Government College Of Engineering & Research, Avasari Kh

ASTROPHILE

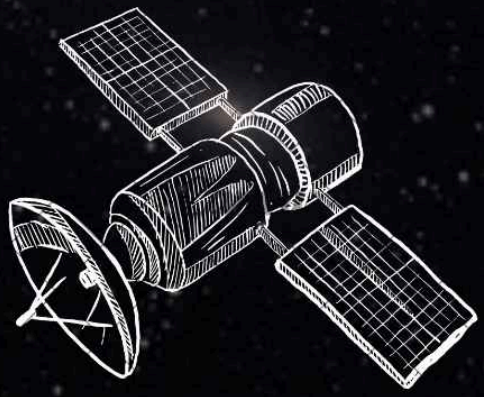
YOUR GUIDE TO SPACE

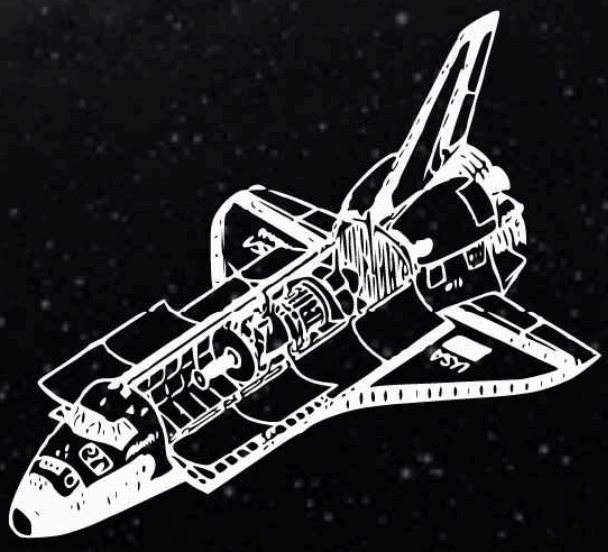
THE COSMIC FAREWELL

PUNE'S REVOLUTIONARY ATOMIC CLOCK

THE MANDELLA EFFECT

INDEX





VOTE OF THANKS

Team Astrophile is a newly formed astronomy club at Government College of Engineering and Research, Avasari. We as a team work towards propagating astronomical knowledge and making others aware of recent development in the field of astrophysics and astronomy. We would like to thank our Honorable Principal Dr. D. R. Pangavhane and Respected Head of Applied Physics Department Prof. U.S. Kakade for supporting us and for the team formation. The team supports and welcomes all kind of ideas which can benefit everyone and works together to make it happen.

ABOUT TEAM

As Space industry has evolved with discovery of new technologies, exploring our universe has become a vital part of a developing nation/society. Making others aware with this information and new discovery can ensure an all-rounder development. Knowledge about New missions of different Government and private aerospace sector will inspire younger generation to choose it as a career option. Apply the theoretical knowledge in practically watching its effect on the universe helps to understand and visualize the knowledge in a more personal way.

Team Astrophile publishes this knowledge in its own magazine, podcasts, info flyers and via social media too. We make it easily accessible for the common readers. Our magazine contains special sections for different astronomical phenomenon, which people watch but aren't'aware of, such as different constellation and identifying stars and planets.

A special section in our magazine is devoted to the art in the field of astronomy. Different digital pictures or space photography is encouraged and published in the magazine. Different and innovative ideas are discussed in the podcast, and this podcast is an open platform where students can express their ideas and share them with others. Our Podcasts mainly holds discussion on different theory and ideas which are in use in day-to-day life. Students are welcomed to have a talk on this kind of theories in astrophysics and astronomy.

We participate in different competitions related to space sciences and astrophysics. We mainly participate in IAAC (International Astronomy and Astrophysics Competition) globally and rocketry competitions organized by different organizations all over India.

INDIA'S KALPANA, NASA'S KC!

Name :

Kalpana Chawla

Born :

17 March 1962

Died :

01 February 2003

Kalpana Chawla, a name that resonates with courage, determination, and the spirit of exploration, has become an enduring symbol of women's achievements in space. Born on March 17, 1962, in Karnal, India, Kalpana Chawla defied societal norms and shattered the glass ceiling to pursue her dream of reaching for the stars. Her extraordinary journey, both on Earth and in space, continues to inspire countless individuals, including myself, who admire her unwavering passion and indomitable spirit.

Kalpana Chawla's fascination with flying began at a young age. She always had an innate curiosity about the world beyond our planet and the boundless possibilities that lay beyond the confines of Earth.

After completing her education in aeronautical engineering, Chawla earned a Master's degree in aerospace engineering from the University of Texas. She then went on to obtain a Ph.D. in aerospace engineering from the same institution. Her academic accomplishments were indicative of her unwavering dedication and pursuit of excellence.

In 1994, Kalpana Chawla joined NASA's astronaut program, a milestone achievement that would pave the way for her extraordinary career in space exploration. Her first mission as a mission specialist came in 1996 when she flew aboard the Space Shuttle Columbia on STS-87. This historic journey made her the first woman of Indian origin to venture into space. Chawla's relentless pursuit of knowledge and passion for discovery led her to embark on another mission aboard the Space Shuttle Columbia in 2003, tragically ending in disaster.

It was on February 1, 2003, during the re-entry phase of the STS-107 mission, that the Columbia disintegrated, resulting in the loss of all seven crew members. Kalpana Chawla, along with her fellow astronauts, made the ultimate sacrifice in the name of scientific progress and human exploration. The loss was deeply felt, not only by the global space community but by people around the world who had come to admire her courage and determination.

Kalpana Chawla's legacy extends far beyond her untimely demise. Her remarkable achievements and contributions to space exploration continue to inspire generations of aspiring scientists and astronauts, particularly women who dare to dream beyond societal expectations. She exemplified the notion that gender should never limit one's aspirations or capabilities.

As always she used to say Daring to Rise, Braving the Odds, and Reaching the Stars!!

- Venu Jangam
(T.E. Mechanical)

Hubble Space Telescope

The Hubble Space Telescope is a space telescope that was launched into low Earth orbit in 1990 and remains in operation. It was not the first space telescope, but it is one of the largest and most versatile, renowned both as a vital research tool and as a public relations boon for astronomy.

Launch

First conceived in the 1940s and initially called the Large Space Telescope, the Hubble Space Telescope took decades of planning and research before it launched on April 24, 1990.

Location

Launched on April 24, 1990, aboard the Space Shuttle Discovery, Hubble is currently located about 332 miles (535 km) above Earth's surface, where it completes 15 orbits per day — approximately one every 95 minutes.

Mission

Scientists have used Hubble to observe the most distant stars and galaxies as well as the planets in our solar system. Hubble's launch and deployment in April 1990 marked the most significant advance in astronomy since Galileo's telescope.

