authenticated document of commemoration of an event or personality or to show case culture, flora and fauna of the country. A postage stamp not only communicate a message but disseminate information and knowledge about the theme it depicts.

In this hobby I find a wonderful idea of using it as resource material for teaching learning process. Stamp collection is good pedagogy, it associates the subject material with pleasure and fun as hobby. Developing a *thematic stamp* collection is a discovery-based process so we learn various skills like, art of developing a story, skill of scientific classification and arrangement, observational capacity and searching for further relevant information. It rewards patience and persistence.

Introduction of Display- Unfolding the Mysteries of Universe

Since ages as man looked up the starry sky, he always wondered rhythmic movement and mysterious appearance of heavenly bodies. As man's desire to explore unknown and to impart certain order on the apparent chaos of starry sky, he observed, analyse and then devised certain principle and set some rules to unfold the mysteries and also assigned some divine meaning.

Like every one, mysteries of cosmos always fascinated me. So, I took cosmos as a subject of my thematic collection when I persuaded this hobby and developed this collection as philatelic survey of the story of the man's desire to understand this mysterious cosmos and attempt to *Unfolding the Mysteries of the Universe*. Being a teacher, my first thought was to develop this philatelic collection as a teaching learning tool for ever curious minds by inviting them to not only enjoy this beautiful world of postage stamps but also motivate them to explore its intrinsic educational value to explore further.

Since this exhibit is mainly prepared on the guideline of philatelic display for *National Philatelic Exhibition*, so stress is mainly on the philatelic or postal items and their variety. Story line and description of the subject is self-illustrated by postage stamps as pieces of Zig Saw Puzzle to narrate the story, with minimum description.

My philatelic narration of the story of development of cosmology from ancient period to the modern time has been receiving recognition in the form of awards.

References and numerous other internet resources

- | | |
|---|---------------|
| 1. <i>Stamping Through Astronomy-</i> | Renalo Dicati |
| 2. <i>History of the Universe and Cosmology</i> | John North |
| 3. <i>Fascinating Astronomy:</i> - | V.N. Komarov |
| 4. <i>Mask of the Universe</i> - | Andre Scheer |

About Author



Yogesh Bhatnagar, 65, retired as Vice Principal from St Xavier's Sr. School Jaipur. He has, won the CBSE National Award – 2012, written and presented science based scripts, talk shows and demonstrations for children's programme at AIR and Doordarshan Jaipur, been associated with DST (Rajasthan) as resource person) as resource person for National Children Science Congress and other activities. He is an active IAPT member, presently an EC member of RC-06.

A Philately enthusiast, he has won medals and trophies at National /State Philatelic Exhibitions. He is Vice President of Philatelic Society of Rajasthan.

Story of Cosmology through Postal Stamps..... 1

E0146/3 DIVINE COSMOLGY

INDIAN (HINDU) MYTHOLOGICAL VIEW

अहमेवासमेवाग्रे नान्यद्यत् सदसत् परम्।पश्चादहं यदेतच्चोऽवशिष्येत सोऽस्यहम् ॥

Vishvaroop-Virat Swaroop is cosmic manifestation of Devine showing entire universe and its cyclic movement engulf within. *Omni form of Lord- who is the origin and end of all cosmic and earthly objects. He represents the various cyclic process taking place in this universe. He is the universal truth*



Hindu deities associated with Creation, Sustenance and End of the universe



Brahma- the creator



Vishnu- the keeper



Shive – The destroyer



Buddhist view of universe

Vaaman Swaroop of the god who encompasses universe within his approach



Trimurti - coexistence of all three form of god into one



BULLETIN OF INDIAN ASSOCIATION OF PHYSICS TEACHERS

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

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*If underlivered please return to :***Dr. Sanjay Kr. Sharma****Managing Editor**

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