The Quaterly Science Wall Magazine
"REFLECTIONS"
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Regional Institute of Education (NCERT), BBSR

EDITORIAL

Science holds key solutions to the challenges we must overcome to build more equitable and sustainable development. Through this wall magazine our motto is not only to popularize science but also to motivate students for such writings.

As usual this issue of "REFLECTION" is a fine blend of articles on various interesting topics of Science and Mathematics. This issue also pays homage to Sir C. V. Raman, the first Indian Nobel laureate in Science on the occasion of National Science Day. All these articles are worth reading.

I hope students and teachers benefit from these articles.

Prof. (Mrs.) Manasi Goswami
Editor

MESSAGE
from Principal's Desk

I express my heartiest congratulations to the Department of Education in Science and Mathematics on the inauguration of the Quarterly Wall Magazine "REFLECTIONS" of the department. The initiative will prove to be a great motivator for the students in addition to providing them with an opportunity to showcase their talents and dwell upon pertinent themes. I highly appreciate the efforts of the team members who worked hard to put up this wall magazine. The endeavours of the students under the motivating guidance of their teachers, is extremely commendable and I wish them great success in their future ventures.

Prof. Prakash Chandra Agarwal
Principal, RIE, Bhubaneswar

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.

C. V. Raman

On this world-wide nightscape, human-made lights highlight particularly developed or populated areas of the Earth's surface, including the seaboards of Europe, the eastern United States, and Japan. Many large cities are located near rivers or oceans so that they can exchange goods cheaply by boat. Particularly dark areas include the central parts of South America, Africa, Asia, and Australia. This composite was created from images that were collected during cloud-free periods in April and October 2012 by the Soumi-NPP satellite, from a polar orbit about 824 Kilometers above the surface, using its Visible infrared Imaging Radiometer Suit.

Editorial Board:-
Prof. (Mrs.) Manasi Goswami
Dr. Anup Kumar Parida
Ms. Sagnika Chakraborty
Ms. Vandana Umang
Mr. Jeevanjeet Dash
Mr. Binayak Chanda
Mr. Nutan Prabhash Taria

Designed by TARUN

BIRTHDAY DIARY


FEBRUARY 11 1847
Birthday of inventor Thomas Alva Edison who invented the electric light bulb, the phonograph and motion pictures


FEBRUARY 15 1564
Birthday of Scientist Galileo Galilei, the first person to look at the night sky through a telescope


FEBRUARY 19 1473
Birthday of astronomer Nicolas Copernicus who proposed the theory that the Earth and the other planets revolve round the Sun.


FEBRUARY 21 1894
Birthday of Sri Dr. Shanti Swaroop Bhatnagar, the Founder Director of Council of Scientific and Industrial Research (CSIR)


FEBRUARY 22 1857
Birthday of physicist Heinrich Hertz who was the first to produced and detect radio waves.


FEBRUARY 28 1901
Birthday of chemist Linus Pauling, one of the first scientists to use quantum theory to describe the structure of molecules.


MARCH 08 1879
Birthday of Otto Hahn, 1944 Nobel Laureate in Chemistry for his discovery of the fission of heavy nuclei.


MARCH 14 1879
Birthday of physicist Albert Einstein, who developed the theory of relativity.


MARCH 27 1845
Birthday of physicist Wilhelm Conrad Rontgen, the discoverer of X-rays.


APRIL 01 1578
Birthday of physician William Harvey who discovered the circulation of blood


APRIL 15 1452
Birthday of painter / inventor Leonardo da Vinci who designed (but did not build) a helicopter, a parachute, and pendulum clock.


APRIL 23 1958
Birthday of Nobel laureate German physicist Max Planck, considered as the founder of the quantum theory.


APRIL 26 1900
Birthday of geologist Charles Richter who invented the Richter scale for measuring earthquake intensity.

Scientists calculate total amount of plastics ever produced:

Binayak Chanda

Humans have created 8.3 billion metric tons of plastics since large-scale production of the synthetic materials began in the early 1950s, and most of it now resides in landfills or the natural environment. The researcher found that by 2015, humans had generated 8.3 billion metric tons of plastics, 6.3 billion tons of which had already become waste. Of that total waste, only 9 percent was recycled, 12 percent was incinerated and 79 percent accumulated in landfills or the natural environment. If current trends continue, roughly 12 billion metric tons of plastic waste will be in landfills or the natural environment by 2050. Most plastics are non biodegradable, so the plastic waste humans have generated could be with us for hundreds or even thousands of years.

Every quantum particles travels backwards :

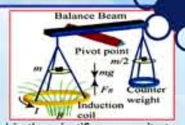
Nutan Prabhash Taria

In everyday life, objects travels in the same direction as their momentum "a car in a forward motion is going forwards, and certainly not backwards. However, this is no longer true on microscopic scales" quantum particles can partially go into reverse and travel in the direction opposite to their momentum. This unique property is known as 'backflow'.

This is the first time this has been found in a particle where external forces are acting on it. Previously, scientists were only aware of this movement in "free" quantum particles, where no force is acting on them. Using a combination of analytical and numerical methods, researchers also obtained precise estimates about the strength of this phenomenon. Such results demonstrate that backflow is always there but is a rather small effect, which may explain why it has not been measured yet.