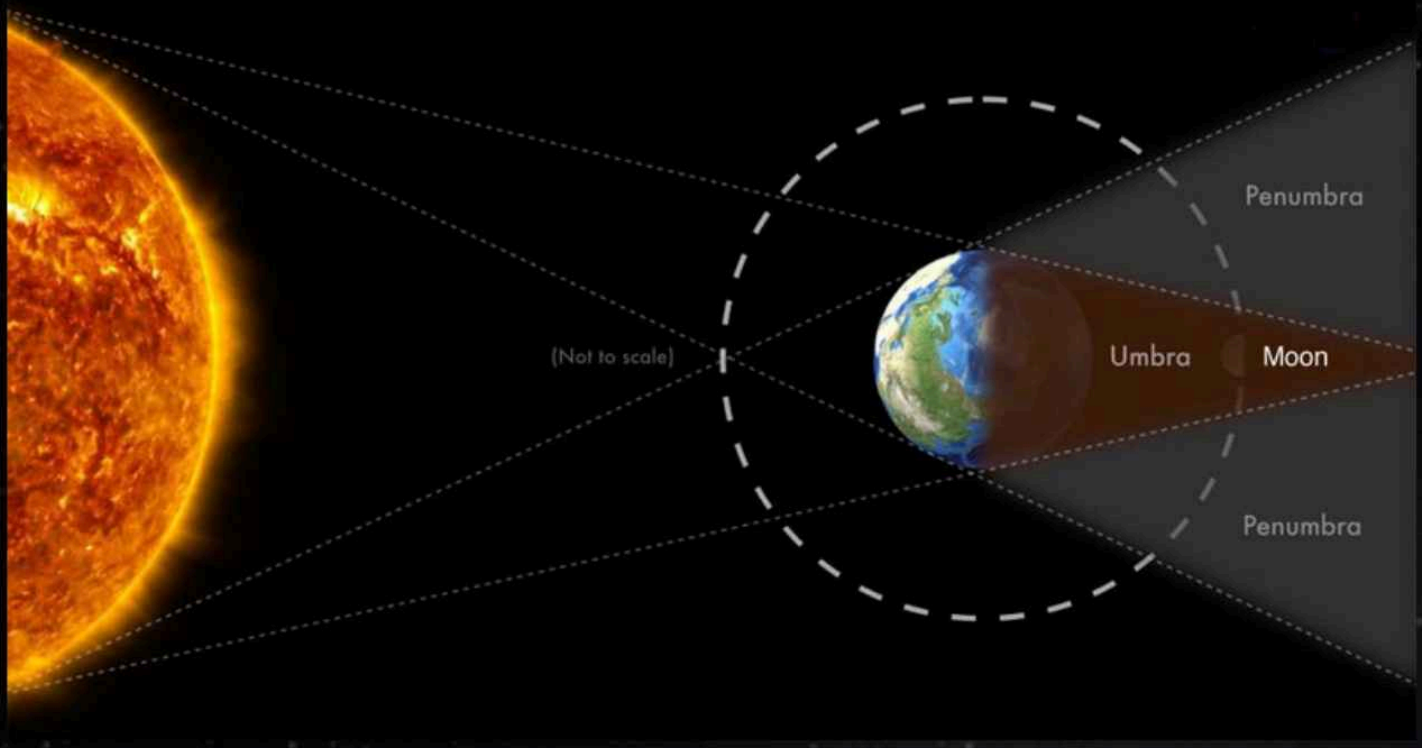
Purpose

Hubble was designed as a general purpose observatory, meant to explore the universe in visible, ultraviolet and infrared wavelengths. To date, the telescope has studied more than 40,000 cosmic objects, providing views astronomers were unable to capture from the ground.

What Is Blood Moon .?

A red moon, also known as a blood moon, can be formed during a lunar eclipse. A lunar eclipse occurs when the Earth passes between the Sun and the Moon, casting a shadow on the Moon. There are three types of lunar eclipses: total, partial, and penumbral.

During a total lunar eclipse, the Earth completely blocks the direct sunlight from reaching the Moon. However, some sunlight is refracted (bent) by the Earth's atmosphere and reaches the Moon indirectly. The Earth's atmosphere filters out shorter wavelengths of light such as blue and green, allowing longer wavelengths of light, such as red and orange, to pass through. As a result, the light that reaches the Moon during a total lunar eclipse is predominantly red, giving the Moon a reddish or coppery appearance.



The exact color and intensity of the red moon can vary depending on several factors, including the Earth's atmospheric conditions at the time of the eclipse. For example, if there are significant volcanic eruptions or large amounts of dust in the Earth's atmosphere, the moon may appear darker and redder.

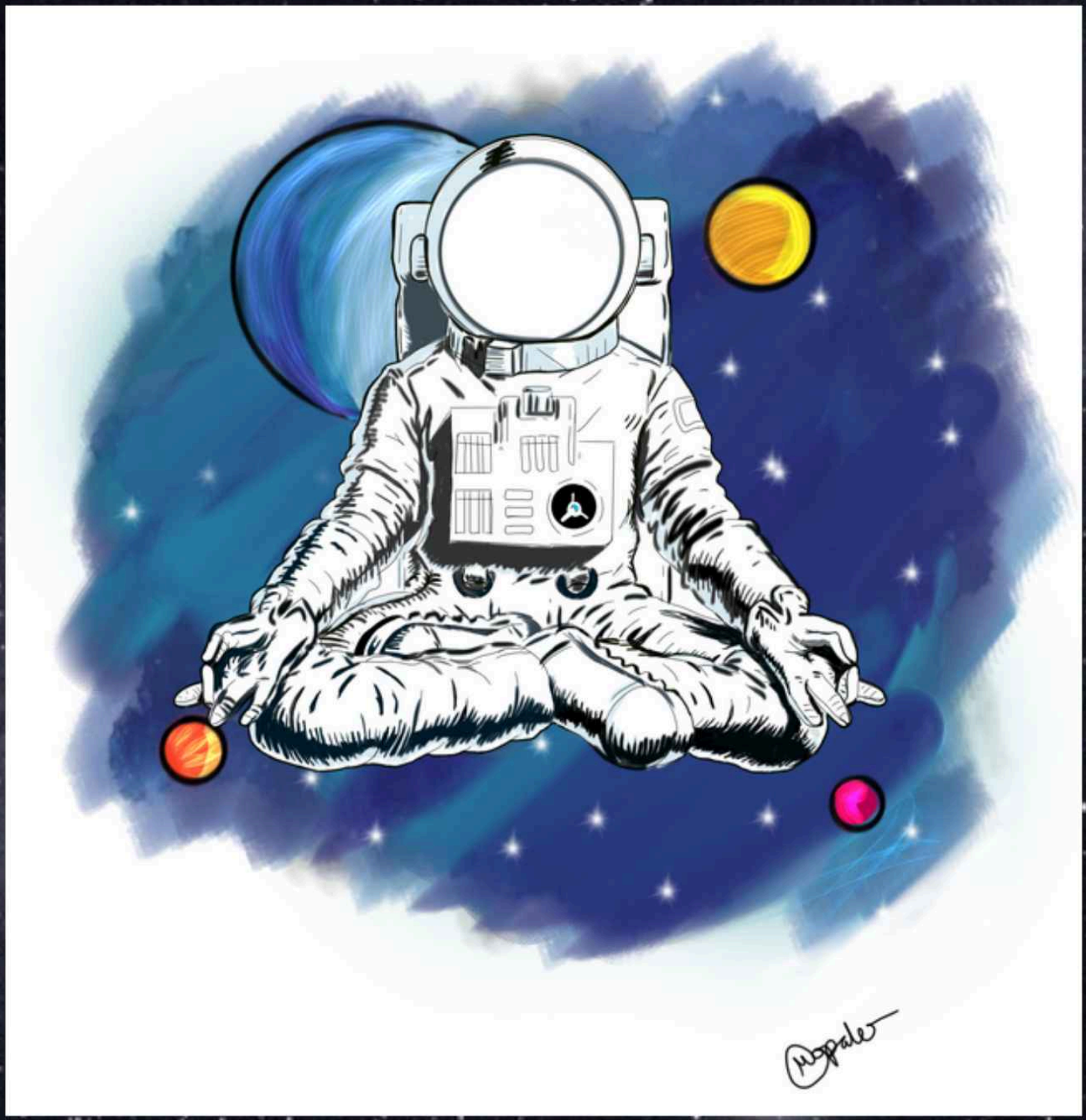
It's important to note that a red moon or blood moon only occurs during a lunar eclipse. During a regular full moon, the Moon's color appears white or slightly yellowish, depending on the observer's location and atmospheric conditions.

