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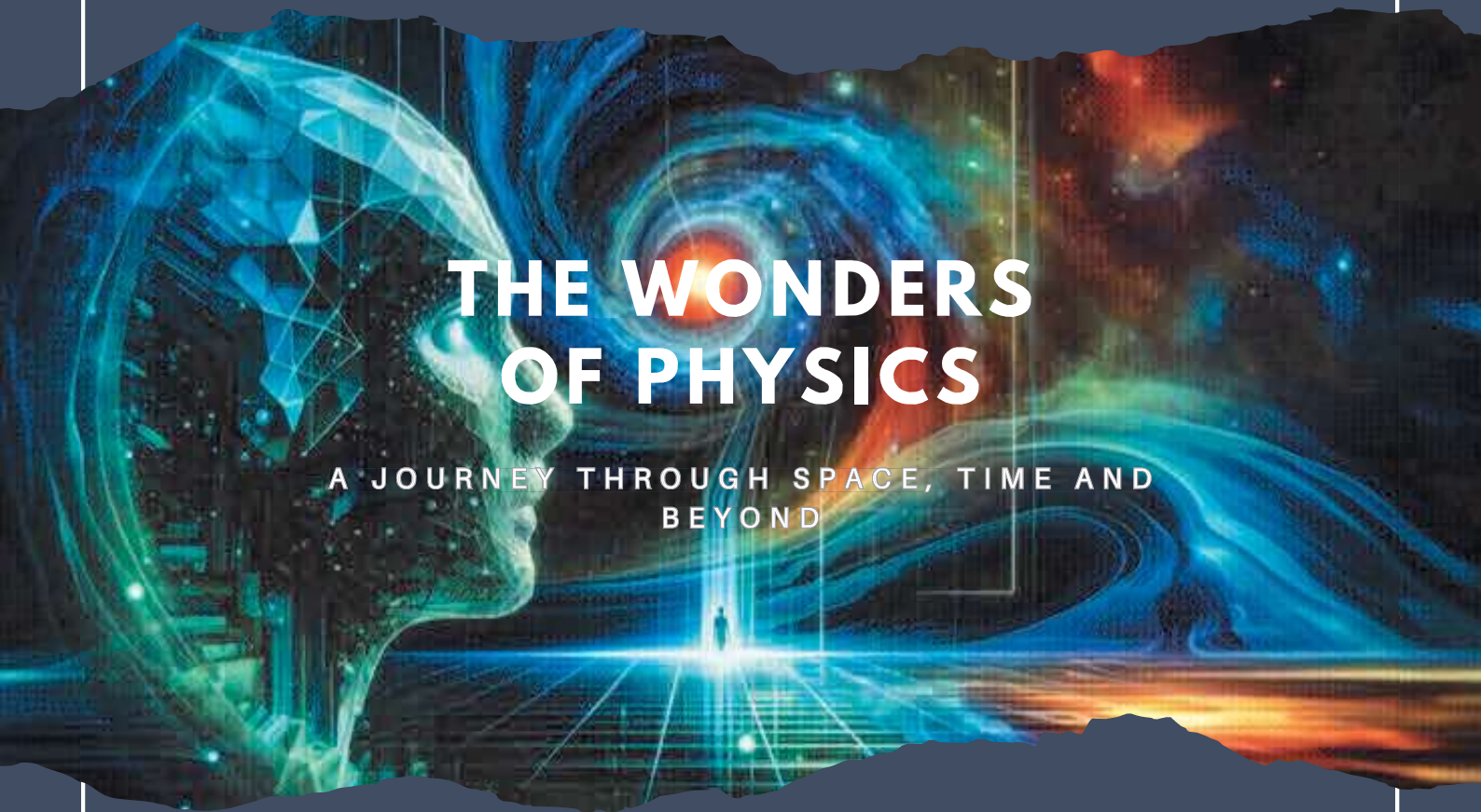
A MAGAZINE FROM PHYSICS ASSOCIATION | MARCH 2025

EntanQle Nexus



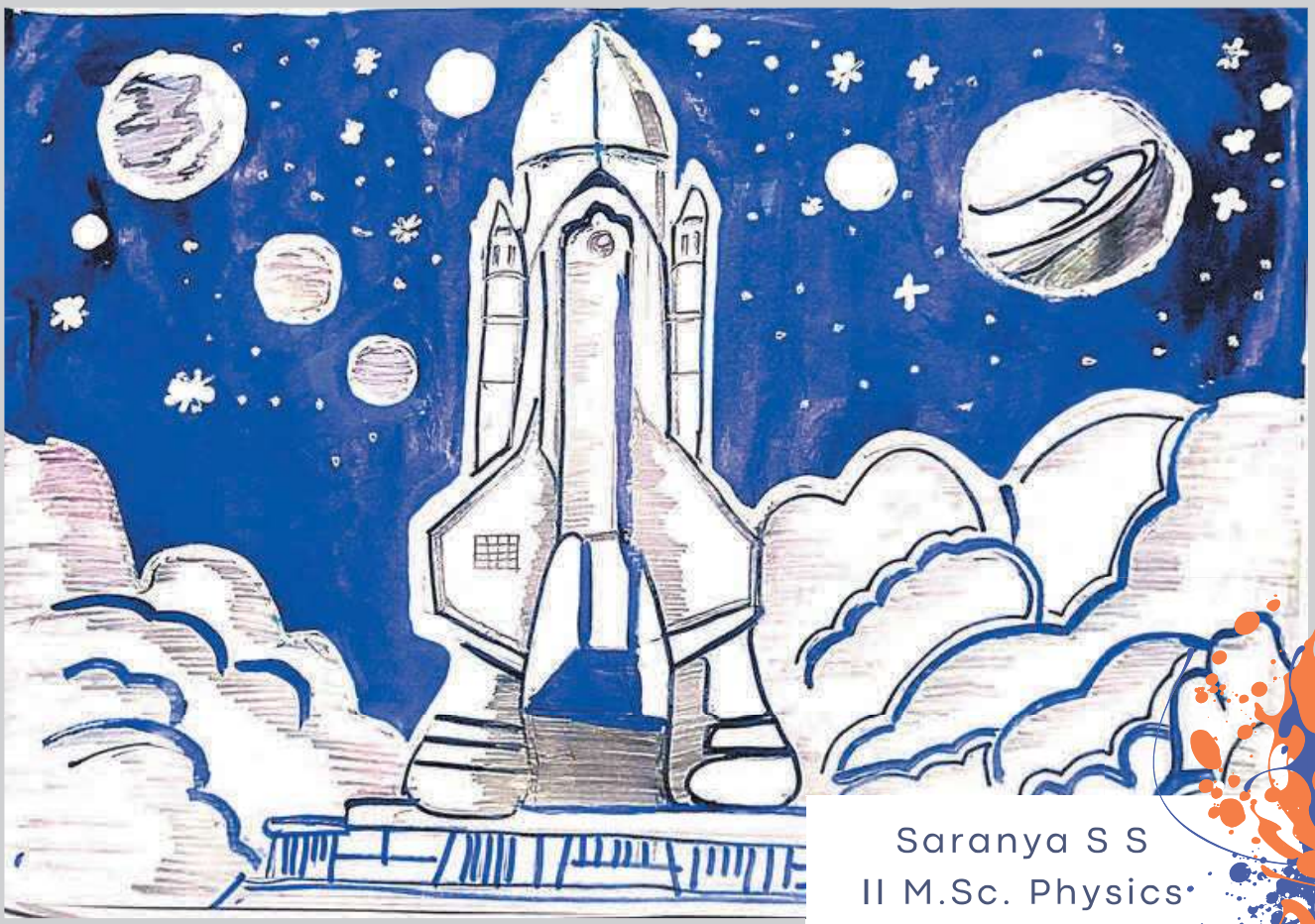
THE WONDERS OF PHYSICS

A JOURNEY THROUGH SPACE, TIME AND BEYOND

EDITORIAL TEAM:
EDITOR-IN-CHIEF: DEEPALAKSHMI M
ASSOCIATE EDITORS: SIVA SAKTHI R, SNEHA J, KEERTHIGA S
II M.SC. PHYSICS

JOURNEY TO THE STARS

EXPLORING SPACE THORUGH ART



Saranya S S
II M.Sc. Physics

A note from Principal's Desk

Dr. B. Uma Maheswari
M.Sc., M.Phil., Ph.D.

It gives me immense pleasure to introduce this special edition of our Physics magazine, a compilation of insightful articles on some of the most intriguing and impactful topics in modern science. This publication, meticulously curated by our talented postgraduate students, focuses on solar energy, space science, the functioning of scientific instruments, and the remarkable contributions of pioneering scientists.

As we stand at the crossroads of innovation, understanding the principles behind solar energy and space science becomes ever more critical. Our students have delved deeply into the physics governing these fields, unraveling the intricate mechanisms that power both the future of renewable energy and our exploration of the cosmos. Additionally, the articles on scientific instruments shed light on the precision and technology that enable these discoveries.

The students have not only showcased their academic knowledge but also their ability to think critically and engage with cutting-edge research.

I commend their dedication and encourage all readers to immerse themselves in this collection of thought-provoking work. It is a proud moment for our college to see such talent emerge from our classrooms.