On road to a redefined kilogram

Manasi Goswami



In a secure vault in the suburbs of Paris, an egg-sized cylinder of metal sits in a climate-controlled room under three glass bell jars. It is the mass against which all other masses in the world are measured-by definition the quintessential kilogram. Now efforts are afood in the scientific community to define mass using a fundamental constant of nature instead – a value that in theory can be measured anywhere in the universe and won't change with the smudge of a fingerprint or the settling of a fleck of dusk.

A team at National Institute of Standard and Technology (NIST) has now reached an important milestone on the road to replacing the standard kilogram. The scientists have taken the first full set of measurements on a new machine, called the NIST-4, designed to measure a fundamental physical quantity called Planck's constant, or h. Planck's constant relates a quantum particle's frequency to its energy, which is turn can be related to mass through Einstein's E=mc2. NIST-4 is a watt balance, a high-tech scale that compares the weight of a mass to the electromagnetic force needed to balance it. The electromagnetic force – which is created by running current through a coil of wire suspended in a magnetic field – can then be used to calculate Planck's constant.

Before the world redefines the kilogram – an event currently scheduled for 2018 – multiple independent measurements of Planck's constant must agree with each other. NIST-4's first Planck's constant measures measurement likely meet this standard. The value matches with other experiments relatively well, and it has an uncertainty of only 34 parts per billion. All the groups will have unit July 2017 to publish new measurements of Planck's constant in order to be taken into account for the redefinition of the kilogram. The results will be fed into a computer program that will calculate a value of h that best fits all the data. With the redefinition, h will become "fixed for all time" and the role of the watt balance will be flipped. Instead of using standard masses to measure Planck's constant, the watt balance will use the standard value of h to measure mass.

A Neutron Star in a Lab – the first step towards understanding turbulence

Sagnika Chakraborty

The holy grail of studies on quantum turbulence is to understand and explain turbulence in classical fluids. The work of Makinen and Eltsov is an initial step towards coming to grips with the inner workings of vortices in super fluids. From there, one could move on to comprehending turbulence in our everyday environment, in a 'classic' state.

The implications could spin entire industries round. New ways to improve aerodynamics of planes and vehicles of all kinds or controlling the flow of oil or gas in pipelines would open up, just to name a few.

Mysteries of the universe are also contained in these experiments. Collapsed, massively heavy neutron stars are believed to contain complex super fluid systems. Glitches and abnormalities like sudden changes in the stars' rotation speed, could be caused by bursts of vortices and similar energy dissipation to the one now discovered in the experiments at Aalto University.

SCIENTOON

Zombie Fungus Enslaves Only Its Favourite Ant Brains

Vandana Umang

Fungi of the genus Ophiocordy ceps – so called Zombie ant fungi – needs ants to complete their life cycle. When an ant comes across fungal spores while foraging, the fungus infects the insect & quickly spreads though out its body.

When the fungus infects a carpenter ant, it grows though the insects body draining it of nutrients & hijacking its mind. Over the course of a week, it compels the ant to leave the safety of its nest & ascend a nearby plant stem. If stops the ant at a height of 25 cms from ground – a zone which precisely the right temp. & humidity for the fungus to grow. It forces the ant to permanently lock its mandibles around a leaf. Eventually, it sends a long stalk through the ant's head, growing into a bulbous capsule full of spores. And because the ant typically climbs a leaf that overhangs its colony's foraging traits, the fungal spores rain down into its sisters below, zombifying them in turn.

Want to see these ants?
Go to a tropical country like Brazil and venture deep into the jungle. Find a leaf that's hanging almost exactly 25 cms above the forest floor, no more no less. Now look underneath it.
If you are in luck !!
You may find one……

AMAZING FACTS

Jeevanjeet Dash

1. Is Pizza derived from Maths ?

Ans) Pizza being a cylindrical shell, in this case :
Height of Pizza = a & Radius of Pizza = a
New, Volume of Cylinder = $\pi r^2 h = \pi(a)^2 a = \pi a^3$
Which can be extraordinarily written as pizza as (π=pi)
Hence, volume of pizza we eat = pizza
It is interesting to find if the pizza we eat actually got its name from mathematics.

02. Why 0.999 is actually equal to 1 ?

Ans) 0.999 ..... with infinite decimals after written as 0.(9) is actually equal to 1.
Firstly 1 ÷ 3 = 0.333 ..... or 0.(3)
0.(3) X 3 = 0.999 ..... or 0.(9) but it is also 1 because a number multiplied and devided by the same number remains unchanged.
Ratio 1 : 3 = 0.333 or 0.(3)
0.(3) X 3 = 0.(9)
1:3 x 3 = 1 So 1 = 0.9
Another method :
x = 0.999 ..... ⇒10x = 9.999
⇒10x – x = 9.999 ..... – 0.999 ... ⇒9x – 9
⇒x = 1, Hence 0.999 ..... = 1

3) There are as many even numbers as natural numbers

Ans) The natural numbers are the 'counting' numbers like 1, 2, 3, 4, etc.
There are an infinite number of natural numbers we can set up a one-to-one correspondence between the natural numbers and the even numbers that shows that for every natural numbers are comprised of both the evens and the odds.
Every natural number has a number that is twice as large as it, and every even number has a natural no. that is half its size.
1↔2, 2↔4, 3↔6, 4↔8, 5↔10 .....

You'd imagine that there are more natural numbers than even numbers because the natural nos. are comprised of both the evens and the odds.