- Savidhan Choudhari
(T.E. Civil)

Team Astrophile presents

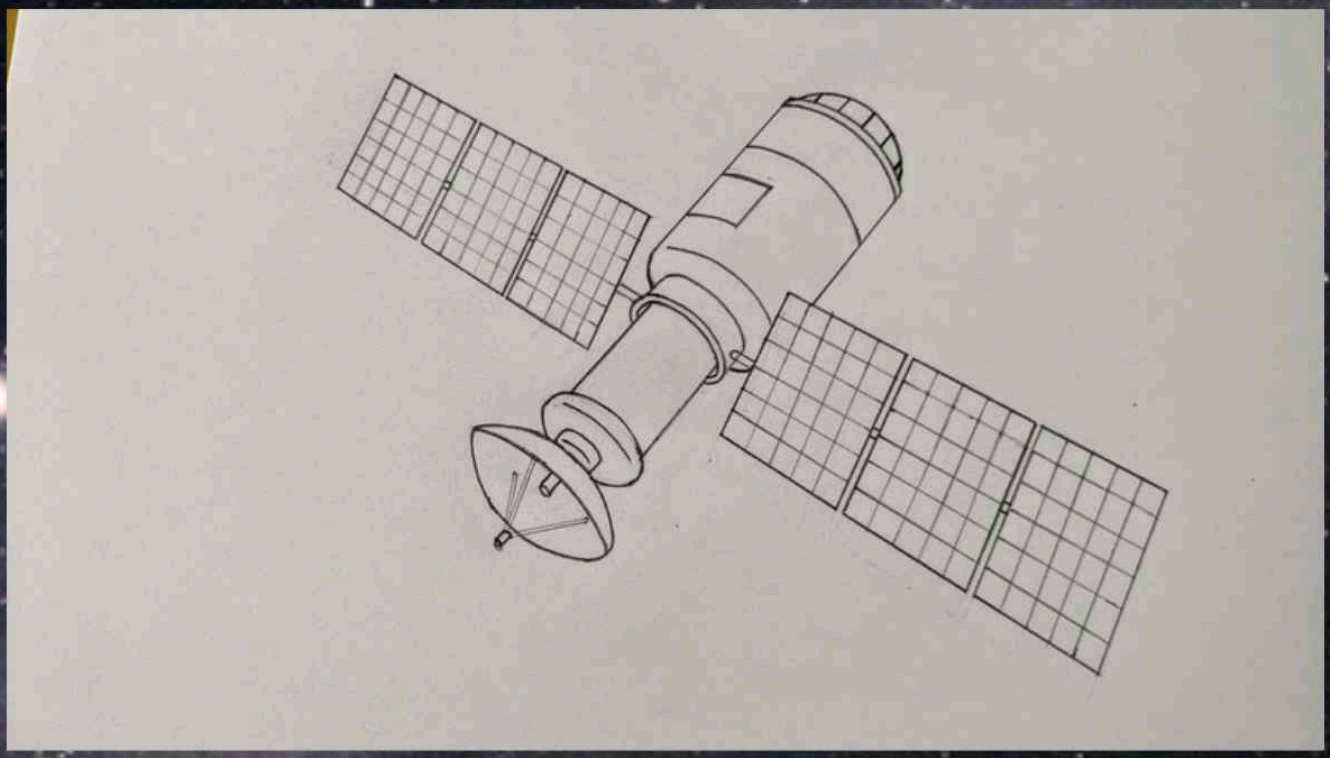
ASTRO ART

Here we bring you the astronomical arts & photographs from students & members



- Om Topale
(B.E. Automobile)

- Aditya Rathod
(T.E. Civil)



- Abhishek Sonune
(F.E. Automobile)

- Savidhan
(T.E. Civil)

- Aditya Rathod
(T.E. Civil)

- Vibhanshu Hire
(B.E. Mechanical)

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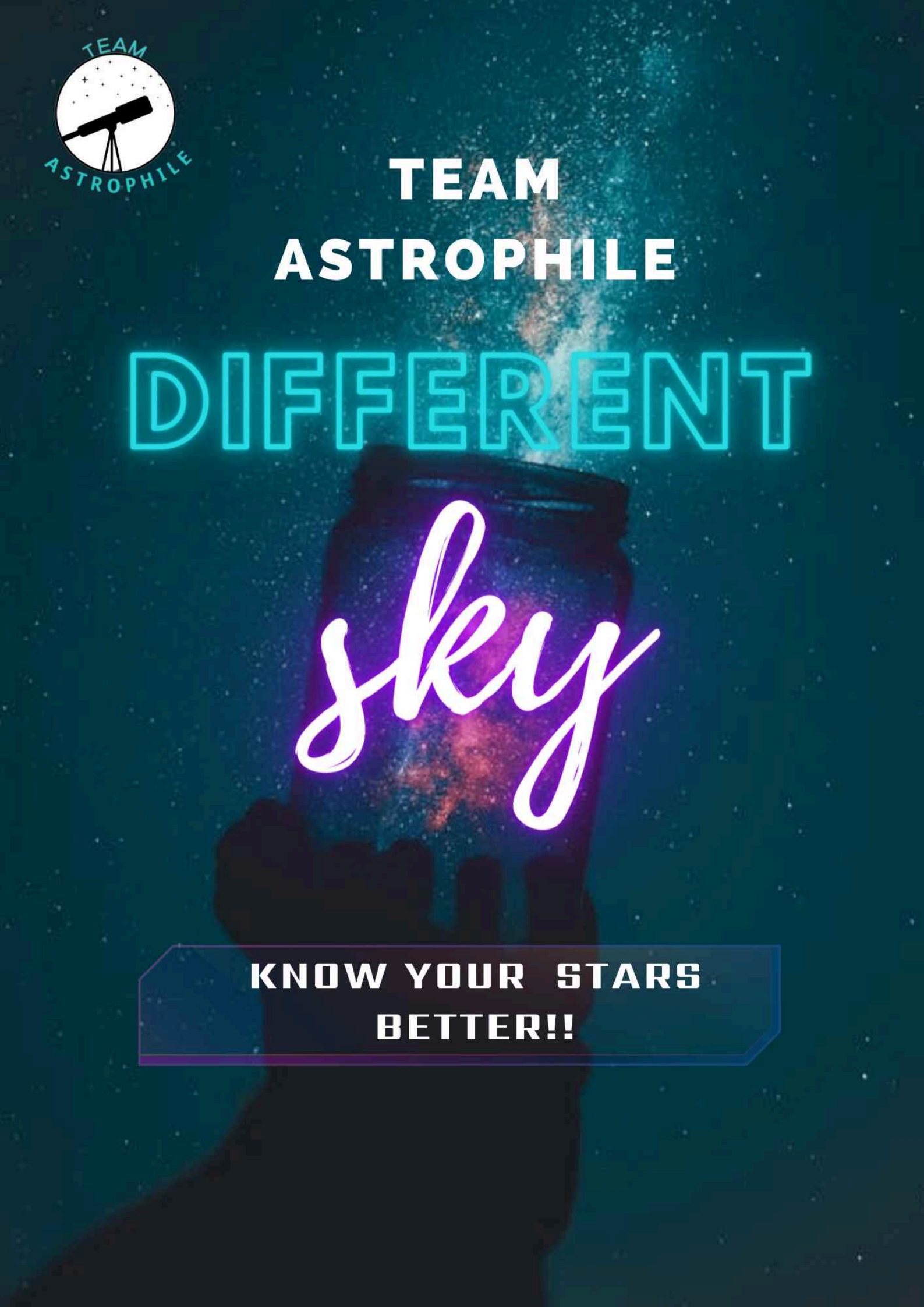
(B.E. Mechanical)


TEAM
ASTROPHILE
TEAM ASTROPHILE
DIFFERENT
sky
KNOW YOUR STARS BETTER!!

