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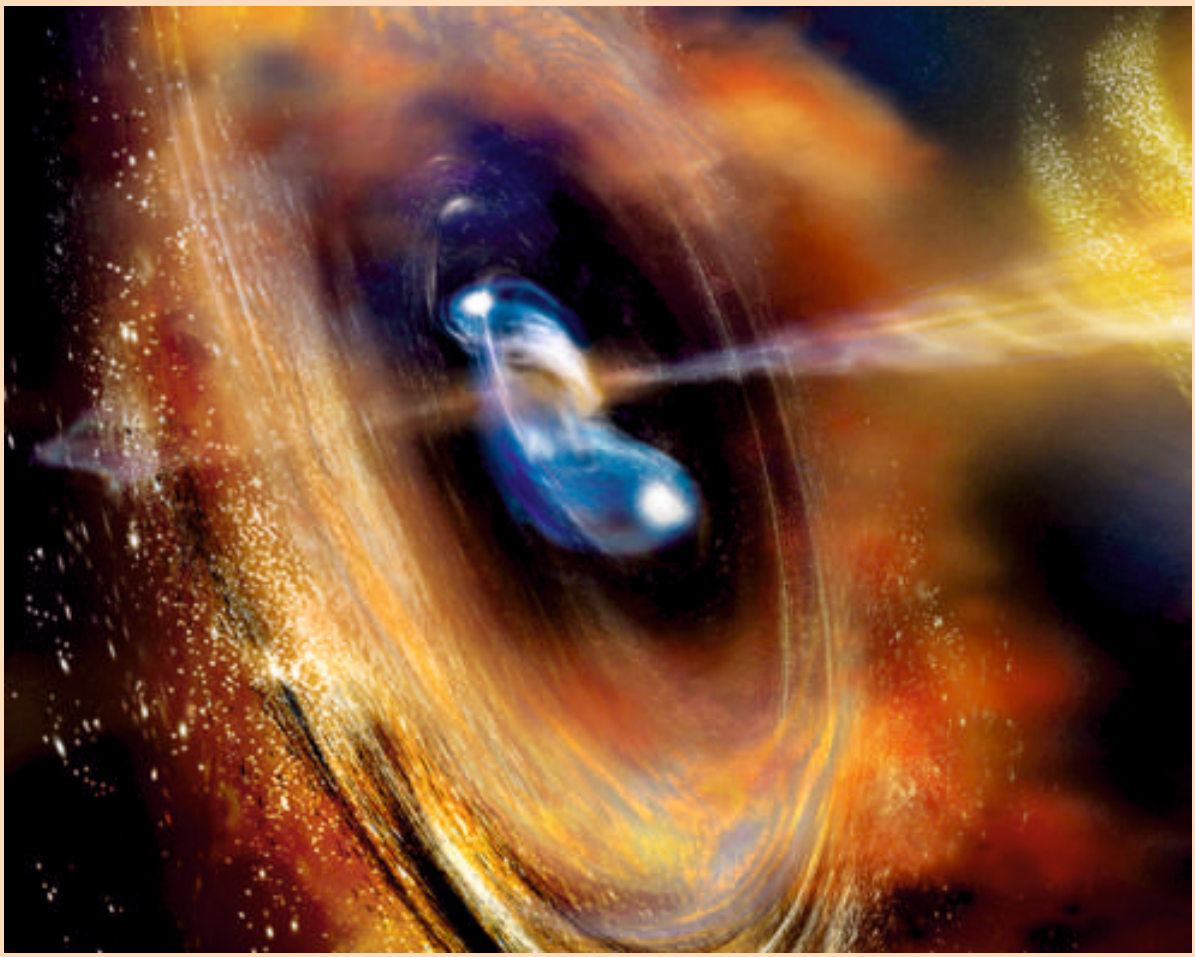


Two neutron stars begin to merge in this illustration, blasting a jet of high-speed particles and producing a cloud of debris. These gamma-ray bursts (GRBs) are the most powerful events in the universe. Scientists think these kinds of events are factories for a significant portion of the universe's heavy elements, including gold. They based their estimates on the rate of short burst GRBs thought to occur across the cosmos, but a Dec. 11, 2021, discovery showed they'll need to factor long bursts into their calculations as well.

For the last few decades, astronomers have generally divided GRBs into two categories. Long bursts emit gamma rays for two seconds or more and originate from the formation of dense objects like black holes in the centres of massive collapsing stars. Short bursts emit gamma rays for less than two seconds and are caused by mergers of dense objects like neutron stars.

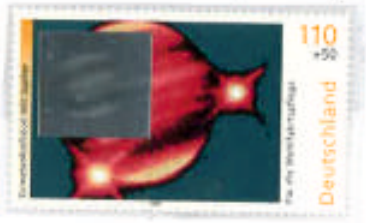
(Link: https://www.nasa.gov/image-feature/neutron-stars-collide:)

The Story Of Cosmology Through Post Stamps 07

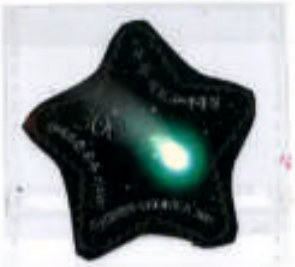
COMET

IMPACT -TO ELIMINATE OR TO BEGIN

There are very few incidences of impact of a comet with a planet or with the Sun in the history of mankind, like one in July1994 when Comet shoemaker Levy collided with Jupiter. But Scientist think, about 4 billion years ago comets bombarding the young earth brought vast quantity of water that now fill Earth's oceans. Detection of organic molecules in comets has led to speculation that that comets may have brought life to Earth.



Stamp embedded with holographic sticker- depict the collision of comet Shomaker Levy 9 with Jupiter. Hologram attached shows event in animation



Star shaped Self-adhesive stamp-depict diffused light due to vaporization of ice from comet.

Souvenir Sheet – illustrate the theory of extinction of dinosaurs from earth 65 million years ago -probably by impact of comet with earth which have enough energy to generate but much less rocky material. It kills about 70% of all species just in a short period of tome most notably the non-avian dinosaurs.
Long period comet like Hale Bopp (1997) are ball of dust, rock and ice that are highly eccentric trajectories around the sun. may go in collision course.

Comet 46/Wirtanen comes from a class - ***hyperactive comet***-which release more water as they draw closer to the Sun- are the clue of water on the Earth

Water on the earth is brought by impact of comet like ***Hartley (103P/Hartley)*** which contain ocean like water

Cometary contribution could have been significant for organic matter, especially prebiotic material & could have contributed to shape life on earth

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National Curriculum Framework (Schools): Less is More or More is Less Debate

National Curriculum Framework (NCF) for schools is out. It is a very verbose document seemingly leaving nothing to imagination. It requires lot of time, energy and above all patience to read each line of the document. Fortunately, for our purpose, there is a section on science education providing guidelines for the course design for which the above debate is relevant. The course design proposes four core courses and two advanced elective courses for Physics beyond the class tenth. Students who come to study these courses are supposed to have no knowledge of topics such as trigonometry, calculus, and vectors. Course design proposes that these topics will be covered as and when encountered in the context may be creating scope for context-based learning. Elective courses are for those students who want to continue their study of Physics further. The way this has been put is akin to introduction of choice-based credit system. Earlier, choices were mainly decided by whether students want to go for medical or non-medical subjects. Medical students used to do their courses without any prerequisite of mathematics which was built with in the course content. So, is it the same wine in the new bottle or some other cocktail? Naturally this is what is worrying the teachers and students on the ground zero.

Majority of the teachers in schools see load shedding of content as most desirable reform, but some experts feel that as the boundaries of

knowledge in a subject expand, topics are likely to percolate down from postgraduate courses to undergraduate courses to senior secondary level. And this makes less is more or more is less debate shriller.

Also, there is a side show, will less students opt for Physics at UG level and PG level leading to reduction in teaching opportunities and jobs as a result of such a choice. A worrisome situation.

IAPT from 23rd March 2023 has started a series of webinars on NEP, NCF (schools) and NCF(UG/PG). We hope to reach out to experts who are seeing these developments as either active participants or have a good view from the sides and get them to our community to discuss these issues. IAPT has also created a working group to investigate this scenario which is getting rolled out in chunks for implementation. We would like to have your considered views on this exercise to be conveyed to the authorities, so that we may not find ourselves in a position of mute spectators. I extend you an invitation to be part of the webinars, send us an abstract on what you want to share, IAPT platform will be made available. You can send the abstract to me on my google mail

.

What are your views, get hold of your laptop/mobile, get ready and participate in this debate. This debate also reminds me of a very famous quote of Nobel Laureate PW Anderson, a Condensed Matter Physicist: ***More the merrier***.