The Important thing is to never stop questioning

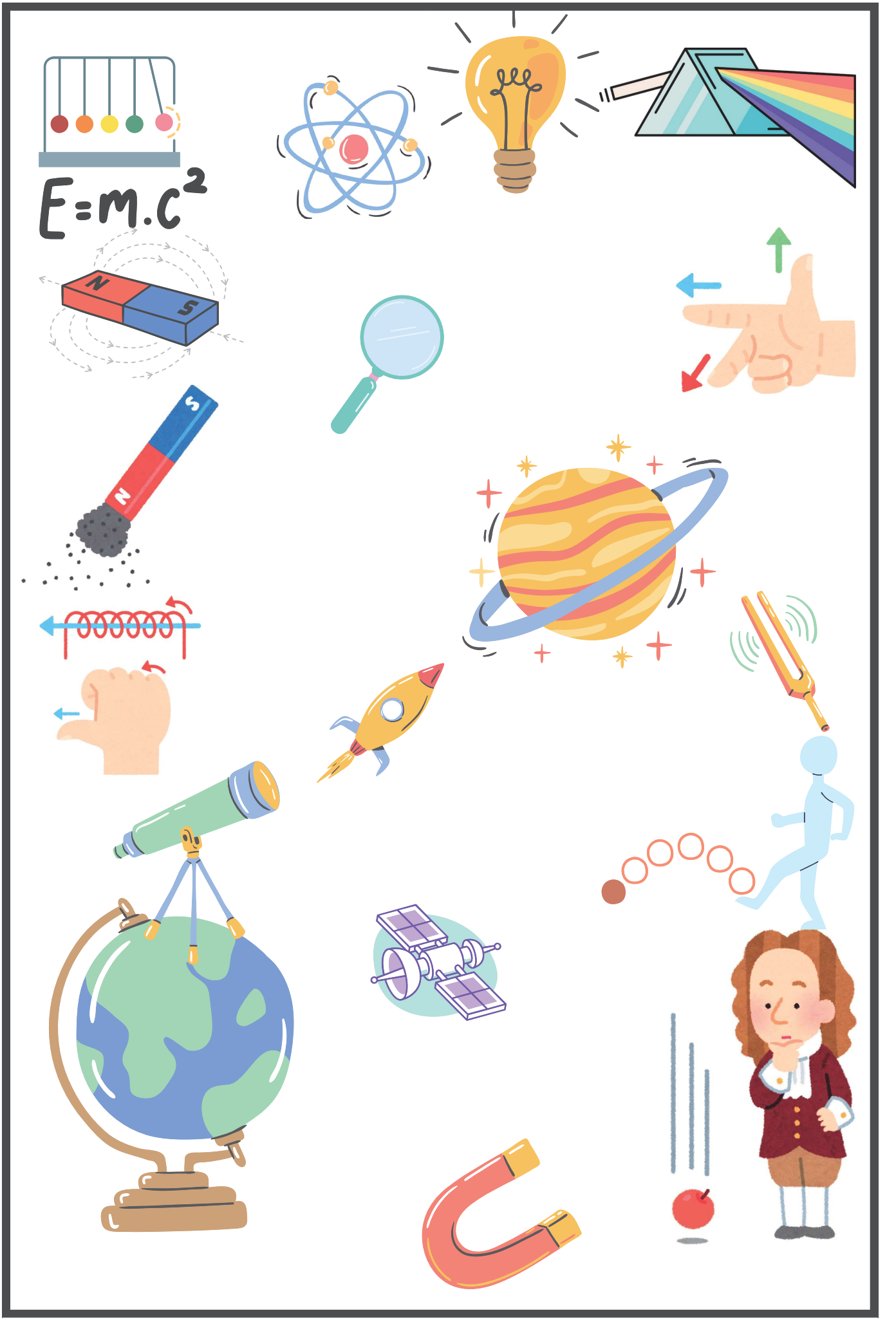
Albert Einstein

A Note from HoD's Desk

It is with great pride that I present this edition of our Physics Magazine, dedicated to the fascinating fields of solar energy and space science. This publication is the result of the hard work and creativity of our talented Postgraduate students, who have passionately explored the frontiers of these critical areas of scientific inquiry. Solar energy, with its potential to revolutionize our approach to sustainable energy, and space science which continues to unlock the mysteries of the universe, are both vital to our future. The magazine also highlights the groundbreaking work of scientists whose contributions have shaped our understanding of the universe and laid the foundation for future advancements.

In this issue, our students have delved into the latest advancements, challenges and opportunities within these fields, demonstrating their growing expertise and commitment to pushing the boundaries of knowledge. I encourage you to explore their insights and appreciate their innovative approaches to the challenges of tomorrow. This magazine is a testament to the bright future of both our students and the fields they are contributing to.

Dr. Hemamalini Rajagopal
Associate Professor & Head
M.Sc., M.Phil., Ph.D.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EDITOR'S NOTE

Deepalakshmi M
II MSc Physics

Welcome to the very first issue of **EntanQle Nexus —** a magazine born out of curiosity, creativity and collaboration. As we step into this new venture, the title itself holds a world of meaning.

The word "EntanQle" is inspired by the fascinating concept of quantum entanglement, one of the most mysterious and beautiful ideas in physics. The "Q" in the title stands proudly for Quantum Mechanics, which celebrates its 100th anniversary this year. It was in 1925 that the foundations of quantum theory were laid, forever changing our understanding of the universe. Much like the entangled particles in quantum mechanics, our stories, ideas, and perspectives are deeply connected, influencing and shaping one another in ways we often can't predict.

Nexus, on the other hand, signifies a hub of connections — a meeting point for diverse thoughts, voices, and experiences. Together, EntanQle Nexus represents a space where science meets creativity and where curiosity sparks conversations. It is a platform for explorers, dreamers, and thinkers to come together and share their visions.

This magazine is a proud initiative of our Physics Association, a community driven by the spirit of exploration and a passion for knowledge. Through this platform, we celebrate the love for physics and the creative energy that fuels every new idea and perspective. Our association has always been a space where students come together to learn, question and create and this magazine is a reflection of that collective spirit.

I thank **Dr. B. Anita, Associate Professor of Physics**, for motivating us and guiding us through this journey.

Crafting this magazine has been a journey on its own — one of collaboration, dedication and excitement. A huge thank you to everyone who wrote articles, shared their perspectives, and helped shape the content of this magazine. I am grateful to my incredible editorial team **— Siva Sakthi R, Sneha J and Keerthiga S** all from Second year MSc Physics for their unwavering support and contributions. A special recognition goes to the content creators **— Jayashree N and Sneha S**, also from the second year MSc Physics whose thoughtful and engaging work stands out. Their dedication and unique insights have added immense value to this issue, and we're proud to feature their contributions. Every article, idea and visual here reflects the effort and enthusiasm of our entire team. I thank The Principle, Head of the Department and all Faculty members for their unwavering support.

As you turn the pages of this magazine, I hope you find inspiration, wonder and the joy of discovery. Whether it is science, adventure, art, or ideas, let this magazine be a reminder of how beautifully interconnected we all are — just like the universe itself.

Happy reading!

Microwave Oven's Sweet Discovery

In 1945, Percy Spencer, an engineer working on radar systems, stood too close to a magnetron (a device that produces microwaves). He suddenly noticed that the chocolate bar in his pocket had melted.

Intrigued, he placed popcorn kernels near the magnetron, and they popped! Realizing the potential, he built the first microwave oven. Today, millions of people use microwaves to heat food—all because of an accidental chocolate meltdown.

The Power of Oops!

Experiment That Proved Time Slows Down

In 1971, two scientists, Hafele and Keating, took atomic clocks on airplanes and flew them around the world. When they compared them to clocks that stayed on the ground, they found a small but real difference in time.

This experiment proved Einstein's theory of time dilation—showing that time slows down as you move faster. Without this discovery, modern GPS systems wouldn't work!

Floating Frog and Quantum Levitation

In the 1990s, physicist André Geim and his team were playing with powerful magnets and liquid nitrogen. One day, they placed a tiny frog in the magnetic field—and it floated!

This strange effect, called diamagnetic levitation, occurs because the water in the frog's body is weakly repelled by the strong magnetic field. Geim later went on to win a Nobel Prize for his work on graphene, but he remains the only scientist to have won both a Nobel Prize and an Ig Nobel Prize (for unusual scientific achievements).

Strange Story of the World's First Battery

In 1780, Italian scientist Luigi Galvani was dissecting a frog when his scalpel accidentally touched a brass hook. To his shock, the frog's leg twitched as if it were alive!

This led him to believe animals produced electricity, but fellow scientist Alessandro Volta disagreed. Volta experimented and found that stacking metals with saltwater-soaked cloth produced a steady electric current—the first true battery. His invention paved the way for modern electricity.

Sticky Accident That Led to Velcro

In 1941, Swiss engineer George de Mestral went on a nature hike and noticed burrs sticking stubbornly to his dog's fur. Curious, he examined them under a microscope and saw tiny hooks that latched onto fibers.

Inspired by nature, he spent years developing a fabric with the same hook-and-loop mechanism. The result? Velcro! Today, it's used in everything from astronaut suits to children's shoes.

Abinaya M T
II M.Sc. Physics

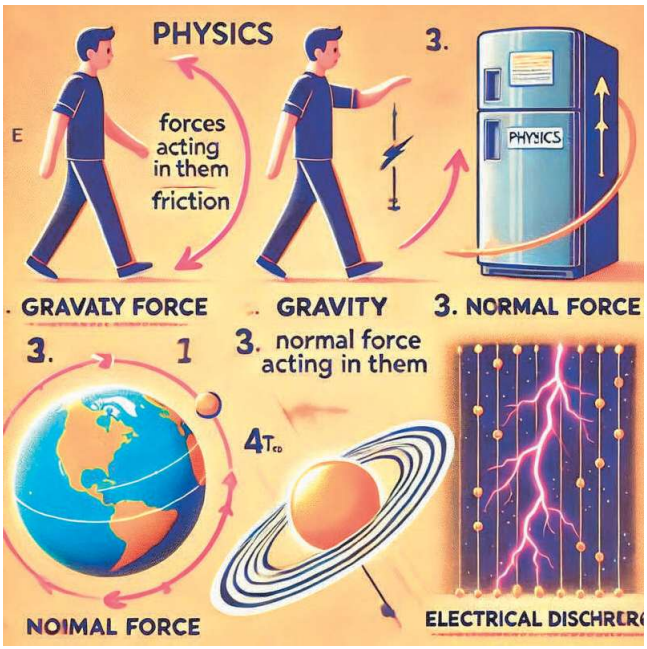
Role of Physics in Our Daily Life

We are living in the century of Science and Technology, and the introduction of science in our daily lives has transformed our lives. When people had no idea about science, even then, their lives were governed by the principles of different branches of science.

When we light a fire, it is a chemical process; when we eat and digest food, it is a biological process; when we walk on Earth, it is governed by the laws of physics; when an earthquake occurs, it is a seismic activity.