सप्तर्षी तरका समूह

रात्रीच्या वेळी आकाशात हजारो तारे दिसतात. यापैकी काही तारे एका गटात एक नमुना तयार करतात, ज्याचा आकार आळखता येतो. या तार्‍यांच्या समूहाला नक्षत्र म्हणतात. सध्या सुमारे 88 नक्षत्र आहेत. प्रत्येक नक्षत्राला त्याच्या आकारानुसार एक नाव देण्यात आले आहे. जसे की सप्तर्षी (Ursa major) , ध्रुवमत्स्य (Ursa minor), मृग (Orion), सिंह(Leo major) आणि शर्मिष्ठा(Cassiopeia) ही काही महत्वाचे तारका समूह आहेत.

स्थान

सप्तर्षी हे आकाशात उत्तरेकडील एक नक्षत्र असून त्याचे स्थान सुमारे 10 तास 40 मिनिटे उजवीकडे आरोहण आणि 56° उत्तरेला आहे.(Ursa major is a constellation of the northern sky, at about 10 hours 40 minutes right ascension and 56° north declination.)

महत्त्व

सप्तर्षी तारका समूह दर 24 तासांनी ध्रुव ताऱ्याभोवती संपूर्ण प्रदक्षिणा पूर्ण करते आणि या कारणास्तव, ते क्षितिजाच्या खाली कधीही दिसू शकत नाही. या गतीमुळे, नक्षत्राचा वापर संपूर्ण इतिहासात तारेचे घड्याळ म्हणून केला गेला आहे.

- Avanti Nikam
(T.E. Civil)
-Mayuri Vidhate
(T.E. Instru)

SPACECRAFT CEMETERY

At 48 52.6'S latitude and 123°23.6 W longitude, approximately 2.688 kilometres from the nearest land-Ducie Island, 4 kom beneath the surface of the ocean rest the remains of over 236 space crafts. This place is called the spacecraft cemetery or also known as Point Nemo. The word "Nemo" in Latain means no one. As the name suggests this location is the remotest location situated in a region in the southern Pacific Ocean east of New Zealand making it a perfect place for crashing broken or giant spacecraft (that have reached the end of their usefulness are routinely crashed) in the ocean. Notable craft buried here includes Russian Progress cargo craft the Japan Aerospace Exploration Agency H-II Transfer Vehicle, and the European Space Agency's Automated Transfer Vehicle. The International Space Station is stated to end up in the spacecraft cemetery upon retirement

DOESN'T MARINE LIFE GET AFFECTED ?

The question that arises is doesn't the dumping of spacecraft affect marine life? Well, it is certain that there is no human life possible at this point Point Nemo's location falls at the centre of the Southern Pacific Gyre, a rotating ocean current that keeps nutrient-rich waters away from the area. Also, it's too far for the winds to carry organic matter at point Nemo. Water temperatures average around 7.23 degrees Celsius. The ocean floor is a full 13,000 feet below the surface-2.5 miles straight down. Due to a lack of nutrition and temperature in this place holding any kind of lifeform here is nearly impossible. But even due to all of the difficulties life somehow manages to thrive at the spacecraft cemetery.

At a depth of 65 to 16,000 feet, researchers found bacteria that have been found in other parts of the ocean. Though they are one-third less than what other parts of oceans hold bacteria population. But still, microbial life exists in some traces. The reason for these traces of life to exit even in such drastic conditions of nature is cause of the line of underwater volcanoes present near Point Nemo.

During an eruption, these underwater volcanoes release chemicals which in turn help the bacteria to feed one. Other than the microscopic life thriving here there are a species of crabs, yet crabs which are found here. Actually, these Yeti crabs feed on these microorganisms. Other than these creatures this place does not hold any lifeforms, at least for now. Due to this lifelessness, this place gives an edge to act as a spacecraft cemetery. So hence the spacecrafts buried here won't cause much harm to marine life.

Now the question arises about the water pollution which could happen due to these spacecraft! Well, most of the substances which are used in spacecraft are harmless but there is still a potential threat of chemical spillage poses a risk to the marine environment. Hydrazine is a widely used rocket propellant that is highly toxic. Due to the isolated location of this point, it won't cause much trouble for short term but if this continues this will surely create measure issues for the lifeforms for the long terms

SOME FACTS ABOUT POINT NEMO :

1. The closest humans to Point Nemo don't travel by boat they are the astronauts in the International Space Station, who fly just under 400 km above the zonel

2. Unlike the traditional way of finding a place, this place was discovered by marking the coordinates in the software. Hrvoje Lukatela, the Croatian-Canadian engineer who made the discovery, never actually visited Point Nemo.

3. In 1997, oceanographers recorded a mysterious underwater sound east of Point Nemo. They called it the "bioop" and this event led many to believe in the existence of a huge creature living in these isolated oceanic depths

- Sakshi Kushwaha
(F.E. ENTC)

THE COSMIC FAREWELL : EXPLORING THE END OF A STAR'S LIFE

- Gayatri Giradkar (T.E. Instrumentation)

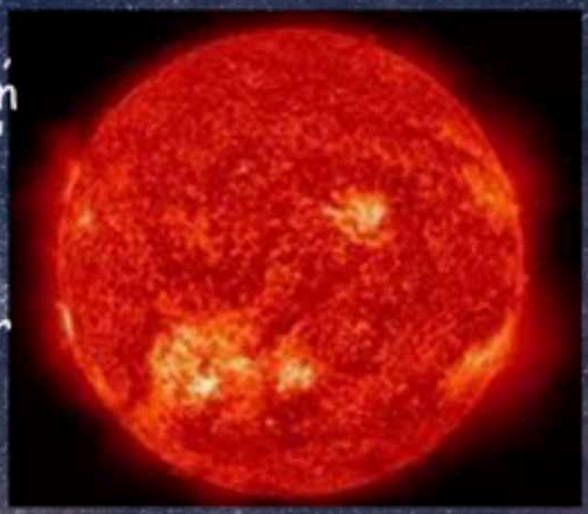
Stars, those magnificent and shining giants of the universe, have a remarkable story to tell. Just like all living things, stars also have a lifespan.

FADING BRILLIANCE

After shining brightly for millions or even billions of years, a star starts running out of fuel, which is mainly hydrogen. As this happens, changes begin to occur within the star, leading to its ultimate demise.

RED GIANTS

If the star is relatively small, it undergoes a transformation called becoming a "red giant." As it exhausts its hydrogen fuel, the core of the star starts to shrink, while its outer layers expand. The star swells up, becoming much larger and redder than before.