PK Ahluwalia
President IAPT

When learning is purposeful, creativity blossoms. When creativity blossoms, thinking emanates. When thinking emanates, knowledge is fully lit. When knowledge is lit, economy flourishes.

✧ ✧ ✧

If you FAIL, never give up because F.A.I.L. means "First Attempt in Learning". END is not the end; in fact E.N.D. means "Effort Never Dies". If you get NO as an answer, remember N.O. means "Next Opportunity".

✧ ✧ ✧

All Birds find shelter during a rain. But Eagle avoids rain by flying above the Clouds. Problems are common, but attitude makes the difference!!!

Dr. A P J Abdul Kalam

PHYSICS NEWS

Experiments see first evidence of a rare Higgs boson decay

The discovery of the Higgs boson at CERN's Large Hadron Collider (LHC) in 2012 marked a significant milestone in particle physics. At the Large Hadron Collider Physics (LHCP) conference this week, ATLAS and CMS report how they teamed up to find the first evidence of the rare process in which the Higgs boson decays into a Z boson and a photon. This Higgs boson decay could provide indirect evidence of the existence of particles beyond those predicted by the Standard Model of particle physics. The result has a statistical significance of 3.4 standard deviations, which is below the conventional requirement of 5 standard deviations to claim an observation. The measured signal rate is 1.9 standard deviations above the Standard Model prediction.

With the ongoing third run of the LHC and the future High-Luminosity LHC, CMS and ATLAS will be able to improve the precision of this test and probe ever rarer Higgs decays.

Read more at: https://phys.org/news/2023-05-evidence-rare-higgs-boson-decay.html

Original paper: Provided by CERN (still not published)

Quantum matter breakthrough: Tuning density waves

Scientists at EPFL have found a new way to create a crystalline structure called a "density wave" in an atomic gas. The findings can help us better understand the behavior of quantum matter, one of the most complex problems in physics. Scientists have long been interested in understanding how materials self-organize into complex structures. In the world of quantum physics, this sort of self-organization of particles is seen in "density waves," where particles arrange themselves into a regular, repeating pattern or order. Density waves are observed in a variety of materials, including metals, insulators, and superconductors. However, studying them has been difficult, especially when this order occurs with other types of organization such as superfluidity. To explore this interplay, the researchers created a "unitary Fermi gas," a thin gas of lithium atoms cooled to extremely low temperatures, and where atoms collide with each other very often. When enough photons are emitted and reabsorbed easily tuned in the experiment the atoms collectively organize into a density wave pattern.

Read more at: https://phys.org/news/2023-05-quantum-breakthrough-tuning-density.html

Original paper: Nature (2023). DOI: 10.1038/s41586-023-06018-3

Researchers investigate the swarming behavior of microrobots

Miniaturization is progressing rapidly in many fields, and the trend toward the creation of ever smaller units is also prevalent in the world of robot technology. In the future, minuscule robots used in medical and pharmaceutical applications might be able to transport medication to targeted sites in the body. Researchers are looking for new ways to perform tasks on the micro- and nanoscale that are otherwise difficult to realize, particularly as the miniaturization of devices and components is beginning to reach physical limits.

Statistical physics can help to uncover new strategies that may be utilized by collectives of robots. The field of active matter models and robotics covers many realms of the living and the nonliving world in which collective behavior or collective movement can be observed, one prominent example being the way that flocks of birds move in unison.

Read more at: https://phys.org/news/2023-05-swarming-behavior-microrobots.html

Original paper: Science Advances. DOI: 10.1126/sciadv.adf.5443

Soumya Sarkar
IISER PUNE
INDIA

Muon g-2 Anomaly

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The recent results from the Muon 'g-2' collaboration at the Fermi National Accelerator Laboratory (FNAL) show a discrepancy of the muon's magnetic moment value with the theoretical calculated value. Earlier calculations from standard model (SM) show that the 'g' value is slightly greater than 2 due to the effect of virtual particles created and annihilated in vacuum. Though the discrepancy is less, it opens a door for inclusion of new physics beyond the standard model. In this article, we discuss briefly the magnetic moment anomaly of muon.

Keywords: Muon, anomalous magnetic moment, standard model, new physics

I. MAGNETIC MOMENT OF MUON

When a charged particle of mass 'm' moving in a circular orbit of radius 'r' with velocity 'v' the time period of its rotation is given by:

$$T = \frac{2\pi r}{v} \tag{1}$$

Due to the motion of this charged particle, a small amount of current is generated whose value we can get from the expression as:

$$i = \frac{q}{T} = \frac{qv}{2\pi r} \tag{2}$$

The current loop behaves as a tiny magnet whose magnetic dipole moment is given by:

$$\mu_l = iA = \frac{qv}{2\pi r}\pi r^2 = \frac{qvr}{2} \tag{3}$$

Dividing and multiplying eq.(3) by the mass of the particle we can write

$$\mu_l = \frac{q(mvr)}{2m} \tag{4}$$

But when a particle moves in a circular motion its angular momentum is given by the expression

$$L = mvr \tag{5}$$

Using eq.(5) in eq.(4)

$$\mu_l = \frac{q}{2m}L \tag{6}$$

This is how the magnetic dipole moment of a charged particle is related to its angular momentum. But in quantum mechanics when we consider charged elementary particles along with the orbital motion, they also exihibit spinning motion about their own axis. So they have a nonzero magnetic momentum value even though not moving in a circular orbit. However, the relation between spin magneic moment and spin angular momentum can't be exactly written as eq.(6). Rather the relation can be written as:

$$\mu_s = g\frac{q}{2m}S \tag{7}$$

where 'g' is called the gyromagnetic ratio, which indicates how strong the magnet is and rate of its gyration around an external magnetic field. When this magnetic moment came in contact with an external magnetic field it experences a torque.

$$\tau = \mu \times B \tag{8}$$

From relativistic quantum mechanical solutions of Dirac equation, the value of 'g' is 2 for all spin $\frac{1}{2}$ particles. However, quantum field theory gives rise to a deviation from this i.e. 'g-2' becomes a non-zero value. This is called the anomalous magnetic moment.

In 1948, a super precise value of 'g' for electrons was calculated as 2.00238 or 0.1% higher. This extra value came due to inclusion of a branch called quantum electrodynamics (QED). It tells that the space near a charged particle is not realy empty. A continuous process of creation and annihilation of virtual photons are occuring in it. This virtual photon interacts with the charged particle and helps to increase in its g value. Later the electroweak and quantum chromodynamics (QCD) allows the presence of virutal charged particles like electrons and quarks and their antiparticles. The bigger effects in the deviation of g comes from the interaction of photons and electrons. But smaller effects include the case when the muon's electric field creates a photon that then makes a quark and anti quark. It has a very small contribution to gyromagnetic ratio and very difficult to calculate also. In order to include the hadronic contribution scientist followed an alternative method called the lattice QCD. However, it doesn't support the theory.

The anomalous magnetic moment of muon is given by

$$a_\mu = \frac{g_\mu - 2}{2} \tag{9}$$

[Here subscript is used to indicate the values for muon] Measurement of highly precise value of a_μ is required to

check whether it matches the theoretical value given by standard model or not. Any descripancy allows us to search for physics beyond standard model.

As the g-factor of muon is slightly greater than 2 its anugular and spin magnetic momentum precesses at different angular frequencies, the difference of which is called the anomalous precession frequency and is given by

$$\omega_a = \omega_s - \omega_c = a_\mu \frac{qB}{m} \tag{10}$$

where,

ω_s = spin precession frequency and
ω_c = momentum (cyclotron) precession frequency.

The fact that muon is chosen, its an elementary particle of mass having 207 times higher than that of electron which makes it sensitive to new kind of virtual particles. Also it has a longer life span (about $64\mu s$) which allows scientists to measure its properties more precisily.

II. BACK HISTORY

The search for experimental value of the anomalous magnetic moment of muon was started in 1959 at CERN (The European Organization for Nuclear Research, on the Franco-Swiss border near Geneva, Switzerland). They perfermed three experiments in 1959, 1966 and 1969 respectively. Initial experiment which used synchrocyclotron, presented two results; 1st one having a 2% precision with respect to the theoretical value and the 2nd one gives 0.4% precision. The 2nd experiment which used proton-synchrotron gave 25 times more precise result than the previous one. The results from 3rd experiment which was published in 1979, gave result with a precision of 0.0007% with the theory. All the three experimental results didn't provide any such discrepancy with the standard model.

The 2nd stage of experiment was performed at Brookhaven National Laboratory (BNL) (situated in Rochester city, United States) in 1989 with an improved experimental setup. In 2006, they gave their final result which showss a 3.7σ deviation from the theoretical value. It didn't give enough certainty as in high energy physics we need a standard deviation of 5σ in order to claim a solid discovery however this result motivates scientists to perform another experiment at Fermilab.