When we talk about different terrains and gems on Earth's surface, it is related to geology. There is no single activity in our lives that does not define one or another field of science. Similarly, physics governs our everyday lives and is involved in a number of activities we perform and the things we use in our daily life.

Here, we will discuss how physics is playing its part in running our everyday tasks and assisting us in doing our errands, chores, and duties smoothly and effectively.

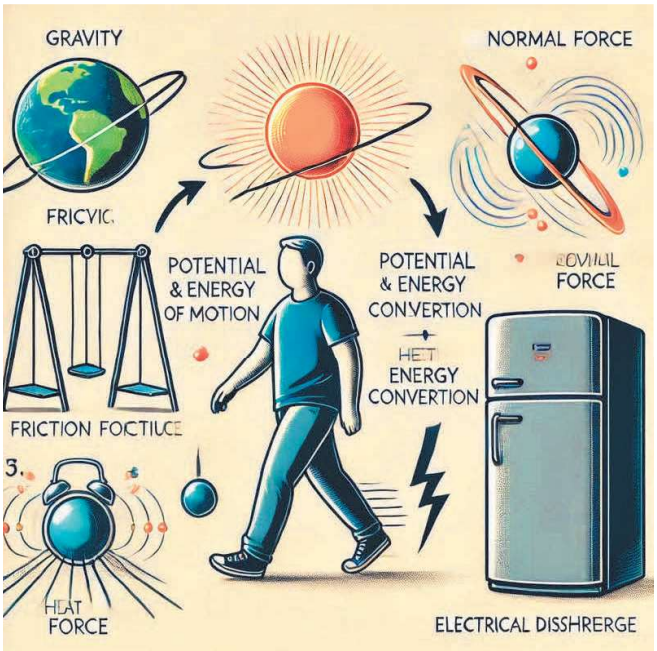


BODY

Physics is considered a natural science because it deals with things like matter, force, energy, and motion. As these are all related to everyday life, we can say that physics studies how the universe works, how the Earth moves around the Sun, how lightning strikes, how our refrigerator works, and much more.

In short, physics defines how everything works around us. We cannot separate anything from science, and our world cannot disconnect itself from the wonders of physics. When we look around us, we can see a number of things that work on the principles of physics.

We can explain our various activities by making use of the knowledge of physics. Here, we will discuss some examples that will help us learn how physics plays its part in our lives each day.



WALKING

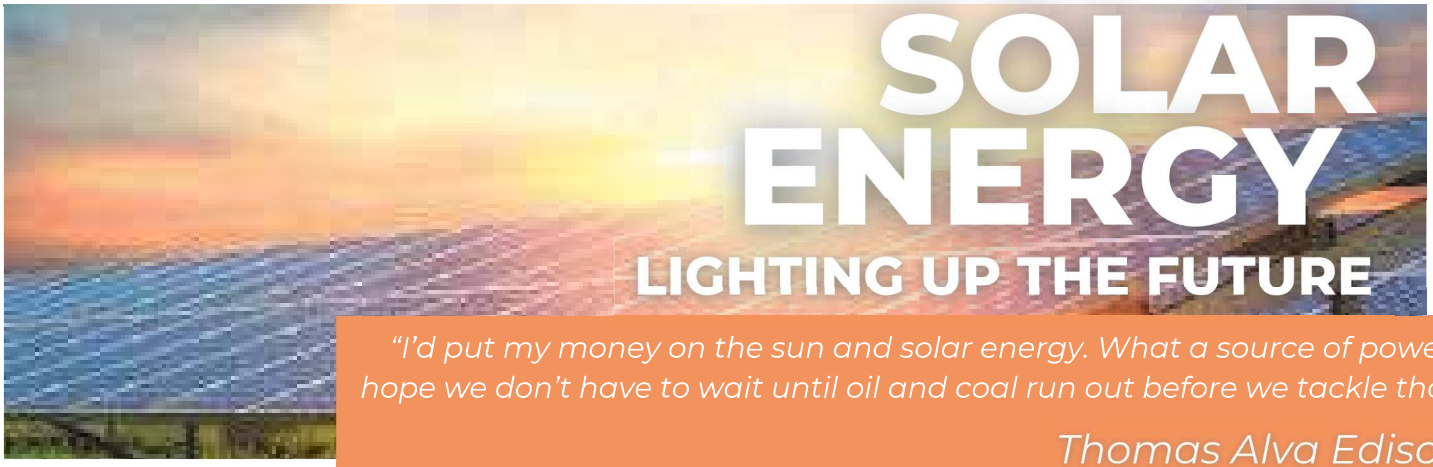
A number of principles of physics are involved in the simple act of walking. It involves concepts of weight, Newton's three laws of motion, inertia, friction, gravitational law, and potential and kinetic energy.

When we walk, we actually act like an inverted pendulum. When we put our foot on the ground, it becomes our axis, and our mass is centred in our abdomen, describing the shape of an arc. When we set our foot on the ground, we actually put weight, i.e., W = mg, and apply a backward force on the ground. In response to our weight, the ground reaction continues until our leg comes nearest to our tummy.

When the leg is moving, kinetic energy is at its maximum, and potential energy is zero, but when the leg reaches nearest to the belly or arc, potential energy reaches its maximum. When another step is taken, the stored potential energy is converted into kinetic energy, and this process continues.

We act as an imperfect pendulum because not all potential energy is converted into kinetic energy. Only 65 percent of energy is provided by stored potential energy to take the next step, while the remaining 35 percent is provided by biochemical processes.

ELAKKIYA N
I MSC PHYSICS



SOLAR ENERGY

LIGHTING UP THE FUTURE

"I'd put my money on the sun and solar energy. What a source of power! I hope we don't have to wait until oil and coal run out before we tackle that."

Thomas Alva Edison

Solar energy is a type of renewable energy that comes directly from the Sun. This energy drives the climate and weather and supports virtually all life on Earth. Solar energy-based technologies harness the Sun's energy for practical purposes. These technologies date back to the time of the ancient Greeks, Native Americans, and Chinese, who warmed their buildings by orienting them toward the Sun. Modern solar technologies provide heating, lighting, electricity, and even flight. Solar power is used synonymously with solar energy but more specifically refers to the conversion of sunlight into electricity. This can be done either through the PhotoVoltaic effect (PV) or by heating a hydrogen-based fluid to produce steam to run a generator.

What is Solar Energy?

Solar energy is one of the fastest-growing and most environmentally sustainable trends in renewable energy. Energy-efficient homes and businesses benefit from solar energy as a smart investment. It is converted into usable energy, such as electricity. The light and heat energy from the Sun can be harnessed to generate electricity.

Which year did India start using Solar Energy for electricity?

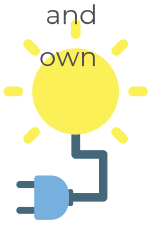
India's solar journey has been fascinating. When it was decided in 2009 that India should have a national solar mission, the country's solar power capacity was barely a few hundred megawatts. The mission was launched in 2010 with the ambitious goal of creating 20,000 MW of solar capacity by 2022. Now it is increased to 70,000 MW in 2024.

Which Country produces the most Solar Energy?

- The largest solar energy-producing country is China.
- The next position is held by the United States, followed by Japan in third place.
- India is in fourth place and has currently overtaken Japan to claim the third position.
- As of the current year, India's installed solar power capacity reached 89.4 GW in August 2024.

Advantages

- Solar energy is free, although there is a cost involved in building collectors and other equipment required to convert solar energy into electricity. However, this cost is not very high.
- Solar energy does not cause pollution.
- Solar energy can be used in remote areas where it is too expensive to extend the electricity power grid.
- The world's oil reserves will last for only 30 to 40 years. On the other hand, solar energy provides a sustainable alternative.
- Solar energy is a clean energy source that does not release greenhouse gas emissions while generating electricity.
- Solar panels are durable and require little maintenance, such as cleaning a couple of times a year.
- Solar energy systems can significantly reduce (or even eliminate) electricity bills.
- Solar power allows individuals and communities to generate their own electricity.



SOLAR ENERGY

Solar Power Generation

A solar-powered village uses 1000 solar panels that have been installed on village homes to generate electricity for the villagers around the clock, making it self-sufficient in solar energy generation. It is created using a ground-mounted solar power plant and more than 1300 rooftop solar systems on homes and government structures, all connected to Battery Energy Storage Devices.

Solar energy use in Houses

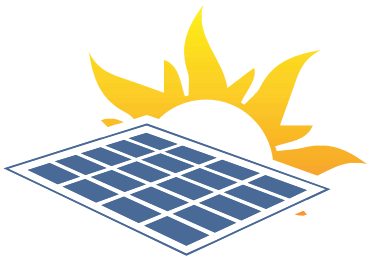
- Sunlight activates the panels.
- The cells produce electrical current.
- The electrical energy is converted for household usage.

A Village using Solar Energy in Daily Life

Modhera is located 35 km away from Mehsana district headquarters in Gujarat. It is famous for its Sun Temple, a protected ancient site situated on the banks of the river Pushpavati. It was constructed in 1026-1027 by the Chalukya dynasty king Bhima-I. The temple was built in the Chalukya (Maru-Gurjara) architectural style. It also hosts a solar-powered 3D projection facility installed on its premises to provide visitors with information about the village's history. The temple has also installed heritage lighting, making it the first heritage site in India to run solely on solar power.

Modhera has a ground-mounted solar power plant, 1300 rooftop solar systems, and a Battery Energy Storage System (BESS).

The village's solar power project provides round-the-clock solar energy, benefiting the entire village.



Top 10 Power Plant in India

- Bhadla Solar Park (Rajasthan)
- Pavagada Solar Park (Karnataka)
- Kurnool Ultra Mega Solar Park (Andhra Pradesh)
- NP Kunta (Andhra Pradesh)
- Rewa Ultra Mega Solar (Madhya Pradesh)
- Charanka Solar Park (Gujarat)
- Kamuthi Solar Power (Tamil Nadu)
- Ananthapuramu-II (Andhra Pradesh)
- Galiveedu Solar Park (Andhra Pradesh)
- Mandsaur Solar Farm (Madhya Pradesh)

Which Airport in India is fully Solar powered?