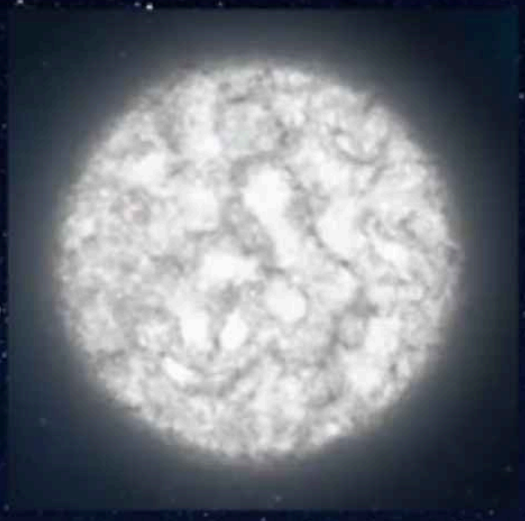


PLANETARY NEBULA

During the red giant phase, the outer layers of the star are thrown off into space, creating a beautiful and glowing cloud of gas and dust called a "planetary nebula." Despite its name, a planetary nebula has nothing to do with planets—it's just a remnant of the star's outer layers.

WHITE DWARF

Once the star has shed its outer layers, what remains is a small, hot, and incredibly dense core known as a "white dwarf." It doesn't emit its own light but continues to glow from the leftover heat. Over time, the white dwarf cools down, eventually fading away into darkness.



SUPERNOVAE

In the case of larger stars, a more explosive ending awaits. When a massive star reaches the end of its life, it undergoes a spectacular event called a "supernova." During a supernova, the star explodes with tremendous force, releasing an enormous amount of energy into space.

NEUTRON STARS AND BLACK HOLES

After a supernova explosion, the core of the massive star can take one of two paths. If it's between about 1.4 and 3 times the mass of our Sun, it becomes an incredibly dense and compact object called a "neutron star." Neutron stars are made up of tightly packed neutrons and are incredibly heavy for their size. If the core is even more massive, it can collapse further, forming a "black hole." Black holes have such strong gravity that nothing, not even light, can escape from them.

Stars, despite their dazzling brilliance, are not immortal. Their final chapter is as captivating as their birth. Whether they transform into red giants, create stunning planetary nebulae, or end their lives in explosive supernovae, stars leave behind a legacy that continues to shape the cosmos. Understanding the life and death of stars not only expands our knowledge of the universe but also reminds us of the impermanence and beauty of all things in the cosmic tapestry.

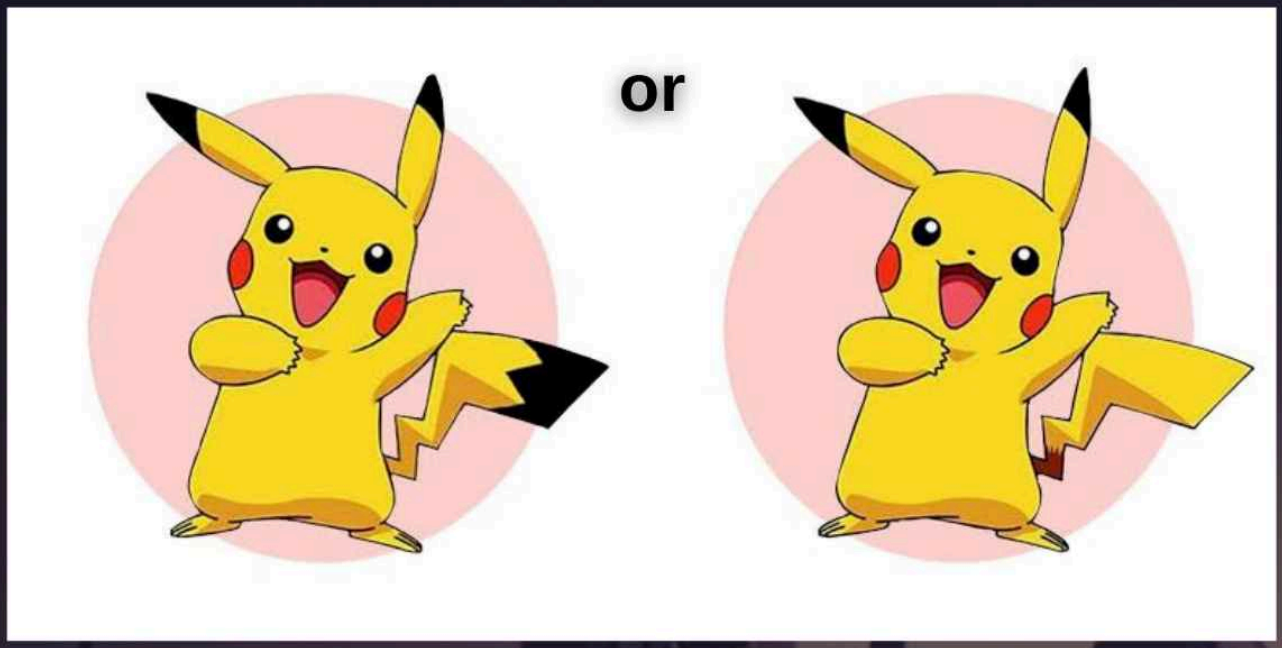
Mandela Effect

The Mandela Effect refers to a phenomenon where a large group of people remembers something differently from how it occurred or is documented. It is named after Nelson Mandela, as many people believed he had died in the 1980s while he actually passed away in 2013. The Mandela Effect suggests that there may be a discrepancy between collective memories and objective reality.

One possible explanation for the Mandela Effect is false memory. Our brains store and retrieve memories, but sometimes the recollection can be flawed or altered. When memories are retrieved, they can be influenced by similar memories or external information, leading to the creation of false memories.

Another concept related to the Mandela Effect is the idea of parallel universes or alternate timelines. In this explanation, it is proposed that individuals may be crossing over into parallel universes or experiencing glitches between different timelines, resulting in conflicting memories.

For example, the misconception that Alexander Hamilton was a president of the United States could be attributed to false memory or a blending of historical knowledge. People may associate Hamilton with a prominent role in American history and mistakenly assume he was a president, even though he was not.



Similarly, in the case of Pikachu's tail color or the famous dialogue from a movie, false memories or collective misinterpretation can lead to a shared misconception.

Overall, the Mandela Effect is still not fully understood, and there may be multiple factors at play, including cognitive biases, social influence, and the fallibility of human memory. It continues to be a topic of interest and discussion among researchers and the public.

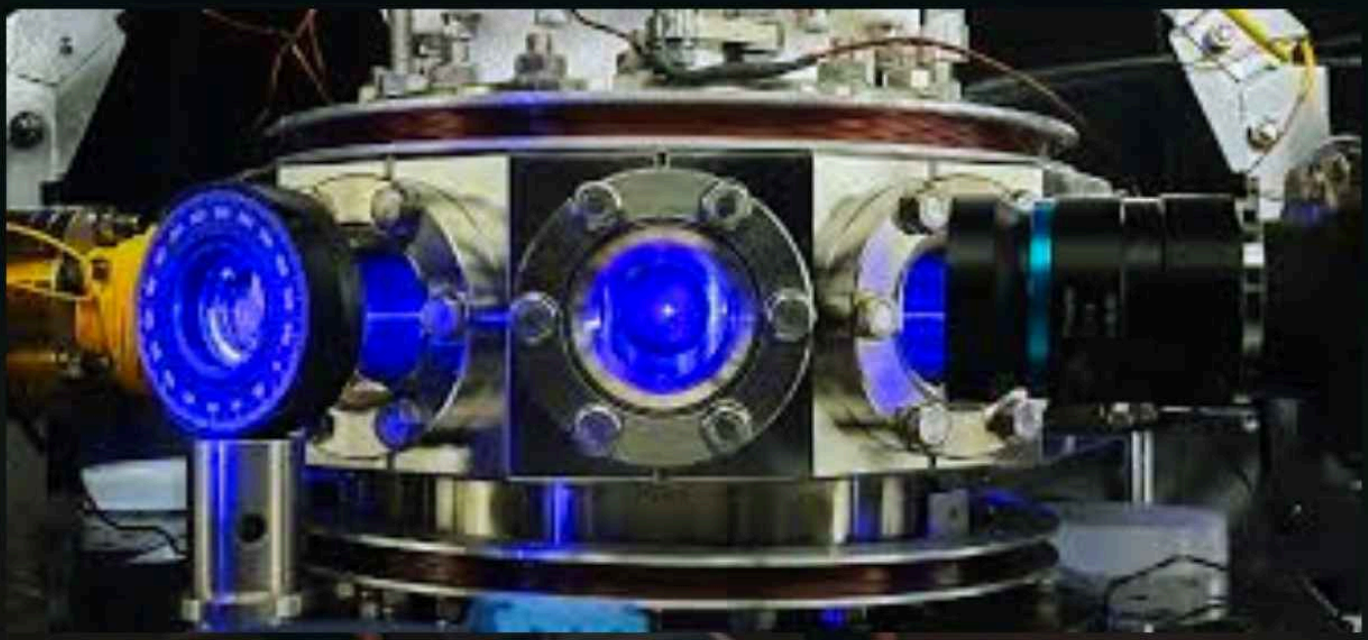
- Ganesh P
(F.E. Instrumentation)