III. EXPERIMENTAL SETUP IN FERMILAB

The Fermi National Accelerator Laboratory (located just outside Batavia, Illinois, near Chicago, USA) experiment was designed to measure the anomalous momentum value more precisely with the help of advanced instrumentation though the working principle is more or less similar to that on BNL. The accelerator produces an intense beam of muons. High energetic protons are crushed into a fixed target, producing pions which latter decays into muons. The muons are injected to a magnetic ring which is the centeral part of the Muon g-2 experiment at Fermilab. This is called 'g-2' experiment because it measures directly the small difference between the Lande g factor of the lepton's gyromagnetic ratio and 2, the value of electron's g predicted by the Dirac equation in the absence of field theoretic corrections.

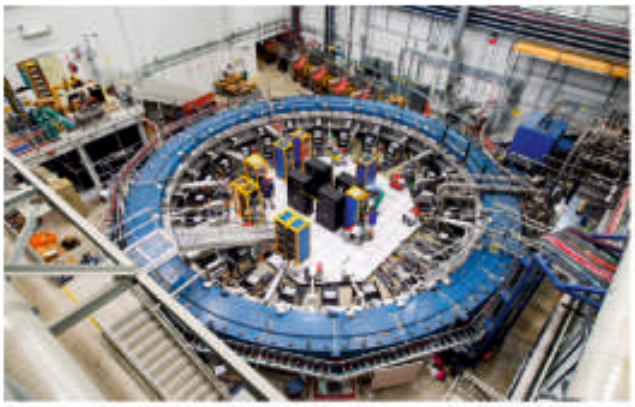

FIG. 1: Exp. set up at FNAL for the calculation of g-2 value [https://vms.fnal.gov/asset/detail?recid=1950114]

The superconducting magnetic ring is made of steel, aluminum and superconducting wire having a diameter of 50 feet, was previously used in BNL to produce the desired magnetic field. In FNAL, it produces an uniform magnetic field of 1.45 Tesla. The muons circulate inside the ring with nearly the speed of light and lasts upto $64\mu s$ before decaying into a positron and a neutrino antineutrino pair. The neutrino antineutrino pair goes undetected while the positrons are tracked by the 24 calorimeters present at the inner side of the ring. The calorimeters measure the energy and time of arrival (relative to the injection time) of the decay positrons (and their count). Precision frequency is calculated from the positrons they emit. The experiment requires simultaneous measurement of the precision frequency, the magnetic field and the muons distribution inside the strage ring. Nearly 16GB per second raw data is produced which is handeled by a sophisticated data acquisition (DAQ). The data taking was started in 2018.

IV. CONCLUSIONS

The recent measurements of the muon's 'g-2' collaboration indicate that the magnetic moment of muon is different from its SM value. This is known as anomalous magnetic moment of muon. The SM of particle physics says that the muons magnetic moment should be a number very close but not equal to 2.

From standard model calculations, the anomalous

magnetic moment of muon $a_\mu(SM) = 116591810(43) \times 10^{-11}$. From the run 1 data at Fermilab $a_\mu(FNAL) = 116592040(54) \times 10^{-11}$ which is an uncertainty of 3.3 standard deviation. Combining the result from FNAL with that obtained from BNL the new world average is given by $a_\mu(Exp) = 116592061(41) \times 10^{-11}$ having an uncertainty of 4.2 standard deviation from the standard model value.

The results published till now may be a crucial evidence that our understanding of the elementary world is incomplete. But we don't know what might be the new physics behind it. If the discrepancy between experiment and theory reaches up to discovery level that would be a strong evidence for the existence of new physics and we are just waiting for its discovery.

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ARTICLE

Max Planck: His Story of Winning the Nobel Prize in Physics

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Abstract

During 19th century, Germany, France, and UK were leaders in science and most of the Nobel Prizes were shared amongst their scientists. Max Planck is acknowledged as the Father of Quantum Physics. He got 74 nominations, including one from Albert Einstein, for Nobel Prize between 1907 and 1918 before he was awarded the Nobel Prize in 1919. The story reveals that getting nominated is not so difficult but there are many hurdles to be crossed for achieving the award. Max Planck explained the black body radiation spectrum over all wavelengths by his quantum hypothesis, now known as Planck's law. His ideas influenced the development of Theoretical Physics in Germany and later in the whole world.

1. Introduction

Max Karl Ernst Ludwig Planck (Max Planck) was born in Kiel, Germany on April 23, 1858. After passing high school examination, Planck, who was considered hard-working and talented, was enrolled at the University of Munich to study mathematics and natural sciences. He studied for three years at the University of Munich, one of the top universities in Prussia, Germany. He was tutored by the well-known mathematicians Gustav Bauer and Ludwig Seidel. He learnt physics from equally eminent Professors of his time, such as Hermann von Helmholtz and Gustav Kirchoff in Berlin University. He got his Doctorate from Munich University in 1879 for his work on thermodynamics. At the age of 22, in 1880, he received 'habilitation' (a qualifying degree for teaching in a university) from Munich and qualified for teaching as a lecturer in the university.

Max Planck started his research work in thermodynamics. He gave a new definition of Second Law of thermodynamics based on Entropy. Later, he developed a new theory of black body radiation using entropy and Boltzmann constant which became famous as Planck's law of radiation. He was appointed Professor of Theoretical Physics in university of Berlin. Soon after, he was nominated as a member of Prussian Academy of Sciences. In Berlin, he published two books in German language, “Das Prinzip der Erhaltung der Energie” (The Principle of Conservation of Energy) in 1887, and “Über irreversible Strahlungsvorgänge” (On Irreversible Radiation Processes), in 1897. These books established his reputation as a scientist and teacher of Physics in Germany.

His journey towards Nobel Prize starts in university of Munich and ends in university of Berlin. He got the Nobel Prize in Physics in 1919 retrospectively for 1918 “in recognition of the services he rendered to the advancement of Physics by his discovery of energy quanta.” Let us explore the adventurous story of his Nobel Prize which he richly deserved but had to wait for 12 years due to wranglings of the Nobel Committee or the intransigence of Royal Swedish Academy of Sciences, which is the final arbiter for awarding the Nobel Prize.

2. Achievements for which Max Planck was nominated for the Nobel Prize

We sum up the achievements of Max Planck for which he was nominated for the Nobel Prize over a period of 12 years from 1907 to 1919.

Planck radiation law: Based on the molecular kinetic observations, in 1896 Wilhelm Wien gave the equation for spectral energy distribution for a black body. In 1899, experimental physicists, Otto Lummer and Ernst Pringsheim, observed systematic deviation between their experimental results and Wien displacement law, in the case of short wavelengths. They doubted the correctness of the law. Later, in the case of long wavelengths, they found that the Wien displacement law did not have general validity. Planck also believed that Wien's law has no theoretical base. From the theory of electromagnetic radiation, he derived a correct version of Wien's law, which is known as Planck's law of radiation. It states that electromagnetic radiation from heated bodies is not emitted as a continuous flow but is made up of discrete units or quanta of energy, the size of which involves a fundamental physical constant (Planck's constant). H. Rubens and F. Kurlbaum believed Planck's formula was most useful due to its simplicity.

Energy quantum and Planck constant: To explain the experimental results, Planck introduced the concept of "Energy element" (ε) proportional to the vibration-number (ν), i.e., $\varepsilon = h\nu$, where 'h' is a universal constant (later came to be known as Planck constant). His calculated value for h was 6.55×10^{-27} ergs x second. Planck published an article in the journal "Annalen der Physik" on Jan. 9, 1901, in which he introduced the term "Elementarquanta" (elementary quantum) in matter and electricity. From his calculations, he found that the elementary quantum of electricity, that is, electron has the value 4.69×10^{-10} esu. He found his value very close to the value determined by J.J. Thomson (6.5×10^{-10}esu). The idea of Planck constant, and energy quantum lead to the quantum theory (now known as 'old quantum theory') which was a harbinger of revolutionary changes in the concepts of classical physics. Theoretical Physics got a 'quantum jump' in Germany after the discovery of Planck's law and Heisenberg's Quantum Mechanics and Schrodinger's Wave Mechanics.

The first Solvay Conference was held in 1911 in Brussels, Belgium where all the topmost scientists were invited. The subject for discussion was: 'The theory of radiation and quanta' and it provided a platform to make Planck's energy quanta known outside German speaking area. Many comments for and against the quantum hypothesis of Planck were received. Einstein wrote to a friend that in Brussels, the failure of the quantum theory was lamented, without a remedy being found. Still, conference was a success - by positively changing attitudes towards the quantum concept and emphasizing the central importance of this concept for future physical research. Max Born wrote: "According to Planck hypothesis absorption was a continuous while emission discontinuous phenomenon involving discrete quanta. But this strange hypothesis seemed to him the only way out of the dilemma between quantum effects and electro-magnetic theory."