The CIAL Solar Power Project is a 50 MW photovoltaic power station built at Cochin International Airport.

In Tamil Nadu: Kamuthi Solar Power

Kamuthi Solar Power Project spans 2500 acres in Ramanathapuram district, 90 km from Madurai. It is the world's 12th largest solar park based on capacity. It started on 13 June 2016 and was completed on 21 September 2016.The entire solar park is connected to a 400 kV substation in Tamil Nadu. The solar panels are cleaned daily by a self-charged robotic system.

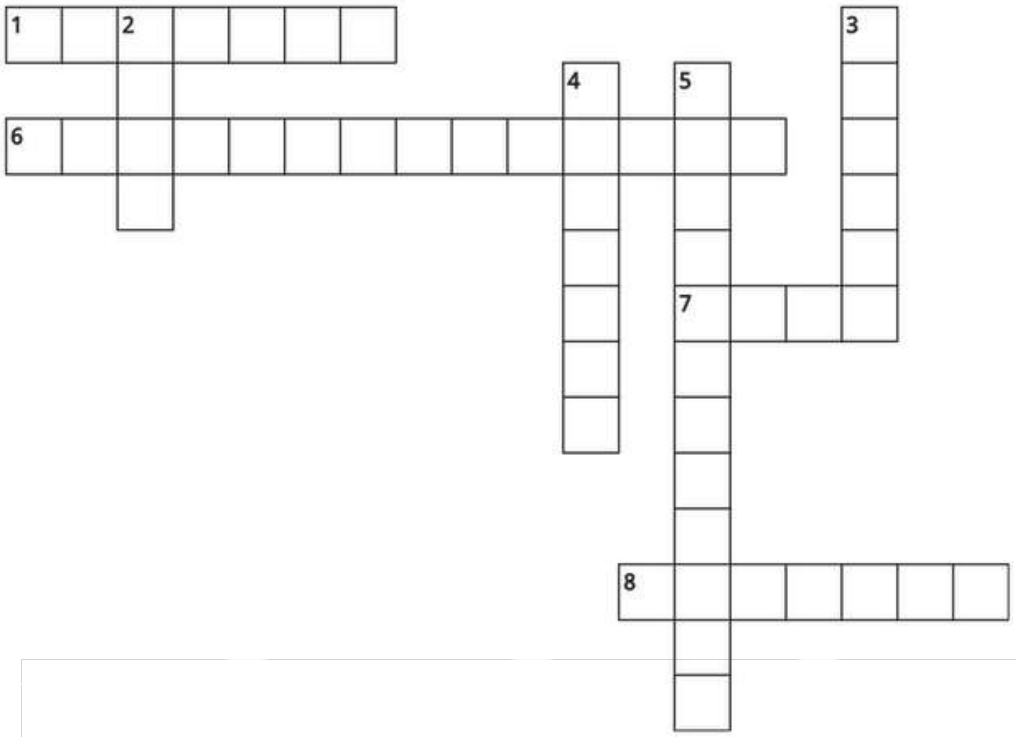
Conclusion

The use of solar energy is efficient in nature as it is a renewable energy source. By using such types of energy, we can generate electricity while protecting the environment from global warming.Currently, solar energy usage is minimal and does not make a significant difference in justifying the costs. However, in the future, it has the greatest potential because it does not need to be manually produced, extracted, or burned. Additionally, it can also be used in outer space.

Keerthi S P
III B.Sc. Physics (EM)

Cross word

PUZZLE



Across

1. What is the hardest natural substance on earth?
6. The process by which plant make their own food
7. The basic unit of living things
8. The force that pull object towards the centre of the Earth

Down

2. Smallest unit of matter
3. Unit of pressure
4. The metal that is liquid at room temperature
5. The powerhouse of the cell

Across

1. Diamond
6. Photosynthesis
7. Cell
8. Gravity

Down

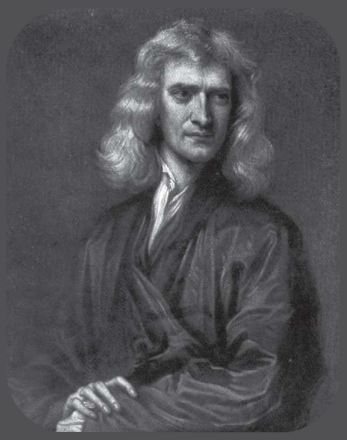
2. Atom
3. Pascal
4. Mercury
5. Mitochondria

CHARUMATHI S
I M.SC. PHYSICS

கவிதை

அறிந்து தெளிவோம் அறிவியல்

உலகில் பல இயல்கள் இருந்தும் - நம் இல்லாமையில்
பல இயங்காமையில் நமக்கு உதவியாய் இருப்பது அறிவியல்

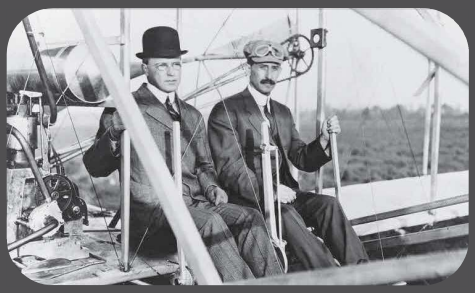


நியூட்டன் கண்டுபிடித்தார் "விசை" - இன்று
அவரைப் பற்றி சொல்கிறது பல "இசை"

உல்லாச பயணம் செய்ய நாம் விரும்புவது "விமானம்"
அது எங்கள் ரைட் சகோதரர்கள் உங்களுக்குத் தந்த "வெகுமானம்"

டி.வியை கண்டுபிடித்தான் "பெயர்டு" - அதனால்
இன்று போகிறது நம்முடைய "டயர்டு"

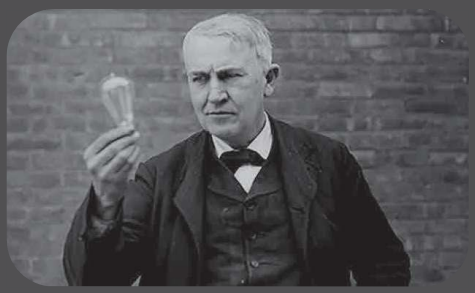
ஒளி தந்த "எடிசனே" - நீ இருட்டு
என்னும் நோய்க்கு கிடைத்த "மெடிசனே"



எழுதும் பேனாக்களும் சொல்கிறது எங்கள் அறிவியலை
என்னை கண்டுபிடித்தவன் "வாட்டர் மேன்" என்று,

காதல் செய்யும் காதலர்களும் அறிந்திருப்பர் - கால்
செய்யும் கைப்பேசியை கண்டுபிடித்த "கூப்பரை"

உலகம் உருண்டை என கூறியவர் "கலிலியோ"
அதை அறியாதவர் உண்டோ இந்த "புவியிலோ"?



நாம் பயன்படுத்தும் காப்பரிலிருந்து - காப்பியடிக்கும்
பேப்பரிலும் கூட இருக்கிறது அறிவியல்

சோதனைகள் பல கொண்ட இயல் - பல
சாதனையாளர்களின் சாதனைக்கு காரணமானது அறிவியல்

எடுத்துச் சொல்லும் இயல்பிருந்தால்
இயற்பியலும் எடுத்தியம்பும் உன் பெயரை

கார் ஓட்டும் ஓட்டுனரிலிருந்து - சோறு
ஊட்டும் தாய் கூட அறிந்திருக்கிறாள் அறிவியலை

இதை அனைத்தையும் பயன்படுத்தும் மானிடா
அதைக் கண்டுபிடித்த இவர்களை மட்டும் நீ இன்னும் அறியாதிருக்கிறாயே
ஏன்???

"அறிந்து தெளிவோம் அறிவியல் மகிழ்ந்து பெறுவோம் மானுடவியல்"

ரேவதி பா
2 ஆம் ஆண்டு முதுகலை அறிவியல் இயற்பியல்

SPACE TRAVEL

Earth is the cradle of humanity, but one cannot remain in the cradle forever.

Humanity has always been fascinated with space, and now, we are closer than ever to becoming a multi-planetary species. Space agencies like ISRO, NASA, Space X, Blue Origin and ESA are developing ambitious plans to explore the Moon, Mars, and even deeper into the cosmos. With advanced technology and growing international cooperation, the future of space travel is more promising than ever.

The Moon: A Stepping Stone for Deep Space

The Moon is considered a stepping stone for deep space exploration, and ISRO (Indian Space Research Organisation) has been actively working towards leveraging lunar missions for future interplanetary exploration. Here's how:

Chandrayaan Missions – Laying the Foundation

Chandrayaan-1 (2008): Confirmed the presence of water molecules on the Moon, a crucial discovery for future space colonization.

Chandrayaan-2 (2019): Though the lander failed, the orbiter continues to study the Moon's surface, atmosphere, and exosphere.

Chandrayaan-3 (2023): Successfully landed near the Moon's south pole, demonstrating India's capability in soft landing technology.

Moon as a Gateway to Deep Space

Testing Technologies: The Moon provides an ideal environment to test spacecraft and life-support systems for future Mars missions.

In-Situ Resource Utilization (ISRU): Extracting lunar resources like water in the form of ice can support long-duration missions by producing fuel and oxygen.

Lunar Base for Human Missions: A permanent Moon base could serve as a refueling and research station for deeper space missions.

Gaganyaan and Beyond

ISRO's Gaganyaan mission (planned for 2025) will demonstrate India's human spaceflight capabilities. This experience will be vital for future Moon and Mars missions.

Collaboration for Deep Space Exploration

ISRO collaborates with NASA, JAXA, and ESA on future lunar and planetary exploration missions. The LUPEX Mission (Lunar Polar Exploration) with Japan aims to explore the Moon's poles for Exploration

Future Plans

ISRO has long-term goals of sending astronauts to the Moon and beyond, potentially contributing to Artemis Accords or independent missions to Mars.

The Moon is not just a destination but a testing ground for sustainable human presence in space. ISRO's advancements are a crucial part of this journey, paving the way for interplanetary exploration.