Pune's Revolutionary Atomic Clock: Paving the Way for Precision Timekeeping

The only reason for time is so that everything doesn't happen at once.

- Albert Einstein

In the bustling city of Pune, India, a groundbreaking scientific endeavor is taking place—a team of brilliant researchers is developing a state-of-the-art atomic clock that has the potential to revolutionize timekeeping as we know it. This highly accurate time-measuring device promises to redefine precision in various scientific fields and bring about significant advancements in communication, navigation, and our understanding of the fundamental nature of time.Atomic clocks are the epitome of precision timekeeping.



Unlike conventional clocks that rely on mechanical or electronic oscillations, atomic clocks employ the oscillations of atoms to measure time. They are based on the principle that certain atoms oscillate at a remarkably stable and precise frequency, making them ideal for tracking time with unrivaled accuracy.The atomic clock being developed in Pune is a result of collaborative efforts between esteemed scientists from the National Physical Laboratory (NPL) and the Indian Institute of Science Education and Research (IISER). Led by a team of dedicated researchers, this project aims to create a next-generation atomic clock that surpasses the accuracy of existing timekeeping devices.The new atomic clock in Pune utilizes a cutting-edge technology called optical lattice clocks.

These clocks use laser beams to trap and cool a group of atoms, allowing them to reach an ultra-low temperature. By precisely measuring the energy transitions within this cooled atomic ensemble, the researchers can achieve an astonishing level of accuracy.The significance of this achievement cannot be overstated. While the current best atomic clocks lose or gain just one second in billions of years, the atomic clock being developed in Pune is expected to attain an even higher level of precision. This improvement is crucial for numerous scientific applications that rely on accurate timekeeping, such as global positioning systems (GPS), satellite navigation, telecommunications, and advanced scientific research. Precise timekeeping is fundamental to modern navigation systems, ensuring accuracy in determining positions and distances. By employing the advanced atomic clock technology being developed in Pune, navigation systems, such as GPS, will experience improved performance. This will have far-reaching benefits for transportation, aviation, logistics, and even everyday activities, such as mapping applications on smartphones.Furthermore, the enhanced precision of atomic clocks will have a significant impact on communication systems. The synchronization of data transmission and reception relies on precise timing.

With the Pune atomic clock's unprecedented accuracy, communication networks can operate at peak efficiency, resulting in faster and more reliable data transfer across the globe.The development of the atomic clock in Pune holds great promise for expanding our understanding of fundamental physics and the nature of time itself. These clocks can be used to investigate phenomena such as the effects of gravity on time, the behavior of atoms in extreme conditions, and potential variations in physical constants. The profound insights gained from such research can challenge existing theories and open new avenues for scientific exploration.The new atomic clock being developed in Pune represents a remarkable leap forward in the field of timekeeping. Its unrivaled precision, made possible by cutting-edge technology and the ingenuity of the scientific community, holds tremendous potential for a wide range of applications. From revolutionizing navigation and communication systems to unlocking new realms of knowledge in fundamental research, this groundbreaking atomic clock promises to shape the future of our increasingly interconnected and precise world.

-VIBHANSHU HIRE
(B.E. MECHANICAL)

ISRO's Satellite Launch Vehicles: Pioneering Space Exploration for India

Satellite launch vehicles play a crucial role in modern space exploration, enabling the deployment of satellites into orbit for various purposes such as communication, weather monitoring, Earth observation, navigation, and scientific research. The Indian Space Research Organisation (ISRO) has been at the forefront of developing indigenous satellite launch vehicles, revolutionizing India's presence in the global space arena. Let's delve into the significance of satellite launch vehicles and explore ISRO's remarkable journey from its first rocket to its advanced launch vehicles. The First Rocket: SLV-3

In August 1979, ISRO launched its first experimental satellite launch vehicle, SLV-3 (Satellite Launch Vehicle-3). This historic mission marked India's entry into the world of space exploration. SLV-3 was a four-stage rocket powered by solid and liquid propellants. On July 18, 1980, it successfully placed the Rohini satellite, India's first indigenously developed satellite, into orbit. Although the mission was partially successful due to technical issues, it laid the foundation for subsequent developments in satellite launch vehicle technology.

ISRO's Launch Vehicles:

Polar Satellite Launch Vehicle (PSLV):

The Polar Satellite Launch Vehicle is one of ISRO's most successful launch vehicles. It made its maiden flight in 1993 and quickly gained international recognition for its versatility and reliability. The PSLV is capable of launching satellites into both polar and geostationary orbits, making it suitable for a wide range of missions. Its highlight includes the successful Mars Orbiter Mission (Mangalyaan) in 2014, which made India the first Asian nation to reach Martian orbit.

Geosynchronous Satellite Launch Vehicle (GSLV):

The Geosynchronous Satellite Launch Vehicle made its inaugural flight in 2001 and has been instrumental in deploying communication satellites into geostationary orbits. GSLV uses liquid core stages, solid strap-on boosters, and a cryogenic upper stage, enhancing its payload capacity for heavier satellites. Notably, GSLV-D6 successfully launched GSAT-6, providing crucial communication links to India's armed forces.

GSLV Mark III :

GSLV Mark III, also known as LVM3, is ISRO's most powerful launch vehicle. It made its first suborbital test flight in 2014 and its first successful orbital flight in 2017. GSLV Mark III has an indigenous cryogenic upper stage and is capable of carrying heavier payloads, making it instrumental in India's ambitious missions like Chandrayaan-2 and Gaganyaan (human spaceflight program).

Small Satellite Launch Vehicle (SSLV):

ISRO's Small Satellite Launch Vehicle is a new addition designed to cater to the growing demand for launching small satellites. Its compact design, cost-effectiveness, and short launch turnaround time make it a promising option for commercial satellite launches.

Conclusion:

ISRO's satellite launch vehicles have played a pivotal role in transforming India's space exploration capabilities, enabling the country to establish a formidable presence in the global space community. From the humble beginnings of SLV-3 to the sophisticated GSLV Mark III, ISRO's journey has been a testament to India's scientific prowess and determination to explore the cosmos. As ISRO continues to refine and advance its launch vehicle technology, it is poised to contribute significantly to space exploration and satellite deployment in the years to come.