3. Nominations of Max Planck for Nobel Prize

Max Planck got a record number of nominations from 74 nominators of many different countries of Europe and America during 1907 to 1918. In 1910, one of the longest nominations was from F. Hasenöhrl of Austria. He nominated Planck for his work in the field of theory of heat radiation which contains several new ideas. Their general validity and universal character give useful results for the entire physics. He wrote that as the idea is quite strange, and we are not used to it, thus, the hypothesis of 'energy quanta' had been criticised.

In the second proposal for the year 1910, E. Riecke of Germany stated that Planck's influence on experimental and theoretical research was profound. The award of the Nobel Prize would appear to the proposer, entirely justified. Philipp Lenard, the Nobel Prize winner of the year 1905, opined that as L. Boltzmann has expired, according to his opinion for the important discovery of the radiation laws of black body radiation, the Nobel

Prize be awarded to M. Planck.

I believe the Nobel Committee was not convinced due to lackadaisical attitude of nominators. The nominators believed, the theory in the present form is not perfect. They observed: “Max Planck is aware and continues to improve the theory. The “quanta” hypothesis has already passed successfully through many discussions. It is more and more gaining ground. Its great fruitfulness has been shown in the successful application to the theory of the specific heat as described by A. Einstein and others”.

4. Successes and Failures of Max Planck Quantum Theory

The successful application of Planck quantum theory is illustrated as follows:

(i) Explanation of the photo-electric effect by Albert Einstein.

(ii) Decrease in specific heat capacity of diamond at low temperature.

(iii) James Franck and Gustav Hertz observed that the energy an electron needs to possess, to ionize a mercury atom, is of the order of a quantum.

(iv) W. Wien showed that the X-rays also can trigger electron emission. This assumption has been brilliantly confirmed.

(v) The conduction of electricity through metal is explained by electron theory as a flow of electrons through metal. Attempts to set up empirical formulae for conduction resistance, adhering to the Planckian radiation formula, with certain assumptions, agrees remarkably well with experiment.

(vi) N. Bohr applied quantum theory to explain the lines of hydrogen spectrum.

Despite all these successful applications of Planck quantum theory, there were some gaps which remained to be fulfilled. In 1910, Planck set up a new idea. In the second Planck radiation theory it is assumed that a resonator absorbs energy continuously but on the other hand emits energy as a whole multiple of energy quantum. One consequence of this assumption is that a resonator at the absolute zero point is not deprived of all energy, but has a “zero-point energy”, independent of temperature. This concept of zero-point energy is a new idea of quantum physics, which is foreign to classical physics.

In 1914, the report of G. Granqvist of Sweden concludes: “Nevertheless, with the focus on the inconsistencies of Planck's quantum hypothesis, it remarks, on the one hand the theory is not perfect as other theories in physics, but at the same time Planck radiation law and Planck constant given in the theory play important role for studying different areas of physics”. Based on Expert's report, the Nobel committee also concluded in its report, despite numerous confirmations Planck's work is not yet as complete to be rewarded with a Nobel Prize.

5. Award of Nobel Prize to Max Planck in 1919

In 1916, H. Rubens, Germany, wrote to the Nobel Committee, that from electrodynamic, thermodynamic and probability theory, Planck gave a radiation law, which is named after him. For the derivation of the law, he found it necessary to introduce a universal constant. This is to be seen as the starting point of the modern quantum theory. It is one of the greatest achievements of the modern physics, even of science. W. Wien, Germany, nominated Planck for his work on radiation theory and for installing the quantum theory. He argued, Planck's work has become important for the development of physics.

The greatest living legend in science, Albert Einstein of Germany, also wrote his letter, which reached the

Nobel Committee on Oct. 18, 1918. In the letter, he nominated Planck for his achievements in the field of heat radiation, and specially for his work "on the law of energy distribution in normal spectrum" and "on the elementary quanta of matter and the electricity". Einstein opined that with them Max Planck made possible, not only to determine the exact and absolute size of atom; but also laid the foundation for the quantum theory. W.C. Röntgen, who was awarded the first Physics Nobel Prize, in a very short letter nominated Planck for his work on quantum theory.

Even though the committee acknowledged Planck's work in 1918, however, it did not find the quantum theory worthy of the Nobel Prize, due to contradictions within the theory. In fact, for the year 1918 none of the proposed candidate was seen as worthy of the Prize. Thus, the prize was reserved.

The Nobel Committee in its report of Sept. 15, 1919 first notes that since 1907 Planck had received the most nominations over the years from the most competent nominees of all the 1919 candidates. In 1919, among these notables were A. Einstein, M. Born, M. von Laue, and W. Wien. The report refers to the discussion about Planck's candidacy in 1908, and the unanimous opinion of the Nobel Committee members, and decline of the proposal by the Swedish Academy. The Nobel Committee considered Planck's discoveries on a par with the classical theories. It even implicitly described Planck as a pioneer of science, and discoverer of the elementary quanta subsequently proposed for the 1918 prize.

Ultimately, after so much wait, 74 nominations, including some from the greatest living Scientists of the world, and a bit of frustration, Max Planck, one of the greatest scientists of Germany and father of Quantum Theory. was awarded the Nobel Prize reserved for 2018 in 2019. It may be of interest for Indian and global readers of this article that lacunas in original derivation of Planck's theory of black body radiation were removed by SN Bose in 1924, who applied Einstein's light-quantum to derive Planck's radiation law. It is unfortunate that Bose missed the Nobel Prize in Physics.

6. Conclusions

1. Nobel Prize in Theoretical Physics is generally awarded after verification of theory by experiments.
2. Max Planck made a speculation to introduce quantum idea for radiation emission which proved to be successful in the long run.
3. He is, without an iota of doubt, founder of Quantum Physics.

Acknowledgements

Author is grateful to authors, Rajinder Singh, University of Oldenburg, Germany & Björn Martens, Physics Institute, Carl von Ossietzky University, Germany for the supply of a complimentary copy of their book "*Inside Story of Max Planck and the Nobel Prize Award"* which forms the basis of my article.

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Dr M L Gupta
(30.1.1924 to 3.5.2023)

We are saddened to inform our readers that Dr. M L Gupta, the only surviving class-mate of IAPT founder Prof. Khandelwal left for his heavenly abode on 3rd May, 2023 at Jaipur.

Born on 30th January 1924, Dr. M L Gupta completed his college education at the Agra College, Agra from 1939 to 1945. He secured first rank at the M.Sc. (Physics) examination of Agra University in 1945. Incidentally, Dr. M L. Gupta is no stranger to Bulletin readers. A few years ago (2016-2019), we published some articles written by him, in which he differed from Einstein and presented his own views on relative motion, envisaging the presence of an 'Ocean of Non-manifest Cosmic Energy in Space'.

As a young lecturer of Physics, he went on a Central Overseas Scholarship from Government of India to do research work at the Imperial College of Science and Technology, London for a Ph.D degree from London University. There he worked from October 1957 to March 1960 with Prof. Abdus Salam (Nobel Laureate 1979) in the field of Nuclear and Elementary Particle Physics. He was awarded a Ph.D. degree by the University of London in April 1960 and also a D.I.C. degree by the Imperial College for the high quality of research work done at the institution. He retired from Rajasthan College Education Service in 1979 as Principal, M.S.J. Post Graduate College, Bharatpur.

After retirement, Dr. Gupta devoted his whole time to scientific research in the Vedas and published more than 60 research papers and 5 books on Science in Vedas. His first book “The Cosmic Yajna-The true story of creation from the Vedas unknown to modern science” (1999) won him the coveted Kunti Goyal International Award, 1998. At the ripe age of 90, he wrote his 6th book “Cosmic Energy and Relativity Phenomena” (2014) based on the Vedic notion of an ocean of cosmic energy.

Dr. M L Gupta is survived by one son and four daughters. We join them in paying our homage to a great physicist and a keen researcher in the field of Science in the Vedas.

K. S. Sharma

It doesn't matter how beautiful your theory is, it doesn't matter how smart you are. If it doesn't agree with experiment, it's wrong.

✧ ✧ ✧

If you think you understand quantum mechanics, you don't understand quantum mechanics.

✧ ✧ ✧

We absolutely must leave room for doubt or there is no progress and no learning. There is no learning without having to pose a question. And a question requires doubt. People search for certainty. But there is no certainty.