NASA's Artemis program aims to land humans on the Moon by the late 2020s, marking the first crewed lunar landing since Apollo 17 in 1972. The goal is not just to visit but to establish a permanent Moon base. Scientists believe that lunar resources, such as ice at the Moon's poles, could be used to produce water and even rocket fuel.

Space X is also developing its Starship spacecraft, which could transport astronauts and cargo to the Moon efficiently. Meanwhile, China and Russia are collaborating on an International Lunar Research Station, which could serve as a long-term habitat for astronauts and researchers.

Mars: The Next Frontier

Mars is the ultimate goal for human space exploration. The ISRO Mars Mission, officially known as the Mars Orbiter Mission (Mangalyaan), was India's first interplanetary mission, launched by the Indian Space Research Organisation (ISRO) on November 5, 2013. It successfully entered Mars' orbit on September 24, 2014, making India the first country to reach Mars on its first attempt and the fourth space agency in the world to do so, after NASA, the Soviet space program, and ESA.

Key Highlights of ISRO's Mars Mission (Mangalyaan):

- Low Cost: The mission was completed with a budget of only $74 million (₹450 crores), making it the cheapest Mars mission ever.
- Scientific Goals: It carried five scientific instruments to study Martian surface features, atmosphere, and mineral composition.
- Technological Achievement: Demonstrated India's capability in deep-space communication, autonomous spacecraft operations, and interplanetary navigation
- Longevity: Though designed for a six-month mission, Mangalyaan functioned for nearly 8 years, far beyond its expected lifespan.

This success positioned India as a major player in space exploration and inspired future missions like Mangalyaan-2 and the Gaganyaan human spaceflight program.

Space X envisions sending people to Mars in the coming decades using Starship, which is designed for interplanetary travel. Musk's dream is to build a self-sustaining colony on Mars, ensuring humanity's survival in case of a catastrophe on Earth.

NASA is also planning a crewed mission to Mars, possibly in the 2030s, using the Orion spacecraft and the Space Launch System (SLS). One of the biggest challenges is radiation exposure, as astronauts traveling to Mars would be exposed to high levels of cosmic radiation. Scientists are developing new spacecraft shielding and habitats to address this issue.

Beyond Mars: The Search for Habitable Worlds

ISRO Venus Mission: Shukrayaan-1

Shukrayaan-1 is ISRO's upcoming mission to Venus, aimed at studying the planet's atmosphere, surface, and geological features. The mission is expected to launch in the late 2020s, possibly around 2028, using India's GSLV Mk III (LVM3) rocket.

Key Objectives of Shukrayaan-1:

- Study Venus' Atmosphere: Analyze the thick carbon dioxide-rich atmosphere, cloud layers, and weather patterns.
- Surface and Geological Studies: Investigate Venus' volcanic activity, surface composition, and tectonic movements.
- Solar Radiation & Space Environment: Understand how solar radiation interacts with Venus' atmosphere and its effect on planetary evolution.

Once we establish a presence on Mars, the next step could be exploring Jupiter's moon Europa or Saturn's moon Titan, both of which have liquid water and could potentially harbor life. Advances in propulsion technology, such as nuclear-powered spacecraft, could shorten the travel time for deep-space missions. Another possibility is sending generation ships—large spacecraft carrying human settlers who would live and reproduce for centuries while traveling to distant exoplanets. Breakthroughs in cryogenic sleep technology and artificial intelligence could make interstellar travel more feasible.

Some of the challenges:

While space exploration is exciting, it comes with major challenges:

- High costs: Developing spacecraft and maintaining space colonies requires massive funding.
- Health risks: Long-duration space travel affects bones, muscles, and mental health.
- Cosmic radiation: Space travelers need better shielding against radiation exposure.
- Sustainability: Developing ways to produce food, water, and oxygen in space is essential.

Despite these challenges, new technologies, international collaborations, and private space companies are making space travel more realistic. The dream of exploring new worlds is closer than ever, and the coming decades could see humans becoming an interplanetary species.

Conclusion:

The journey of space exploration is a proof of human curiosity, ambition, and resilience. It shows that our greatest achievements come from pushing boundaries and working together. As we step onto the Moon, Mars, and beyond, we are reminded that the sky is not the limit—it is just the beginning.

Sneha S
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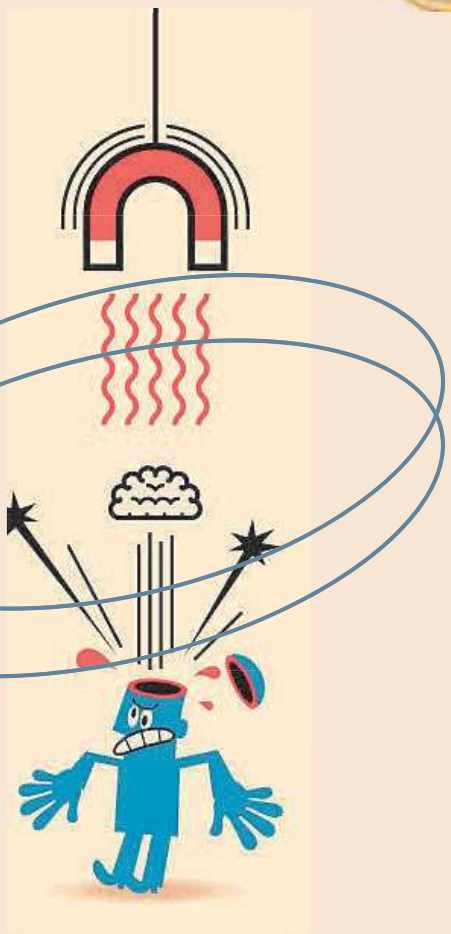
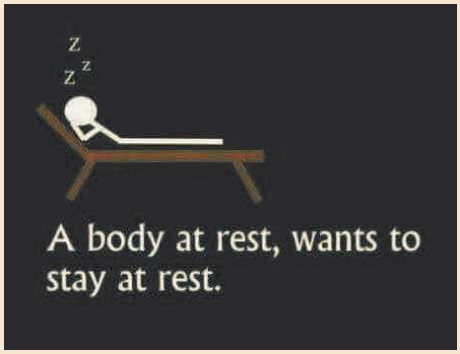
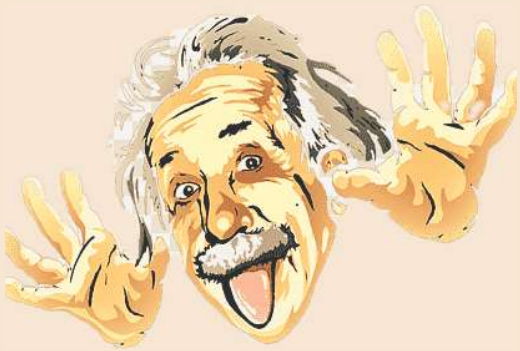
The Big Questions... With Even Bigger Laughs

THINK & LAUGH

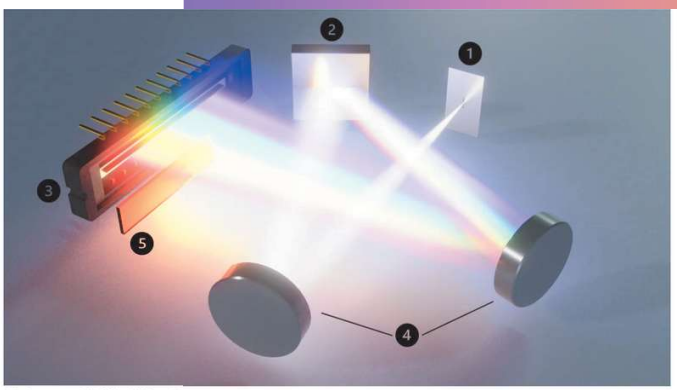
Why can't you trust an atom?
Because they make up everything!
What do you call a dinosaur made of water?
A hydrosaurus!
What did the physics teacher say when a student was late?
You've got a lot of potential, but you need to be more current!
How do you know if a physicist is at your party?
They'll keep trying to find the centre of mass!
Why did the physicist bring a ladder to the bar?
Because he heard the drinks were on a higher level!
Why did the proton go to school?
To become more positive!
What do you get when you cross a physicist with a monster?
Frankenstein's particle!
What did the light say to the mirror?
I reflect on you!
What's an astronaut's favourite part of a computer?
The space bar!
Why did the physicist break up with the mathematician?
Because they had too many arguments over constants!







DEEPIKA S
I MSC PHYSICS



Entrance slit (1), diffraction grating or prism (2), a detector (3), routing optics (4), higher order filters (5)

Spectrometer Secrets: How We See the Unseen

Physics is a subject which deals with nature as we are living our life with many needs from it. When we see nature in a common way it is beautiful. Yes, I agree, but when you see through the vision of physics it shows you lot of magic and surprises. Might be, some cases could be a mystery where you can be a detective to find the solution over here. When I started to learn physics it was all surprises and shocking that what we believed as true before studying was completely wrong. For example, if we ask students which is more elastic whether steel or rubber? Many of them would answer rubber. I was also in this stage before understanding the concept. When I started to know about the concept of Young's modulus in elasticity, I realised that the right answer is steel. This is a very important concept in civil engineering to construct bridges. Like this there are many surprises in physics why the water and sky look blue? Why does white colour disperse into seven colours? Why does oil float on water? etc. The one and only answer is the physics concept behind this.

In the above question I was very surprised to see the dispersion of mercury white light into seven vibrant rainbow colours. To do this magic we need an instrument called spectrometer. Let us dive deeper into this.

How does a spectrometer works?

A spectrometer is a scientific instrument used to analyse the light properties of a luminous object or reflected light. The instrument measures these properties of light over a specific section of the electromagnetic spectrum.

For a spectrometer to operate successfully, it requires a number of different components.

The entrance slit within the spectrometer is important as it determines the amount of light that is able to enter the instrument to be measured. This does not only affect the speed of the spectrometer engine (more light could typically result in a faster instrument) but also the optical resolution expressed in full width at half maximum (FWHM): the smaller the slit size, the better its resolution.