- Omkar Kanekar
(T.E. Civ)

Our Events & Visits

25th Feb 23 Astroparty

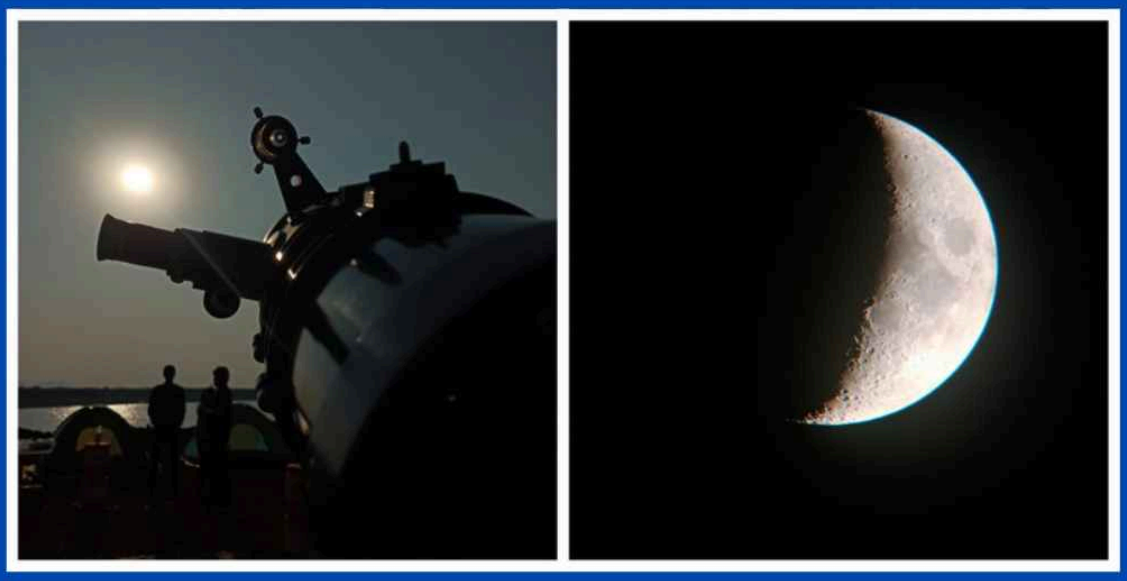
ASX Stargazing Night at Bhor

Astroparty - 22 April 2023

ASX Stargazing Night at Temghar Dam, Lavasa Road

Jayant Naralikar Astronomer Talk at IUCAA Open Day

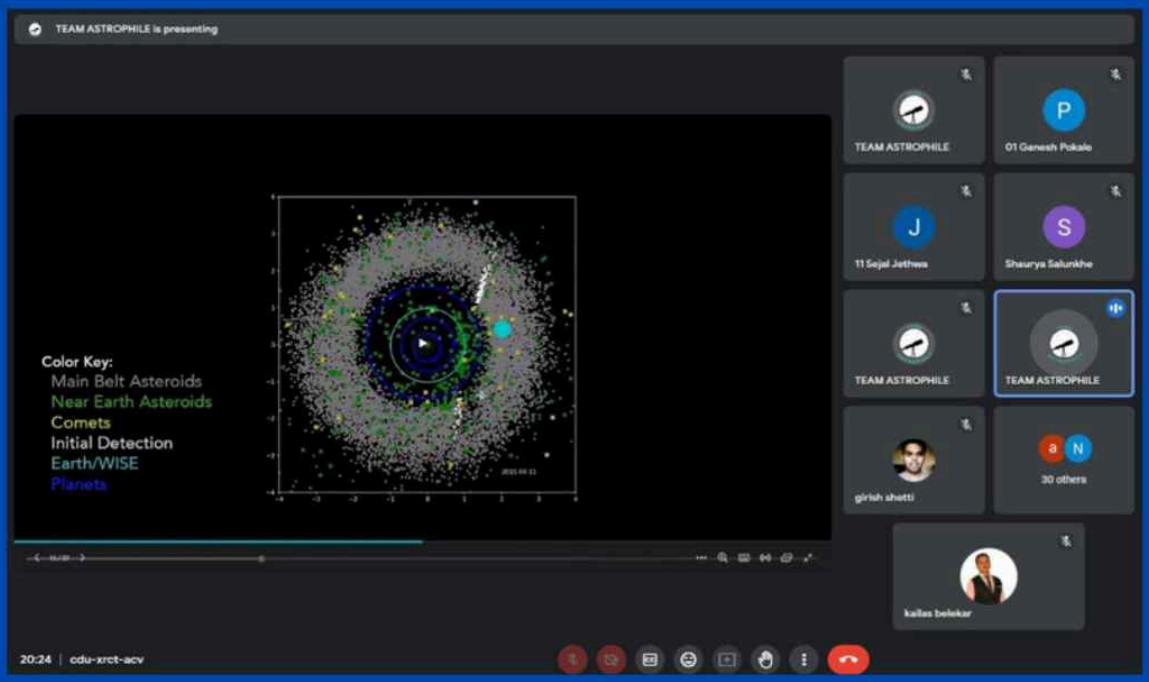
Team ASX & Team Astrophile



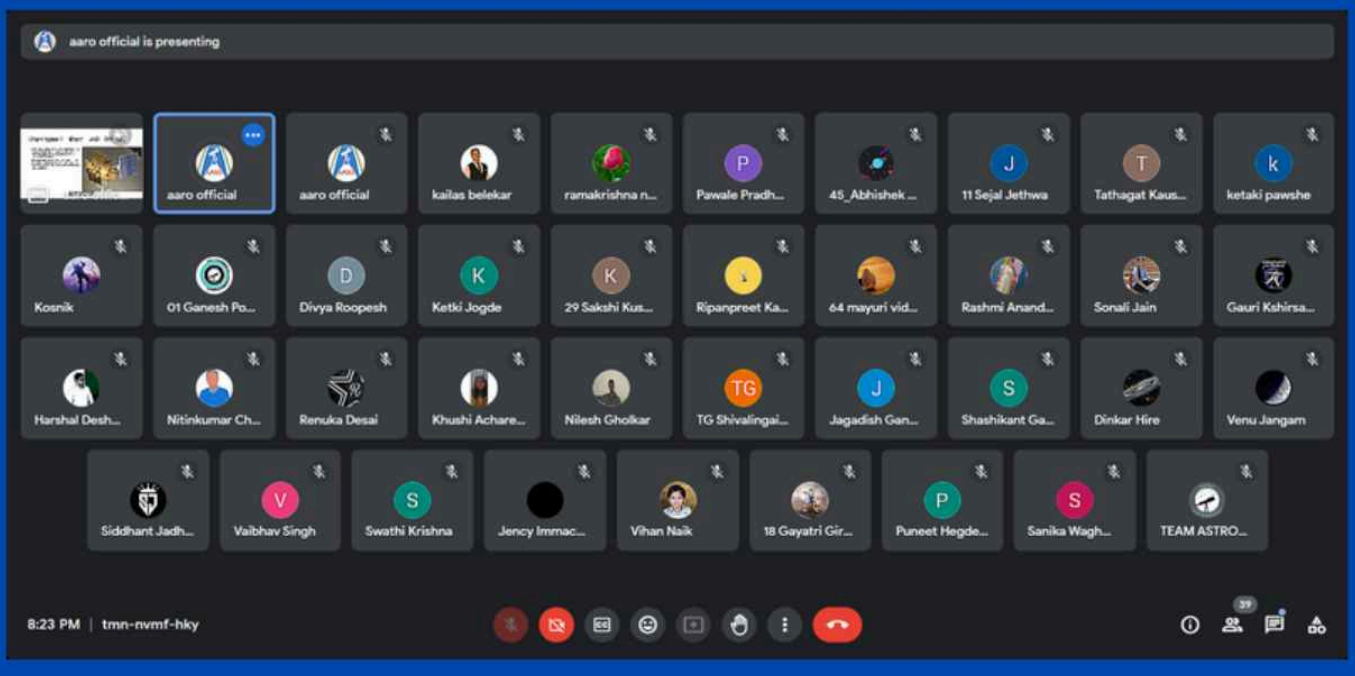
Gazing Nights & Astrophotography

Team Inaugration Ceremony & Astronomy Day

Temghur dam

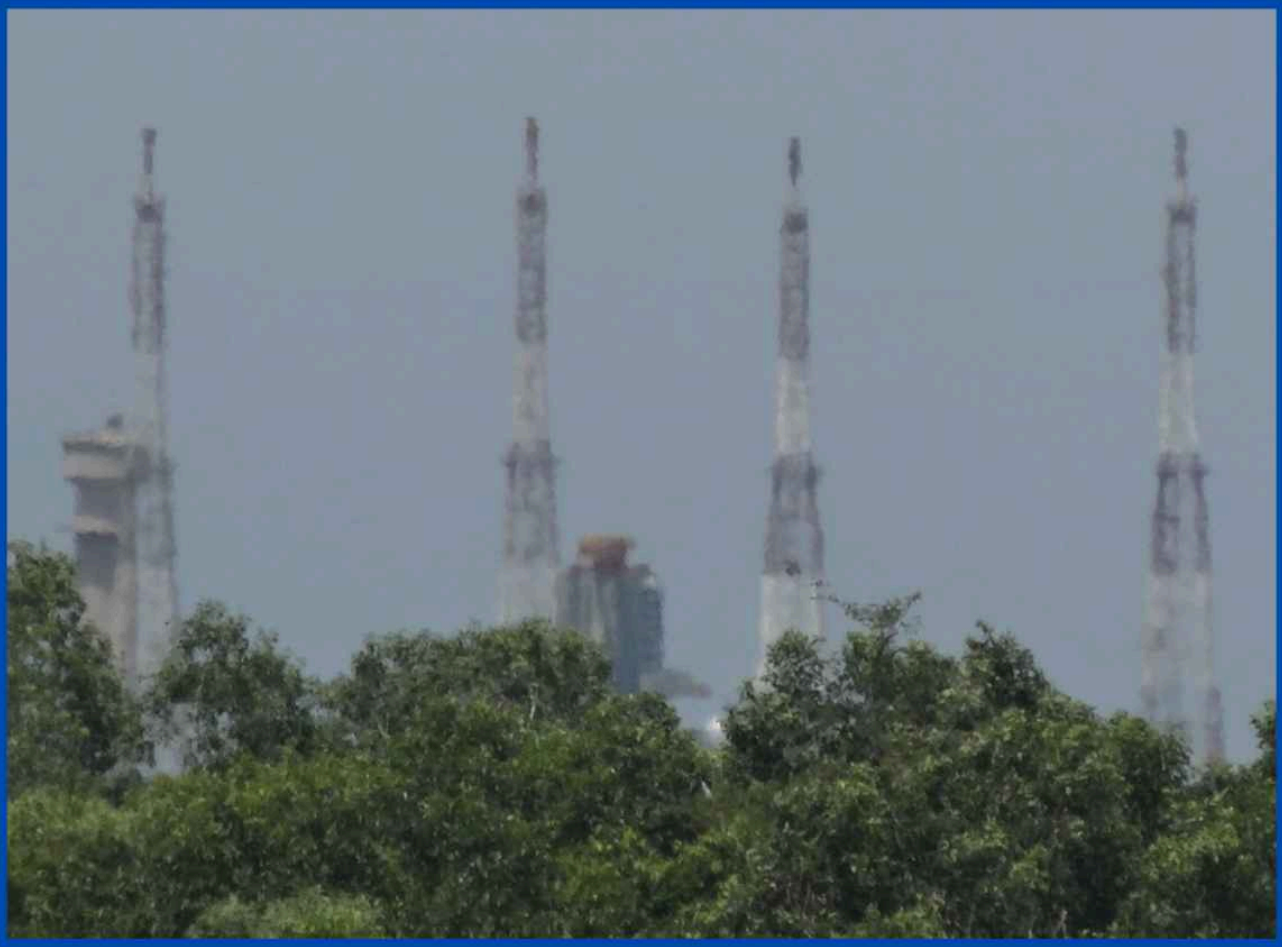


Team ASX & Team Astrophile: Asteroid Day Expert Talk