Richard P. Feynman

Dr Anil Kumar Singh
(31.12.1967 to 11.5.2023)

Dr Anil Kumar Singh former HOD Physics and in-charge of the Departments of Computer Science, Bioscience and Electronics and coordinator of Commerce and BCA in Eving Christian College Prayagraj, was an enthusiastic and dynamic fellow. He is no more with us and left for his heavenly abode on 11.5.23. In his college he came up as the most popular and demanded teacher for his students over a very short span of time. He was a life member of IAPT and a number of other scientific organizations. He always showed interest in intense academic activities. Along with the activities of IAPT he was very much involved in his academic research projects with BARC Mumbai and IISc Bangalore. He was very closely associated with me since last 16 years and was working as the Coordinator NGPE since last four years. He conducted NGPE Part C (An examination in Experimental skill) on an online plateform, very successfully, for the two successive years 2020 and 2021 during Covid period. After Covid, he arranged the conduct of NGPE – 23 Part C offline at IIIT Prayagraj in a successful way. This was really an excellent arrangement under joint responsibility of Dr Anil Kr Singh and Dr Akhilesh Tiwari HOD Physics at IIIT Prayagraj. Last year he played a pivotal role in arranging a big program of RC-4 in the name of NLSP – 2022 in UP for the graduate students under the New Education Policy. I have had a big venture of Conducting NGPE with him in the last five years. The services rendered by Dr Anil Kr Singh for his own students at ECC Allahabad and at the all India level through NGPE/ IAPT will always be remembered. I wish his soul rests in peace and pray the All Mighty to provide strength to the members of grieved family to bear the loss. Om Shanti

B. P. Tyagi

"In the history of science, we often find that the study of some natural phenomenon has been the starting point in the development of a new branch of knowledge."

✧ ✧ ✧

I feel it is unnatural and immoral to try to teach science to children in a foreign language They will know facts, but they will miss the spirit."

✧ ✧ ✧

We must teach science in the mother tongue. Otherwise, science will become a highbrow activity. It will not be an activity in which all people can participate."

– C. V. Raman

Activity Report: 2022-2023

Title of the activity: Awareness lecture on Gravitational Waves: A New Window into the Universe and poster presentation competitions
Date & Venue: 17th April to 19th April 2023,
Program Coordinator: Prof. Dr. L.D. Jadhav, Secretary, IAPT RC 08
Description of Activity:
The regional Council of Maharashtra (RC 08) organized an awareness lecture on **Gravitational Waves: A New Window into the Universe and poster presentation competitions** for the students of Colleges in the jurisdiction of Shivaji University Kolhapur, during 17th to 19th April 2023. Dr. Anupreeta More, Scientific and Technical Officer E (R & D), IUCAA, Pune was invited as the Guest speaker for this activity.

1.Rajaram College, Kolhapur: "Physics Fusion with Gravity".
The department of Physics, Rajaram College, organized, two day inter-collegiate and intra-collegiate student competitions on 17/04/23 and 18/4/23. The activity was named "Physics Fusion with Gravity". The competitions were meant to boost students' creativity, to explore their innate talent and develop scientific temperament and also to exchange their thoughts with each other. The competitions were followed by an Awareness Guest lecture on the topic "Gravitational waves: A new window for exploring the universe" by Dr. Anupreeta More, Scientist from IUCAA Pune.

Seventy students attended the competitions and Guest lecture, out of which 59 participated in different activities. Dr Anupreeta explained the significance of its prediction and detection especially with the scientific devices and also how it will lead to a new window for understanding the Universe in a much better way.
The competitions were, science poetry to highlight how a Scientific thought evolves and touches one's own chord to turn an explanation into a piece of literature. The poems on topics like Dear human, Density, Boundless Eclipse, Atomic world, Don't take me lightly were recited during competition. Brain teaser competition had an overwhelming response, in which students solved crossword puzzles, riddles and problems with enthusiasm. Scientific memes were created and portrayed on the digital screen to make physics learning an enjoyable activity. Scavenger hunt was another attractive feature of the competition. Here the students were given scientific clues to explore the hidden physical goods deployed within our campus. These programs were carried out on 17th April 2023 and on 18th April 2023 poster competition on Gravitational waves: prediction and observation, and astrophotography competitions were arranged.

The entire two days event ended with a note that there is a need to broaden our scientific lookout and to use science for betterment of human life in society. The activity was coordinated by Dr. Ketaki Patankar, Science Coordinator & Associate Professor in physics.

2. Kasegaon Education Society's Smt. Kusumtai Rajarambapu Patil Kanya Mahavidyalaya,(Arts, Science & Commerce), Islampur and Rayat Shikshan Santha's YC Institute of Science, Satara
A workshop on gravitational waves: a new window in to the universe

The aim of the workshop was to provide an opportunity to B. Sc and M. Sc. students, research scholars from various colleges in Sangli District to acquaint themselves with the concept of gravitational waves and it's most violent and warped events in the Universe. The explanation of gravity from the classical perspective of Newton to the modern and complex view of Albert Einstein was carried out in the workshop. The workshop allowed the students to apply their knowledge and practice their skills on cutting-edge science and real-world applications. The technologies used in the LIGO and VIRGO observatories to detect gravitational waves and limit seismic interference in the detected signals were also introduced to the students.

Poster presentation competition was arranged on the following topics:

i) Gravitational Waves: Prediction and Detection,
ii) Effect of Gravitational Waves on Earth,
iii) Study of Planetary Atmosphere,
iv) Exoplanets,
v) Space time Quantum

vi) Parallel Universe

The activity at Islampur was coordinated by Prof. T.G. Shinde, under the supervision of Dr. V.G. Kale, Principal of the Kanya Mahavidyalaya College. 99 UG/PG students participated in this activity. Dr. S. B. Patil, Head, Department of Physics, of the College, Dr. Sachin Pawar, Associate Professor, Department of Physics, Shri.Vijaysinha Yadav, Arts and Science College, Peth Vadgaon and Dr. Dr. I. A. Dhole, Assistant Professor, Department of Physics, Sadguru Gadage Maharaj College, Karad were invited as an examiner for the poster presentation competition.

The activity at Rayat Shikshan Santha's YC Institute of Science, Satara was coordinated by Dr. Sarfraj Mujawar under the guidance of Dr. B.T. Jadhav, Principal, YCIS, Satara. 87 students from different colleges in Satara District were benefitted. Mr. Shubham Jituri , In-charge, Astrophysics, YCIS Satara. Dr. A. P Torane Head, Physics Department were also present. Dr. Gaurav Lohar, LBS College Satara and Mr D.S More YCIS Satara examined the posters.

Winners of poster presentation competition were felicitated weith Memento and rank certificates.Participation certificates were given to the every participant.

L D Jadhav
Secretary
RC-08.

Chief Guest: Dr. Anupreeta More delivering lecture

Prize Distribution

REPORT RC-17

Online Workshop on
Meet The IAU Astronomers! (MTIAUA)
Date: 22-04-2023

A one-day online workshop was organized on 22-04-2023 by the Department of Applied Sciences, Tezpur University (TU), collaborating with the Office for Astronomy Outreach, International Astronomical Union (IAU OAO). Around 660 participants registered for this workshop from all over India and outside India. Although the workshop had a wide audience range, most participants were undergraduate and postgraduate students. The invited speakers spoke on various topics related to astronomy, which was the most exciting part of the workshop. Through a virtual event, the workshop's primary goal was to connect school students, educators, amateur astronomers, undergraduate, postgraduate, Ph.D. students, and faculty members with International Astronomical Union (IAU) member astronomers. Through this event, IAU members engaged the audience in conversation about astronomical research areas, the value of astronomy to society, and the career options available in astronomy. An essential aspect of the workshop was the Interactive session & Career guidance for young aspirants by the resource persons.

The workshop began with a brief inaugural ceremony. Prof. Rajib Haloi, Head of the Department of Applied

Sciences, TU, gave the welcome address. Afterward, Dr. Biplob Sarkar, convenor of the workshop, welcomed the participants and resource persons and mentioned the workshop's objectives. Prof. Partha Pratim Sahu, Dean of the School of Engineering, TU, delivered the inaugural address. After that, Dr. Dhrubajyoti Haloi, Associate Professor, Department of Applied Sciences, TU, addressed the Session, giving a brief overview of the Department of Applied Sciences. The inaugural Session concluded with Dr. Bijoy Krishna Debnath, Assistant Professor, Department of Applied Sciences, TU, being introduced as Session I's chairperson.

Dr. Sujatha Sreeramulu from the M.P. Birla Institute of Fundamental Research, Bangalore, delivered the first talk, "**Astronomy for ALL – A citizen science Approach**." In her talk, Dr. Sreeramulu gave an overview of basic concepts in astronomy and astrophysics and introduced a few projects that astronomy enthusiasts and hobbyists can take up to do astronomy at their own pace and convenience. The second talk of the Session was delivered by Dr. Shyama Narendranath from ISRO, Bangalore, with the title "**Moon: a very happening place**." Dr. Narendranath talked about our current knowledge of the lunar surface, open questions, and future prospects. Both talks riveted the participants, and the participants actively participated in the discussion session in Google Meet and on YouTube live streaming.