Light passing through a narrow opening like a slit has the natural behavior to become divergent. By reflecting the divergent beam onto a concave mirror, the light beam becomes collimating: all rays of light are directed parallel towards the diffraction grating. The grating is used as a dispersive element to disperse the wavelengths of light. Properties of the grating do not only include its dispersion range but also influence the optical resolution by the number of grooves. A second parameter of the grating, its blaze wavelength, determines the optimal efficiency at various wavelengths.

Once the light hits the diffraction grating each wavelength of light is reflected under a different angle (similar to a prism). Different diffraction gratings can be used to identify different wavelength ranges. As also this beam is divergent because of the grating's behaviour, a second concave mirror is used to focus light rays of each wavelength towards specific pixels of the detector. At this point, the actual proportions of each individual wavelength are converted into electrons, which are digitized and then output for the operator to read.

In this article we had many information on spectroscope. We'll have way more information on different topics with different perspectives of physics in upcoming articles. Let me end this "Science is more than a body of knowledge; it is a body of knowledge"- Carls Sagan. So let us start to think differently to create questions and to solve the mysteries

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Amazing Insights from the World of Physics

The Many-Worlds Interpretation

One interpretation of quantum mechanics is the Many-Worlds Hypothesis, which suggests that every quantum event spawns multiple parallel universes, each one representing a different outcome. In this view, all possible outcomes of a quantum event actually occur in separate, parallel realities.

The Speed of Light

The speed of light in a vacuum is 299,792,458 meters per second (about 186,282 miles per second). Nothing can travel faster than this speed, and it's considered a universal constant.

Time Dilation

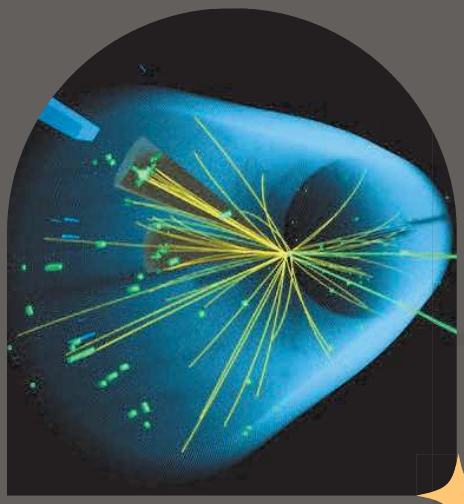
According to Einstein's theory of relativity, time slows down for objects moving at high speeds or near massive gravitational sources. So, astronauts on a high-speed journey in space would age slower compared to people on Earth.

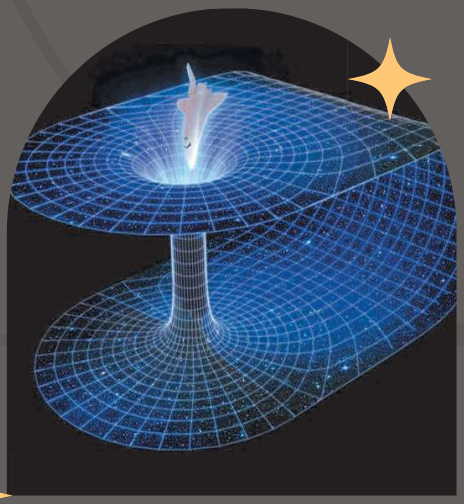
Black Holes and Singularity

At the centre of a black hole lies a point called the "singularity," where the gravitational pull is so intense that space and time as we understand them cease to exist.

The Butterfly Effect

In chaos theory, the Butterfly Effect suggests that small changes in initial conditions in a system can leads to vastly different outcomes. For example, the flap of a butterfly's wings in Brazil might set off a chain of events that causes a tornado in Texas. While a dramatic idea, it highlights how sensitive systems can be to small influences.





God's Particle

The Higgs boson, often called the "God particle," is a fundamental particle linked to the Higgs field, which is thought to give other particles their mass. It was proposed in the 1960s but wasn't discovered until 2012 by CERN's Large Hadron Collider (LHC). This discovery was a monumental breakthrough in particle physics.

The Expanding Universe

The universe is constantly expanding, and galaxies are moving away from each other. The discovery of this expansion, made by Edwin Hubble in the 1920s, led to the formulation of the Big Bang theory.

Wave-Particle Duality

In quantum mechanics, particles like electrons and photons (light particles) exhibit both wave-like and particle-like properties, depending on how they're observed. This is known as wave-particle duality. For instance, light can behave like a wave (showing interference patterns), but in certain conditions, it can behave like a particle (as seen in the photoelectric effect).

Antimatter

For every particle of matter, there is an equal and opposite particle called antimatter. When matter and antimatter collide, they annihilate each other in a burst of energy. Scientists are still searching for ways to create and harness antimatter.

Dark Matter

Around 85% of the mass of the universe is believed to be made up of dark matter, which doesn't emit or interact with electromagnetic radiation like ordinary matter does. It can't be directly observed, but its presence is inferred from its gravitational effects on visible matter.

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A SNAPSHOT OF PHYSICS DEPARTMENT JOURNEY IN 2024-2025

A YEAR IN REVIEW-MEMORIES IN MOTION

"REFLECTIONS OF EXCELLENCE"

Physics Association Inauguration

State level conference conducted by Breakthrought society

Project display at SSL School

Exhibition at Trade Fare

Our Pongal celebration

Marie Curie intercollegiate Quiz competition organised by Physics Department

Our Princesses looking like a warriors on Sports Day!

Physics students shined at QMC Festa Interdepartmental Culturals, participated and won prizes!

ANBARASI A
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Nature's Drama

Aurora Borealis

This optical phenomenon is caused by the interaction of charged particles from the Sun with the atmosphere. It is also known as the Northern Lights. These natural light shows are caused by magnetic storms triggered by solar activity, such as solar flares (explosions on the Sun) or coronal mass ejections. Energetic charged particles from these events are carried from the Sun by the solar wind.

Catatumbo Lightning

It is a natural phenomenon that occurs for over 100 days a year due to the region's (Venezuela) unique wind and heat patterns. The Catatumbo lightning produces 16 to 40 lightning flashes per minute and has the highest lightning density in the world, with 250 lightning bolts per square kilometre. It is characterized by almost continuous lightning, mostly within the clouds, along with large vertical cloud development, and it produces a significant quantity of ozone. The exact cause of this lightning is unknown, but scientists believe it results from a combination of factors, such as warm air from the Caribbean meeting cold air from the mountains, creating the perfect conditions for its occurrence.

Halos

A halo is an optical phenomenon that occurs when light from the sun or moon refracts off ice crystals in the atmosphere. Halos can appear as rings, arcs, pillars, or bright spots in the sky. They are usually white but can sometimes have color. Ice crystals in clouds bend sunlight through refraction. Moon halos are usually white, while sun halos can be rainbow-colored. Halos are caused by light interacting with ice crystals in thin cirrus clouds. Cirrus clouds are thin, wispy clouds that form at altitudes of 16,550 to 45,000 feet (5 to 13 kilometers).

Powered by Physics

Mammatus Clouds

Mammatus clouds are pouch-like clouds that hang from the base of other clouds, usually cumulonimbus rain clouds. They are lumpy and can look like a field of tennis balls or melons. The name "*mammatus*" comes from a Latin word. They form due to descending air in the cloud, which is heavier than the surrounding air because of its high concentration of precipitation particles. Mammatus clouds usually form during warm months and are often associated with thunderstorms. They are fleeting, typically remaining visible for only 10 to 15 minutes at a time.

Permafrost Explosion

It is a rare phenomenon that occurs when the permanently frozen layer of soil and other particles on or beneath Earth's surface explodes. Permafrost refers to any ground that remains completely frozen for at least two consecutive years. This phenomenon is caused when water trapped in sediment, soil, cracks, crevices, and pores of rocks turns to ice as ground temperatures drop below 32°F (0°C). The preservation of permafrost protects polar ecosystems, reduces carbon emissions, and provides scientists with rich material to study. An estimated 1,500 gigatons of carbon—twice as much as the atmosphere contains—are stored in permafrost.

Water Spouts

This is a natural phenomenon that can be explained by Bernoulli's principle. A waterspout is a natural phenomenon that occurs when cold air moves over warm water, creating a column of spinning air and moisture that resembles a tornado over water.

Waterspouts are almost always produced by rapidly growing cumulus clouds. The water inside a waterspout is formed by condensation in the cloud.

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Indian Space Odyssey

The space program was founded in 1962 as the Indian National Committee for Space Research (INCOSPAR) by Dr. Vikram Sarabhai, envisioning space technology as a tool for the development of our nation. Starting with sounding rockets, the program gradually increased its capabilities. The establishment of the Indian Space Research Organization (ISRO) in 1969 marked a pivotal moment in India's pursuit of space exploration. This strategic decision laid the groundwork for developing indigenous satellite technology. The motto of the Indian Space Research Organisation (ISRO) is "Space technology in the service of humankind."

Key Milestones

- Launch Vehicles:
- Satellite Launch Vehicle (SLV-3) (1980)
- Augmented Satellite Launch Vehicle (ASLV)
- Polar Satellite Launch Vehicle (PSLV) (1994)
- Geosynchronous Satellite Launch Vehicle (GSLV Mk III) (1990)

Satellite Series

- INSAT – Powering communication & broadcasting.
- IRS – Earth observation from above.
- NavIC – India's navigation system.

Iconic Missions

- Chandrayaan-1 (2008): India's first lunar probe, which discovered water molecules on the Moon.
- Mangalyaan (2013): The Mars Orbiter Mission (MOM), making India the first country to reach Mars orbit in its maiden attempt.
- Chandrayaan-3 (2023): A historic soft landing on the lunar south pole, showcasing India's technological prowess

Chandrayaan I

The Chandrayaan program was conceived as a testament to India's growing capabilities in space technology. The program aimed to establish India as a key player in lunar research, fostering innovation and scientific discovery.