Team ASX & Team Astrophile Chandrayaan-3 Expert Talk

Mission Chandrayan 3
From Our Lense



Picture Credits - Venu Jangam
(T.E. Mechanical)

Our Achievements


TEAM
ASTROPHILE
INTERNATIONAL ASTRONOMY AND ASTROPHYSICS
COMPETITION
QUALIFIED FOR FINALS
Vibhanshu Hire
Venu Jangam


TEAM
ASTROPHILE
INTERNATIONAL
ASTRONOMY AND ASTROPHYSICS
COMPETITION
Final Round
Vibhanshu Hire - Bronze Honour
Venu Jangam - Silver Honour
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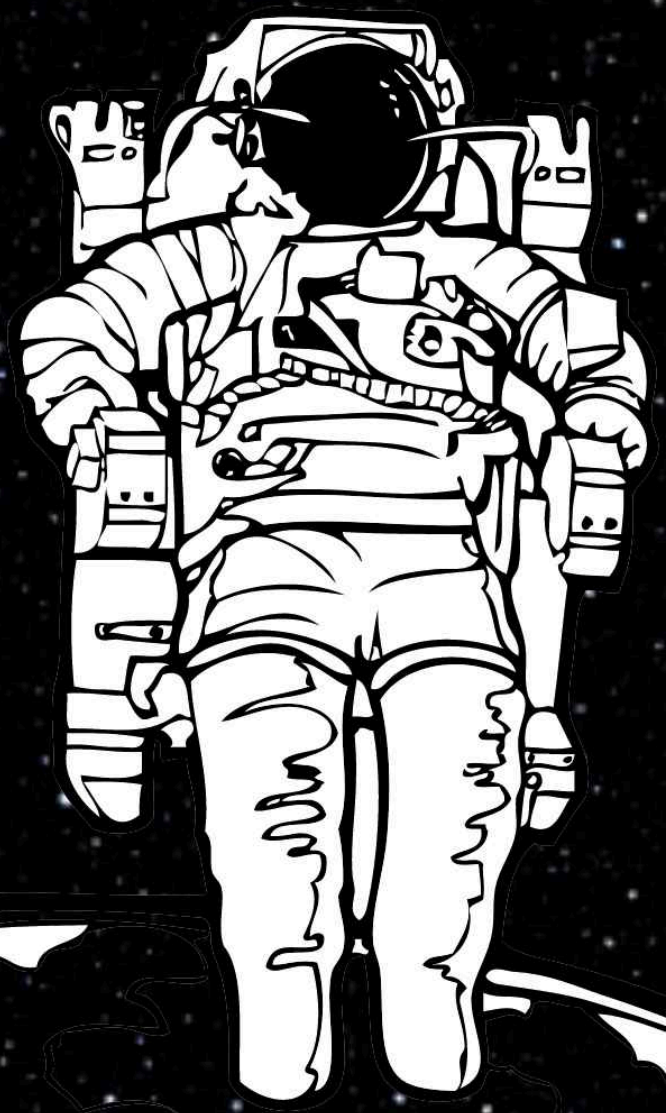

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