Convenor of the workshop, Dr. Sarkar, chaired the post-lunch Session. Dr. Sonali Sachdeva delivered the first talk of Session II from the Raman Research Institute, Bangalore, entitled "**Science of galaxy formation using JWST**." During her talk, Dr. Sachdeva discussed the current status of the field of galaxy formation, provided a description of the latest space-based telescope - JWST (James Webb Space Telescope), and elaborated on our preparation to deduce maximum Science from the upcoming data. Dr. Aru Beri of the IISER Mohali gave the final talk of the workshop entitled "**Probing regions of strong gravity by mapping accreting neutron stars and black holes**." In her talk, Dr. Beri discussed how the new field of X-ray polarimetry and multi-band observations shed light on the geometry of the strong gravity objects. The participants actively attended all the talks via Google Meet and YouTube live streaming. An interactive discussion session with the audience followed each of the talks.

Dr. Sarkar, conducted the valedictory Session. He thanked all the coordinators and faculty members who continuously supported coordinating this encouraging event and made it successful and the delegates and participants who attended the online workshop.

Biplob Sarkar

REPORT RC-12A

NAEST Webinar

Organized by: Shiksha Sopan
Anchored by Vimal Kumar
Platform: Zoom Meetings
Date: 13 May 2023 **Time:** 6-8 pm
No. of teachers and students: 78
Live streamed in YouTube: 279 students
Class: 9-12
Topic: Uncertainty in Physical Measurements
Resource Person: Sarmistha Sahu

Both the prologue and the epilogue by Mr Vimal ji was enticing. I am sure; students will be self-motivated to participate in the Experimental Skill test. The novel National Anveshika ExperimentalSkill Test, one of its kinds, is gaining popularity among children- School and college students.

A series of webinars of various topic, specially for the students, has been a new feature this year.

Uncertainties is a part of experimental work; its inevitability and importance were highlighted. The rules, why and how, and simple tips to express one's work meaningfully was elaborated. Everystep was explained pictorially and with examples. Everything encountered in

school experimentation was covered, though rapidly. But the interaction at the end was a proof of clarity and concept understanding.As the webinars are available in the Shiksha Sopan Channel, they will be used repeatedly by curious students positively.

Activity Based Lectures
Organized by: Chemistry Affinity
Venue: Club house, DLF, Westend Height Begur, Bangalore 68
Date: 3 May 2023 **Time:** 11am --1pm
No. of students 20 No of teachers: 3 Class: Std 6 to 12
Topic: "Learning by Doing"
Resource Person: Sarmistha Sahu
A chemistry teacher organised the workshop with the aim to help the students of her building develop conceptual and real-world learning. Another Physics teacher and a Maths teacher lent their helping hand, and the students had an exceptional experiential learning!
3 mirrors and a protractor were distributed among the students to work on it, observe and infer.
The children exhibited a tremendous presence of mind and acute observational possibilities. A few demonstrations on multiple reflections were enough for them to formulate the general equation and guess the planar angles by counting the number of images. Their imagination of abstract geometry was appreciable. A 7-class student Krishiv Kumavat identified the difference between the planar and solid angles and named it 2D-3D angles! Spatial imagination was in force. Each student developed an original way of understanding and sharing it with his peers. Saptaswa (std IX) projected a curved space to a plane, suggesting the number of images that can be formed by 4 mirrors placed with negligibly small solid angle. A marvellous feat by a creative budding scientist.
The message of 'learning by doing' was spread far in the community. Naturally, parents requested for more of such sessions.
A 'homely' lunch with all the teachers and a student was a pleasant ending. The journey of
64 km, up and down, was worth it.

Sarmistha Sahu
Coordinator

Participating Students with Prof. Sarmistha

10-Day Summer School In Physics

Mumbai Sub-Regional Council (8B) organized a 10-day summer school in theoretical Physics in collaboration with MES's D. G. Ruparel College from 17th April to 28th April 2023. The aim of summer school was to orient the students towards problem solving. The areas of problem solving were: Thermodynamics, Electromagnetism, Quantum Mechanics and Waves and Oscillations. This is the seventh year of organizing such summer schools in Physics by Sub-RC08B.

In all 36 students registered for the summer school. A total of 23 boys and 13 girls participated from the following colleges: Wilson College (2), D. G. Ruparel College (10), Jai Hind College (3), K. J. Somaiya College (1), St. Xavier's College (2), NES Ratnam College (6), Sathaye College (3), Ruia College(5) M.D. College (01), N. Wadia College (1).

The guest for inaugural function was Prof. Archana Pai from IIT Mumbai. Dr. Maske, the I/C Principal of Ruparel College, welcomed the gathering.

Prof. Archana Pai delivered an enrichment lecture titled ***'Gravitational Wave Detection opens a New Era in Astronomy'***, where she explained about the origin of the gravitational waves and how they were first detected. She also talked about the use of gravitational waves in the study of the structure and evolution of the universe and job opportunities in the new project LIGO – India. The Laser Interferometer Gravitational-Wave Observatory (LIGO) - India is a planned advanced gravitational-wave observatory located in Maharashtra, India which is an integral part of the worldwide network of gravitational waves detectors, whose concept proposal is now under active consideration in India.

Mrs. Rekha Ghorpade, General Secretary of IAPT and EC members of Mumbai sub-regional council were present for the function.

The participating students and resource persons used Google classroom facility for sharing reading material and for additional home assignments. Feedback form for each session was taken from students.

The objective of the Summer School was to enhance the problem-solving capabilities of students. Resource persons had prepared daily problem sheets and students were encouraged to solve the problems themselves. Some assignments were also assigned through google classroom. It was indeed a pleasure to see students interacting and solving problems for more than six hours daily for these ten days. We also involved four facilitators who along with resource persons helped the participants in problem solving by providing hints at individuals or group level. Facilitators also helped in evaluating home assignments.Thefacilitators group were consisted of two teachers viz Prof. GaurangTawade and Prof. Ninisha Patil and two students viz Mr OmkarWagh and Ms Sakina Sayed.

The resource persons were:

Electromagnetism: Dr.Jyoti Rao (Former HoD, Ruia College, Mumbai),

Quantum Mechanics: Prof. SumedhSawant(MES's D.G. Ruparel College, Mumbai)

Waves and Oscillations: Prof. Mahesh Shetti (Wilson College, Mumbai)

Thermodynamics: Prof. Ganesh Madkaikar (MES's D. G. Ruparel College, Mumbai)

Following additional enrichment sessions were also conducted:

Dr.Aditi Chaubal (IIT, Mumbai): She guided students about Econophysics which is a new horizon for Physics students

Prof. Abbas Rangawala (Former Head, Department of Physics, Uni. Of Mumbai): He discussed the topic of 'Crisis Management in 19th Century Physics', where he conversed about the events and the mathematical aerobatics that led to the birth of quantum mechanics.

Prof. Anuradha Misra (Former Head, Department of Physics, Uni. Of Mumbai): She presented the history and development of Quantum Mechanics through her talk titled'Linear Algebra and The Physical World'

Dr.Vinayak Kamble (IISER- Thiruvananthapuram): Dr Vinayak Kamble gave two talks on Introduction to Quantum Mechanics and the Career Opportunities after B.Sc. in Physics.

Dr. Vinita Navalkar (JoVE) took online session on 26th April 2023 at 6.00 pm through Google meet on'Careers in

Research Journals' which provided a list of several job opportunities for the Physics students.

Students were served daily breakfast, lunch and evening tea as a part of local hospitality for all days. The day would start at 8:30 am and end by 5pm, after addressing difficulties of participants in specific areas of various assignments.

The valedictory function for the Summer School was on 28th April 2023. Prof. Rangawala was the chief guest. IAPT General Secretary Ms Rekha Ghorpade was the special invitee. She is also ex-officio member of Mumbai Sub Regional Council. Mumbai EC members viz Dr. K G Bhole (Secretary), Dr. Shyamala Bodhane (Treasurer), Prof. Mahesh Shetti, Prof. Hemlata Deshpande hosted the programme. Prof. Mahesh Shetti coordinated the Valedictory. Dr. Mugdha Patki, the coordinator, from D. G. Ruparel College, presented the report of the 10-day Summer School. Some student participants, one resource person and one facilitator expressed their observations of the 10-day summer school. Dignitaries spoke to encourage students and organisers. Certificates to all participants were awarded by the dignitaries. Students who showed consistent performance in class, proactively helped peers and submitted timely home assignments were given Certificate of Merit by Prof. Rangawala. Mrs.Shymala Bodhane proposed the vote of thanks.

We are sure this summer school not only helped students to develop problem solving skills but also must have helped the facilitators in honing their skills in activity-based teaching-learning. Resource persons in turn surely get benefitted while designing problem sheets and that is one of the major aims of IAPT – to improve the teaching-learning process in Physics.