Pioneering Mission

Chandrayaan-1 was launched on October 22, 2008, by PSLV-C11 from SDSC, SHAR, Sriharikota, and was inserted into a 100 km x 100 km lunar orbit. It was India's first lunar probe, marking a significant milestone in the nation's space program. The mission aimed to map the lunar surface and study its mineral composition.

One of the most significant achievements of the mission was the discovery of water molecules on the Moon's surface. This groundbreaking discovery revolutionized our understanding of the lunar environment. The mission was originally planned to last two years, but radio contact with the spacecraft was lost on August 28, 2009. The mission operated for 312 days.

Chandrayaan II

The spacecraft was launched from the second launch pad at the Satish Dhawan Space Centre in Andhra Pradesh on July 22, 2019, at 09:13:12 UTC by an LVM3-M1 rocket. The craft reached lunar orbit on August 20, 2019.

The Vikram lander attempted a lunar landing on September 6, 2019, but the lander crashed due to a software error. Chandrayaan-2 aimed to land a rover on the lunar south pole.

Chandrayaan III

Chandrayaan-3 was launched from the Satish Dhawan Space Centre on July 14, 2023. The spacecraft entered lunar orbit on August 5, 2023, and became the first lander to touch down near the lunar south pole.

The lander was not built to withstand the cold temperatures of the lunar night, and sunset over the landing site ended the surface mission twelve days after landing.

India's JourneyTowards Red Planet

- Mars Orbiter Mission (MOM), also known as MANGALYAN, marked India's ambitious foray into interplanetary exploration. Mangalyaan was launched aboard the Polar Satellite Launch Vehicle (PSLV-C25), a reliable and versatile launch vehicle developed by ISRO. The launch took place from the Satish Dhawan Space Centre in Sriharikota, India.
- After launch, the spacecraft was placed in an Earth parking orbit. Over the next few weeks, a series of engine firings gradually raised the spacecraft's orbit, preparing it for its journey to Mars.
- The final engine firing, known as the Trans-Mars Injection (TMI), propelled the Spacecraft out of Earth's orbit and onto a trajectory towards Mars. This marked the Beginning of Mangalyaan's interplanetary

The mission sought to Map the Martian Surface and analyze its composition, Dynamics, and Processes.

Instruments Aboard:

- Mars Color Camera (MCC)
- Thermal Infrared Imaging Spectrometer (TIS)
- Methane Sensor for Mars (MSM)

Mangalyaan's Instruments were designed to search for methane in the Martian atmosphere. The presence of methane could indicate potential biological activity or geological processes.

Aditya L1: India's Solar Mission to Unlock the Sun's Secrets

Understanding the Sun is crucial for comprehending our solar system and its impact on Earth. Aditya L1 aims to study solar phenomena like coronal mass ejections, solar flares, and the solar wind. By observing the Sun's behavior, we can better predict and mitigate space weather events that can disrupt communication systems, power grids, and satellite operations. The mission also seeks to uncover the processes behind solar heating and particle acceleration.

Journey to L1:

Aditya L1 was launched on September 2, 2023 and reached its halo orbit around the Sun-Earth Lagrange point 1 (L1) on January 6, 2024, approximately 1.5 million kilometers from Earth. This location offers a unique vantage point for continuous solar observation without eclipses or occultation. Reaching L1 involves a carefully planned trajectory using precise orbital Maneuvers. This placement enables Aditya L1 to study the Sun's behavior and its effects on the heliosphere in real-time, providing valuable data for space weather forecasting.

Pay Loads

Instrument	Objective
VELC	Study solar corona
SUIT	Image UV emissions
ASPEX	Analyze solar wind
Papa	Energetic particle analysis

India's space program has been making headlines with its ambitious missions and cutting-edge satellite technology. India's ambitious space program is fueled by scientific exploration, technological innovation, and a commitment to sustainable development.The journey to 2030 promises exciting breakthroughs
and a significant contribution to the global space community.

"Every Failure Fueling Our Space Towards Success"

CHARUMATHI R
III B.Sc. Physics (EM)

The Fun Side of Genius

Quirky Physicists Who Made Science Fun

Physics isn't just about formulas, it's full of brilliant minds with unexpected quirks. Here are three legendary physicists who proved that science can be serious, but scientists don't have to be!

RICHARD FEYNMAN: THE PLAYFUL SAFE-CRACKER

While working on the Manhattan Project, Richard Feynman entertained himself by cracking top-secret safes that held nuclear documents. Using logic and observation, he quickly opened supposedly secure cabinets, leaving notes inside that said "Guess who?", causing panic among officials. His pranks exposed real security flaws, proving that even in the world of physics, curiosity can be mischievous.

ERWIN SCHRÖDINGER: THE CAT THAT MADE HIM FAMOUS

Schrödinger's most famous contribution to physics wasn't an equation—it was a experiment about a cat. In his paradox, a cat inside a box is both alive and dead until someone opens the box. Intended to highlight the weirdness of quantum mechanics, "Schrödinger's Cat" became a cultural icon, appearing in jokes, memes, and TV shows, making him forever linked to a pet he never actually owned.

NIKOLA TESLA: THE MAN WHO LOVED A PIGEON

Nikola Tesla revolutionized electricity, but his personal life was even more shocking. He never married, instead forming a deep emotional bond with a white pigeon he claimed to love "as a man loves a woman." When the bird died, Tesla said he saw a blinding white light and felt his life's work was complete. Along with his obsession with the number 3 and strict sleeping habits, Tesla remains one of history's most fascinating scientists.

SCIENCE WITH A TWIST

From pranks and paradoxes to deep emotional connections, these physicists remind us that brilliance and eccentricity often go hand in hand. Even the greatest scientific minds had their share of fun, mischief, and unusual habits, proving that science is anything but amazing!

Siva Sakthi R
II M.Sc. Physics

HOW PHYSICS POWERS EVERYDAY GADGETS

Physics is at the heart of almost every modern gadget we use daily. From the moment you check your smartphone in the morning to heating food in a microwave or listening to music through wireless headphones, physics is silently at work. Let's explore how fundamental physics principles power some of the most common gadgets around us.

SMARTPHONES: THE MINIATURE PHYSICS LAB IN YOUR POCKET

Smartphones are packed with various sensors and components, all operating on different physics principles:

a) Touchscreen Technology

Capacitive touchscreens rely on the principle of electrostatics. When you touch the screen, your finger (which conducts electricity) disrupts the electric field, allowing the phone to detect the precise location of your touch.

Resistive touchscreens use mechanical pressure, where two layers of conductive material make contact to register a touch.

b) Wireless Communication (Wi-Fi, Bluetooth, Cellular Networks)

Radio waves, a form of electromagnetic waves, enable wireless communication.

Mobile networks work using electromagnetic spectrum transmission, where signals are modulated and transmitted via radio frequency (RF) waves.

Bluetooth and Wi-Fi use shorter radio waves for data transfer.

c) Gyroscopes and Accelerometers

The gyroscope in your phone works using angular momentum and conservation of motion to detect orientation.

The accelerometer, based on Newton's laws of motion, detects acceleration, allowing auto-rotation and step counting.

DIGITAL CAMERAS: LIGHT, LENSES, AND SENSORS

Cameras, including those in smartphones, use optical physics and photoelectric effects to capture images.

Lenses bend light using the principles of refraction to focus an image on a sensor.

Modern cameras use CMOS (Complementary Metal-Oxide-Semiconductor) or CCD (Charge-Coupled Device) sensors, which convert light into electrical signals.

The photoelectric effect, first explained by Einstein, is the foundation of how light is converted into an image.

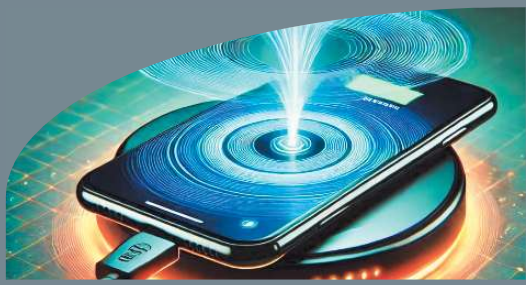
WIRELESS CHARGING: THE POWER OF ELECTROMAGNETIC INDUCTION

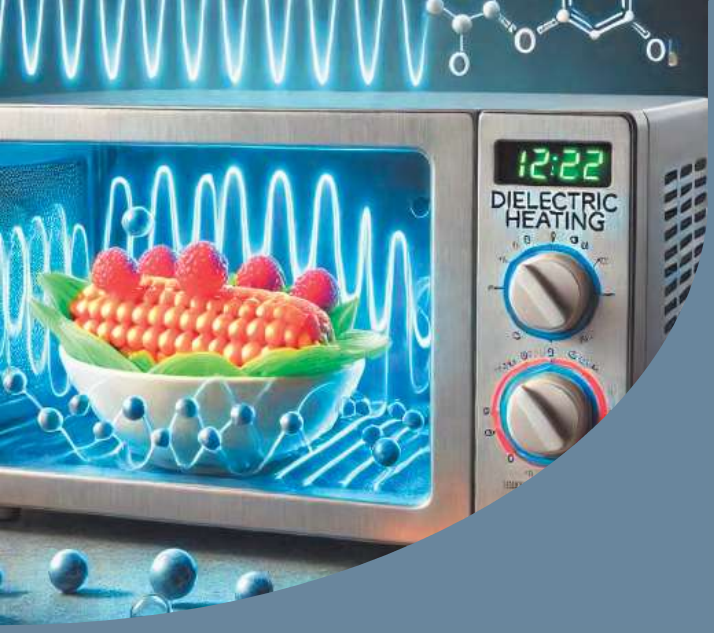
Wireless charging pads use electromagnetic induction, a principle discovered by Michael Faraday.

A coil in the charging pad generates an alternating magnetic field.

This induces a current in the receiver coil inside the smartphone, transferring energy wirelessly.

This is based on Faraday's Law of Induction, which states that a changing magnetic field can induce an electric current in a conductor.





MICROWAVES: HEATING WITH ELECTROMAGNETIC WAVES

A microwave oven operates using microwave radiation, which is a form of electromagnetic waves with a frequency of around 2.45 GHz.