IAPT Mumbai Sub-Regional Council thanks Ruparel College and its faculty for providing us the opportunity to host such Summer School. Dr.Mugdha Patki from Ruparel College coordinated this summer school activity.

K G Bhole
Secretary

Group photo: Resource Persons and Participants with GS Prof. Rekha Ghorpade

Science Day Celebration at Handique Girls' College

The Department of Physics, Handique Girls' College, Guwahati with the support from IAPT, RC-17 organized a talk on the occasion of the National Science Day, February 28, 2023 in the College. The talk was delivered by Dr Jiban Jyoti Das, Professor, Department of Physics, Cotton University, Guwahati on the topic, "CUPAC-NE Accelerator Facility for Fundamental and Applied Sciences".

CUPAC or the Cotton University Particle Accelerator Centre is a unique facility proposed to be set up near Guwahati by Cotton University. The proposed facility has thrown up unique research and development opportunities for not only the accelerator physicists and technologists, but has also opened new vistas of research for the students who decide to pursue careers in as diverse fields as physics, medical physics, antiquarian studies, computer science, anthropology, and so on. Once operational, it will have 8 beam lines to be operated and maintained by the respective institutes of higher studies in the 8 north eastern states including the state of Sikkim.

Dr Das, an alumnus of IIT-Kanpur is the former Scientist-F in the Inter University Accelerator Centre, New Delhi, a visiting scientist in the Joint Institute of Heavy Ion Research, Oak Ridge National Laboratory, USA and a physicist in the National Superconducting Cyclotron Laboratory at Michigan State University, USA.

During the speech Dr Das dwelt on the unique design of the proposed accelerator, which, when completed, would be one of its kind in the country. He also made a lucid presentation on the research opportunities that the proposed accelerator would give to the students of the entire north eastern region.

After the talk there was a lively interaction between the speaker and the audience.

The talk was attended by the faculty members and the Physics Honours students of the Department of Physics of the College and also Mr Basanta Deka, former Head of the Department of the College, students of Pragjyotish College, Guwahati, two former faculty members of Pragjyotish College, Dr Runima Baishya and Dr Ranjita Deka. Dr Baishya is the President of IAPT, RC-17 and Dr Deka is the Vice-President, IAPT, East Zone. In the meeting Dr Anuradha Das Purkayastha, Head, Department of Physics of the College welcomed the speaker while he was introduced to the audience by Dr Shakeel Zamal, and the vote of thanks was offered by Dr Uday Sankar Senapati, both faculty members of the Department.

The function was anchored by Miss Taania Saikia, a student of the Department.

Anuradha Das Purkayastha

Handique Girls' College, Guwahati

To our readers

For change of address and non-receipt of the Bulletin, please write (only) to:
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Workshop on Experiential Learning

Venue: Sain Dass Anglo Sanskrit Sr Sec School, Jalandhar

Date: 3rd May, 2023 **Participants:** 430

Convenor: Mr Rakesh Sharma, Principal Sain Dass A S Sr Sec School

Co-Convenor: Dr. Meenakshi Sayal, EC Member IAPT

Resource Person: Dr. Jaswinder Singh, National Awardee

One day workshop on experiential learning through Wonders of Physics, Beauty of Science and Miracles of Mathematics was organized by Sain Dass A S Sr Sec School in collaboration with IAPT RC -02 . Workshop was inaugurated by Prof. Dr Ajay Sareen ,Principal Hans Raj Mahila Maha Vidyalaya , Jalandhar. She averred that inquisitiveness about daily life phenomena leads to scientific temperament and she further emphasized that learning by doing is powerful tool to understand Physics in particular and Science in general. Principal Rakesh Sharma presented floral welcome to chief guest Dr Ajay Sareen , guest of honor Dr Meenakshi Sayal and Resource Person Dr Jaswinder Singh , National Awardee. 430 students from 10 schools of Jalandhar enthusiastically participated in the workshop. Principals and teachers of S.D. School, Parvati Jain School and Sarvhitkari School along with District Science Supervisor also participated in the workshop. During workshop, Dr Jaswinder Singh explained basic principles like Bernoulli's Principle, Rocket Propulsion, Ohm's Law, Conservation of energy , Gold Leaf Electroscope and phenomena of Optics etc. through experiments and also inspired the students to learn by performing simple activities. He also demonstrated tricks of Mathematics. Enthusiastic response of the students ensured success of the workshop. At the end , teachers appreciated the efforts of the institution and asked for more such workshops to be conducted in future

Meenakshi Sayal
EC Member RC-02.

Inauguration of workshop

Xth IAPT National Student Symposium on Physics (NSSP) -2023

To foster a culture of innovation and creativity among the young students, IAPT has instituted the annual National Student Symposium on Physics (NSSP). The yearly series started in 2013 in collaboration with the Department of Physics, Panjab University, Chandigarh. The first seven in the series NSSP 2013-2019 were successfully held at the Department of Physics, Panjab University, Chandigarh, and the 8th and 9th NSSP were held in Bengaluru during 2021-2022. The Symposium provides a national forum to young students to present their new ideas and innovative work at an early stage of academic career. A Brief Summary of the first seven Programs, their booklets and posters can be accessed here:

https://drive.google.com/drive/folders/199vDTrj3NyhyBATRU98FF_bzXeGFyb2X

We are glad to announce that TENTH in the series, NSSP-2023 will be held during October 27-29, 2023 at Department of Physics, Panjab University, Chandigarh.

SALIENT FEATURES OF THE PROGRAMME:

- Oral / Poster Presentations by the UG / PG Students
- Invited Talks by Subject Experts
- Visit to Research Laboratories
- Limited Travel Support
- Local hospitality and accommodation to outstation students
- Registration fees (for outstation participants Rs. 800/-)

IMPORTANT DATES

Registration opens : 1st week of August 2023

Submission of Abstracts for poster and oral presentations

Display of list of Selected Participants: 1st week of September 2023

Selected Candidates must bring complete manuscript of their work in a proper template which can be accessed from the link:
https://drive.google.com/drive/folders/1MNPyC46KXlPhFq3ZooOMhhOcDEdLK-nw?usp=share_link

Few refereed articles shall be published in "Student Journal of Physics" International Edition

Link for Registration and deadline details shall be notified in the next announcement.
For information cnkumar@pu.ac.in, nssp@pu.ac.in,
Prof. C.N. Kumar, Coordinator NSSP2023, Dept. of Physics, PU, Chandigarh.

Please circulate this information to all interested undergraduate / postgraduate students of your College / University departments to encourage maximum participation.


Indian Association of Physics Teachers
IAPT
DINABANDHU SAHU
MEMORIAL AWARD
2023
IAPT DSM Award recognizes a Physics Teacher for his/her significant contribution to Undergraduate Physics Teaching in any institution affiliated to a University recognized by UGC.
The award consists of a citation and a cash Prize
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Eligibility Criteria

At least 5 years of Undergraduate Physics Teaching

Full-time teacher as per UGC Guidelines

Not More than 50 years of age as on 30 June 2023

For details visit

https://sites.google.com/site/iaptdsma/home

For any clarification contact

iapt.dsm.award@gmail.com

Nomination (online) by an IAPT Member or Physics Faculty or Head of the Institution by 30 June 2023

https://www.cognitoforms.com/IAPTDSMA/iaptdsmanominationform

Application (online) latest by 30 June 2023

https://www.cognitoforms.com/IAPTDSMA/IAPTDSMAApplicationForm

IAPT was established by
(Late) Dr. D P Khandelwal
aims at upgrading Physics teaching and teachers at all levels.

" Physics " the real fun

NAEST 2023

National Anveshika Experimental Skill Test

Registration Begin 1st April 2023

Eligibility Criteria :-
Junior : Std IX -XII
Senior : B.Sc & M.Sc

Register @
https://naest.shiksha-sopan.org/

Maximum Scholarship upto ₹80,000 for four consecutive years

Cash Prize Maximum ₹20,000

Find More Info

8081176889 naest@shiksha-sopan.org

NO CHARGES AT ANY LEVEL

National CO-Ordinator :- Prof.H.C Verma

Organised By
National Anveshika Network Of India, Shiksha Sopan ,Kanpur

NATIONAL ANVESHIKA EXPERIMENTAL SKILL TEST

INFORMATION BROCHURE- NAEST 23

NATIONAL ANVESHIKA NETWORK OF INDIA (NANI) , a unit of INDIAN ASSOCIATION OF PHYSICS TEACHERS(IAPT), in collaboration with SHIKSHA SOPAN, conducts this unique experimental skill test annually, under the leadership of Dr. H. C. Verma (recipient of the Padmashri award 2020), with the help of its network of 29 Anveshikas all over India.