Microwaves excite water, fat, and sugar molecules in food using dielectric heating.
These molecules absorb the microwave energy and oscillate, producing heat through molecular friction.
Unlike conventional ovens, microwaves heat food from the inside out, making cooking faster and more efficient.The metal walls of the oven reflect microwaves to ensure even heating.

REFRIGERATORS: THERMODYNAMICS IN ACTION

A refrigerator operates based on the laws of thermodynamics, specifically the principle of heat transfer.

A refrigerant absorbs heat from the fridge's interior, evaporates, and carries the heat outside. The refrigerant changes between liquid and gas states.

The compressor compresses the gas, increasing its pressure and temperature.
The refrigerant releases heat to the surroundings via the condenser coils and cools back into a liquid.
This cycle repeats, maintaining a cold interior.

SPEAKERS AND HEADPHONES: THE ROLE OF MAGNETISM AND SOUND WAVES

Speakers and headphones function through the interplay of electricity, magnetism, and sound waves.

Electromagnetic induction (Lorentz force) moves the diaphragm of the speaker.
Electrical signals are converted into mechanical vibrations, producing sound waves.
Wireless headphones use Bluetooth radio waves to transmit data.

Physics is everywhere in our daily lives, making our gadgets smarter and more efficient. Understanding these principles helps us appreciate the technology we often take for granted. Next time you use your smartphone, microwave, or wireless headphones, remember—you're interacting with the fascinating world of physics!

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GADGETS

FACT OR MYTH

BUSTING COMMON MISCONCEPTIONS

1 Quantum Mechanics:
Electrons revolve around the nucleus like planets around the sun.
(Answer: Myth — Electrons exist as probability clouds, not fixed orbits.)

2 Gravity & Space:
Astronauts float in space because there is no gravity.
(Answer: Myth — Gravity exists everywhere; astronauts appear weightless because they are in free fall.)

3 Everyday Science:
Metal spoons heat up faster than wooden spoons when stirring hot soup.
(Answer: Fact — Metal is a better conductor of heat than wood.)

4 Classical Physics:
A feather and a stone will fall at the same speed in a vacuum.
(Answer: Fact — Without air resistance, gravity pulls all objects equally.)

5 Heat & Thermodynamics:
Hot water freezes faster than cold water.
(Answer: Fact — This surprising effect is called the Mpemba effect.)

6 Sound & Space:
If you shouted on the moon, someone nearby could hear you.
(Answer: Myth — There's no air on the moon, so sound waves can't travel.)

7 Human Body & Physics:
Your body contains particles from ancient stars.
(Answer: Fact — Elements like carbon and iron were forged in stars billions of years ago.)

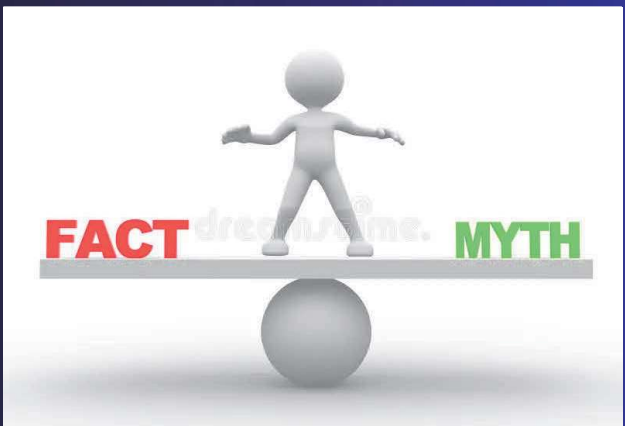
8 Light & Speed:
Light always travels at the same speed, no matter the medium.
(Answer: Myth — Light slows down in denser materials like water or glass.)

9 Magnetic Myths:
All metals are attracted to magnets.
(Answer: Myth — Only ferromagnetic materials like iron, cobalt, and nickel are.)

10 Cosmic Scale:
The sun is a perfectly round sphere.
Fact or Myth?
(Answer: Myth — It's slightly flattened at the poles due to its rotation.)

11 Gravity & Weight:
You would weigh less on the moon than on Earth.
Fact or Myth?
(Answer: Fact — The moon's gravity is only about 1/6th of Earth's.)

12 Space Exploration:
You can't cry in space because tears won't fall.
Fact or Myth?
(Answer: Fact — In microgravity, tears stick to your face instead of falling.)



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இயலாததை இயல வைக்கும்... இந்த இயற்பியல்!

இயல முடியாததை கூட இயல வைத்து விட்டது - இந்த இயற்பியல் வாழ்க்கை!

நன்றி சொல்ல உனக்கு வார்த்தை இல்லை எனக்கு!
ஈர்ப்பு விதியை கொடுத்ததற்கு நியூட்டனுக்கு நன்றி சொல்லவா? - அதை விளக்கின் ஒளியில் அமர்ந்து படித்ததற்கு எடிசனுக்கு நன்றி சொல்லவா?

காந்தம் போல இரு
உனக்கானது அருகில் வரும்போது ஈர்த்துக்கொள்
சரியான திசை அறிந்து ஒளியைப் போல
வேகமாகச் செல்
வாழ்க்கையில் தேவைப்படும்போது
முடுக்கம் கொள்
வாழ்க்கையே நியூட்டனின் மூன்றாவது விதியை போல் தானே!

பிரியதர்ஷினி கு
2ஆம் ஆண்டு முதுகலை அறிவியல் இயற்பியல்

WORD SEARCH

PUZZLE

I	H	B	N	H	G	S	C	I	M	A	N	Y	D	J
A	B	Y	C	N	A	Y	O	U	B	I	Q	O	N	M
W	A	M	J	K	I	M	X	Q	K	N	C	N	A	V
F	Q	Y	V	N	R	N	U	R	C	K	B	I	G	K
R	U	I	O	M	H	O	P	T	I	X	X	N	I	L
H	W	E	R	W	M	A	W	N	N	S	A	I	L	S
V	O	L	T	A	G	E	G	E	H	A	R	H	T	C
G	G	H	I	V	K	A	R	H	M	S	U	U	U	I
N	R	A	C	E	U	S	A	H	I	A	M	Q	M	T
I	A	M	I	L	O	R	E	N	T	Z	R	I	R	A
K	T	H	T	E	R	I	H	G	L	K	M	F	A	M
C	I	A	Y	N	O	I	S	R	E	P	S	I	D	E
A	N	Y	A	G	A	U	S	S	G	D	S	D	K	N
T	G	I	N	T	E	R	A	C	T	I	O	N	J	I
S	N	Z	G	H	A	R	T	R	E	E	F	O	C	K

*DISPERSION * DYNAMICS * KINEMATICS * WAVELENGTH * GAUSS * VOLTAGE * STACKING * LIGAND

*INTERACTION * VORTICITY * FRAMEWORK * LORENTZ *BUOYANCY * SHEAR * HARTREEFOCK

* QUANTUM * DOCKING * GRATING * OHM

GAYATHRI P
II M.SC. PHYSCIS

PARALLEL UNIVERSE

PARALLEL UNIVERSE

One of the many implications of recent cosmological observations is that the concept of parallel universes is no mere metaphor. Space appears to be infinite in size. If so, then somewhere out there, everything that is possible becomes real, no matter how improbable it is. Beyond the range of our telescopes are other regions of space that are identical to ours. Those regions are a type of parallel universe. Scientists can even calculate how distant these universes are, on average.

IDENTICAL US

Not just a staple of science fiction, other universes are a direct implication of cosmological observations

CHARUMATHI S
I MSC PHYSICS

Marie Curie – A Pioneer in Science

One never notices what has been done; one can only see what remains to be done.

Marie Curie, the renowned scientist, is remembered for her discovery of radium and polonium, as well as her significant contributions to the treatment of cancer.

Humble Beginnings

Born Maria Skłodowska on 7 November 1867 in Warsaw, Poland, she was the youngest of five children born to a poor schoolteacher. After her mother's death and when her father could no longer support her, she became a governess, reading and studying in her spare time to quench her thirst for knowledge. She never lost this passion and eventually enrolled at the Sorbonne in Paris, where she studied physics and mathematics.

A New Chapter in Paris

In Paris in 1894, she met Pierre Curie, a scientist working in the city, and they were married a year later. Around this time, she adopted the French spelling of her name—Marie.

Ground breaking work on Radioactivity

The Curies became researchers at the School of Chemistry and Physics in Paris, where they began their pioneering investigations into the invisible rays emitted by uranium—a phenomenon that was discovered by Professor Henri Becquerel. Becquerel had demonstrated that these rays could pass through solid matter, fog, and photographic film and could even cause air to conduct electricity.

Marie noticed that samples of a mineral called pitchblende, which contains uranium ore, were significantly more radioactive than pure uranium. Convinced that she had discovered a new chemical element—despite skepticism from other scientists—Marie and Pierre Curie set out to identify the unknown substance. They extracted a black powder that was 330 times more radioactive than uranium, which they named Polonium (element 84), in honour of the country which she was born, namely, Poland.

In 1898, the Curies published strong evidence supporting the existence of another new element, radium. In 1902, Marie successfully isolated radium and determined its atomic weight to be 225.93. The journey to these discoveries was long and arduous.

Recognition and Nobel Prizes

In 1903, Marie and Pierre Curie were awarded the Nobel Prize in Physics, jointly with Henri Becquerel, for their combined, though separate, work on radioactivity. Later, in 1911, Marie Curie received the Nobel Prize in Chemistry for her work in isolating radium. The first woman to win a Nobel Prize and the only person to win Nobel Prizes in two scientific fields.

Marie Curie, a pioneering researcher on radioactivity, died on July 4, 1934, at the age of 66 from radiation-induced aplastic anemia —a condition that developed after years of exposure to radiation.

Marie Curie (1867–1934) is known as the "mother of modern physics" because of her groundbreaking work in radioactivity.

Inspired by her life and work of Marie Curie, we the PG & Research Department of Physics of QMC, have instituted a Rolling Trophy named “Marie Curie Rolling Trophy” which is given to the winners of the Marie Curie Intercollegiate Quiz Competition which is conducted annually since 2022.

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THE FUSION OF SCIENCE & IMAGINATION

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