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Eligibility

The test is conducted in two categories:

Junior: Students studying in any class 9/10/11/12 from any State Board/ Central Board of India. Those who passed class 12 in 2022 and have not joined any course other than B.Sc are also eligible.

Senior: Students doing B.Sc/M.Sc from any affiliated Colleges/ Universities of India. Those who passed B.Sc in 2022 and have not joined any course other than M.Sc are also eligible.

THE VARIOUS ROUNDS OF NAEST

The first round: SCREENING (ONLINE)

STEPS TO PARTICIPATE:

1. Register at the site
   naest.shiksha-sopan.org
2. Appear for the screening paper at the online Shiksha Sopan platform on the scheduled date.

The screening paper:

It is a video-based paper. There will be 10 short videos of less than a minute from some observations in our day-to-day life or in the labs. Multiple choice questions having one or more correct answers are framed on basis of the video. The question basically aims to test some concepts of physics.

The second round: PRELIMS(ONLINE)

Short listed students from the screening round enter into the prelim round after verification of eligibility through Adhaar and marksheets.
In this round the student has to perform three experiments, the write up of which is sent at their homes. They are then expected to make and send a report which includes their observations and analysis and videos.

The unique experiments:

These experiments are designed in such a manner that they can be performed using materials at home. Innovation required in the set-up for these experiments done at home tests the skills of the student.

OFFLINE SCREENING AND PRELIMS

Some Anveshikas also conduct offline screening. For this, the students have to go and appear for the test from the assigned centre. The screening paper will be similar to the one described above.
If they qualify in the screening round, they will enter the prelims. The prelim round will also be held in physical mode at some assigned centre. They have to go there and perform the experiments as per the guidelines given.

Semifinal and the final rounds

On the basis of the reports sent by students in the online prelim round or on the basis of their performance in the offline prelim round they are selected for the semifinal round.

A unique opportunity:

This round is held in physical mode in Kanpur for all the selected students under the direct guidance of Dr. H. C. Verma. There they have to perform three new experiments on the set-up which is made in the divine premises of Sopan Ashram.

Students who qualify in the semifinal round go into the final round, to work on new experimental set-ups, where the national winner is then declared.



The prizes

Regional prizes at each centre:
(Prelim round)
First: Rs. 1,000
Second: Rs. 750
Third: Rs. 500

National prizes:
(Junior and Senior)
First: Rs. 5,000
Second: Rs. 3,000
Third: Rs. 2,000

- *Participation certificates will be issued to all those students who appear for the screening round*
- *The National level prizes are awarded under the scheme of IAPT-Shilpa Nandakumar Memorial Award*
- *The National winners will be felicitated at the National convention of IAPT*

Additional prizes

Sponsored by Pragati foundation, Shiksha Sopan will also give one-time cash awards to the national winners:

Junior Category:
First: Rs. 10,000
Second: Rs. 5,000
Third: Rs. 2,500

Senior Category:
First: Rs. 20,000
Second: Rs. 10,000
Third: Rs. 5,000

- Scholarship by Pragati foundation of up to Rs. 50,000 per year for four consecutive years for the top three winners in class 9 - 12 group who go for higher studies.
- Scholarship amount can be raised to Rs. 80,000 per year based on the adjudged economic condition of the student.

Prof. H.s. Virk Honoured With Life Time Achievement Award

Dr Florian Kongoli (CEO Flogen Tech Inc. Montreal) organised VIRK International Symposium in Phuket (Thailand) as part of SIPS -2022 during 27 Nov. to 1st Dec. 2022. Prof. Virk was conferred FRAY Int. Sustainability Award for his Lifetime Achievements in Interdisciplinary Research in Physics and Technology on 29th November along with 15 other Eminent Scientists and 5 Nobel Laureates.

Citation of Award

Prof. Hardev Singh Virk is a pioneer in interdisciplinary research in India using heavy ion beams for irradiation of minerals, glasses, polymers and other insulators. He was instrumental in using Radon concentration in indoor air, soil and groundwater for estimation of health hazard effects and earthquake prediction in the Himalayas to develop applications for sustainable development of the region. This award is named after Prof. Derek Fray of Cambridge University.

Guidelines for the contributors

The IAPT Bulletin recommends 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/organiser along with address, email and mobile number

Maximum two photographs, if available, may be sent separately via email, preferably of the activity or audience.

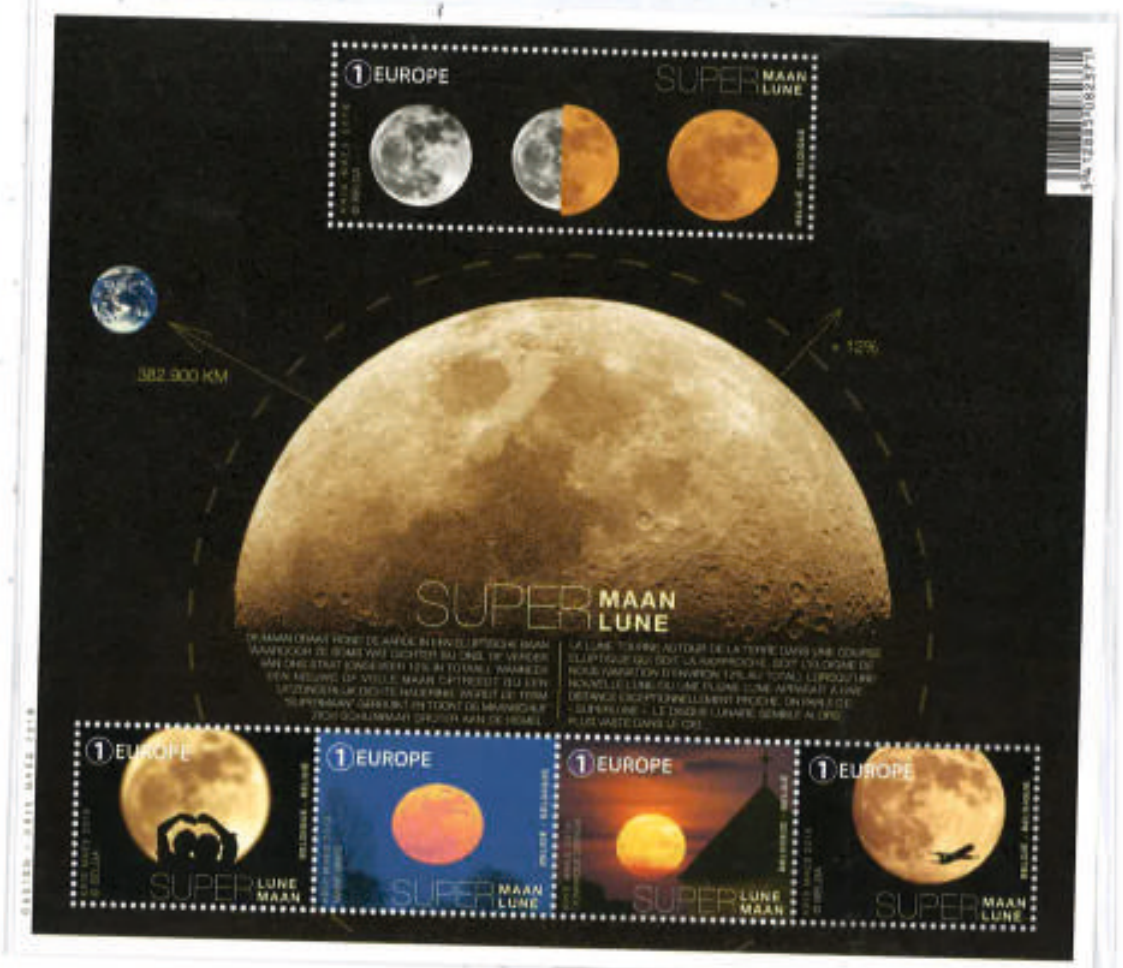
Please send the report soon after the activity is over, not later than, say, three months.

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

The Story Of Cosmology Through Post Stamps 8

MOON

Moon being the brightest object in the night sky, held our imaginations and curiosity for millennia. It is fifth largest satellite in the solar system thought to have formed about 4.6 billion years ago from the debris left over the giant impact between the Earth and hypothetical Theia ***Super Moon***-is a full moon or a new moon that nearly coincide with perigee, the closest that the moon comes to the Earth in its elliptical orbit. Super moon appears roughly 12% larger in diameter and 30% more brighter than normal.



Souvenir sheet -single stamp at the top-depict three images of moon to compare the relative size of Super moon. ***four stamps at bottom***-illustrate four super moons in 21st century (1 April 2011,6 May 2012 & 7 September 2014)

Buzz Aldrin's foot print on the moon's sea of Tranquillity. (1969)

Drawing of first soft-landed probe on the moon, Luna 8 (1966) with view of lunar surface

Lunar rocks

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

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