



The celestial exploration

EQUINOX

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EDUCATORS' NOTE

It is with great excitement and pride, We introduce the very first edition of our Astronomy Club's magazine. Our club, which was introduced just last year, has already ignited a deep fascination with the mysteries of the universe among our students. This magazine is a testament to the passion and motivation we have gained from the numerous activities we've organized, including stargazing sessions, interactive workshops, and engaging discussions on celestial phenomena.

Though new, our Astronomy Club has quickly become a hub for learning and exploration, and this magazine reflects the creativity and curiosity of our members. I am truly thrilled to see this magazine come to life, and I hope it inspires readers to look up and continue exploring the wonders of the cosmos.

A big thank you to all the contributors and supporters who have made this magazine possible. Here's to the beginning of a wonderful tradition!

Happy reading!

Dr. (Mrs.) Pinky Vaishnava , Dr. (Mrs.) Abha Goyal

INTRODUCTION

We are excited to unveil the first edition of "EQUINOX," an Astronomy Club magazine designed to ignite curiosity, creativity, and a wide range of perspectives about the exploration of outer space. From the latest breakthroughs to ancient astronomy, our goal is to inspire, motivate, and engage both sky lovers and newcomers. This magazine will guide you through the mysteries and beauty of the universe.

Will the rings of Saturn disappear? Are we spied by the aliens? Does our parallel version exist in this multiverse? Fasten your seatbelts to explore these space facts with us. In this first edition, we have curated a blend of insightful articles and captivating visual content. We aim to be more than a source of information; we want to inspire action and a new way of thinking.

This magazine will also reveal the activities done by the Astronomy Club on the serene campus of MCGS under the canopy of stars. It showcases our night sky parties with hands-on the telescope, movie sessions, and daily fun STEM activities.

As we embark on this journey, we invite you to join us and dive into the Madness of the Multiverse..

Welcome to Equinox. A step closer to guiding your imagination.

Sincerely,
The Editorial team

The Nova Outburst of T Coronae Borealis

Known as Blaze Star, T Coronae Borealis will likely brighten the sky with its explosion by the end of September, according to Nasa. TCRB, some 3,000 light-years away, is situated in the constellation Corona Borealis, often referred to as the Northern Crown, and is well-known for its recurring nova.

It is a binary star system consisting of two different stars: a red giant and a white dwarf. When enough material from the red giant is taken by the white dwarf in the system, it eventually accumulates up to the point where it will explode thermonuclear on the dwarf's surface. Usually, the constellation quickly shines during these outbursts, making it look like a "new" star in the night sky. Scientists estimate that the next one could light up the sky between February and September of 2024. The last one happened in 1946. NASA officials stated once its brightness peaks, it should be visible to the unaided eye for several days and just over a week with binoculars before it dims again, maybe for another 80 years.

This nova will temporarily appear as one of the most bright celestial bodies, competing with the North Star in sight before diminishing. The upcoming nova outburst presents astrophysics researchers with a unique opportunity to enhance understanding of the structure and dynamics of recurring star explosions, while astronomy enthusiasts might look forward to an equally rare and thrilling event this year.

-Divyanshi Shah , P/2578 XC



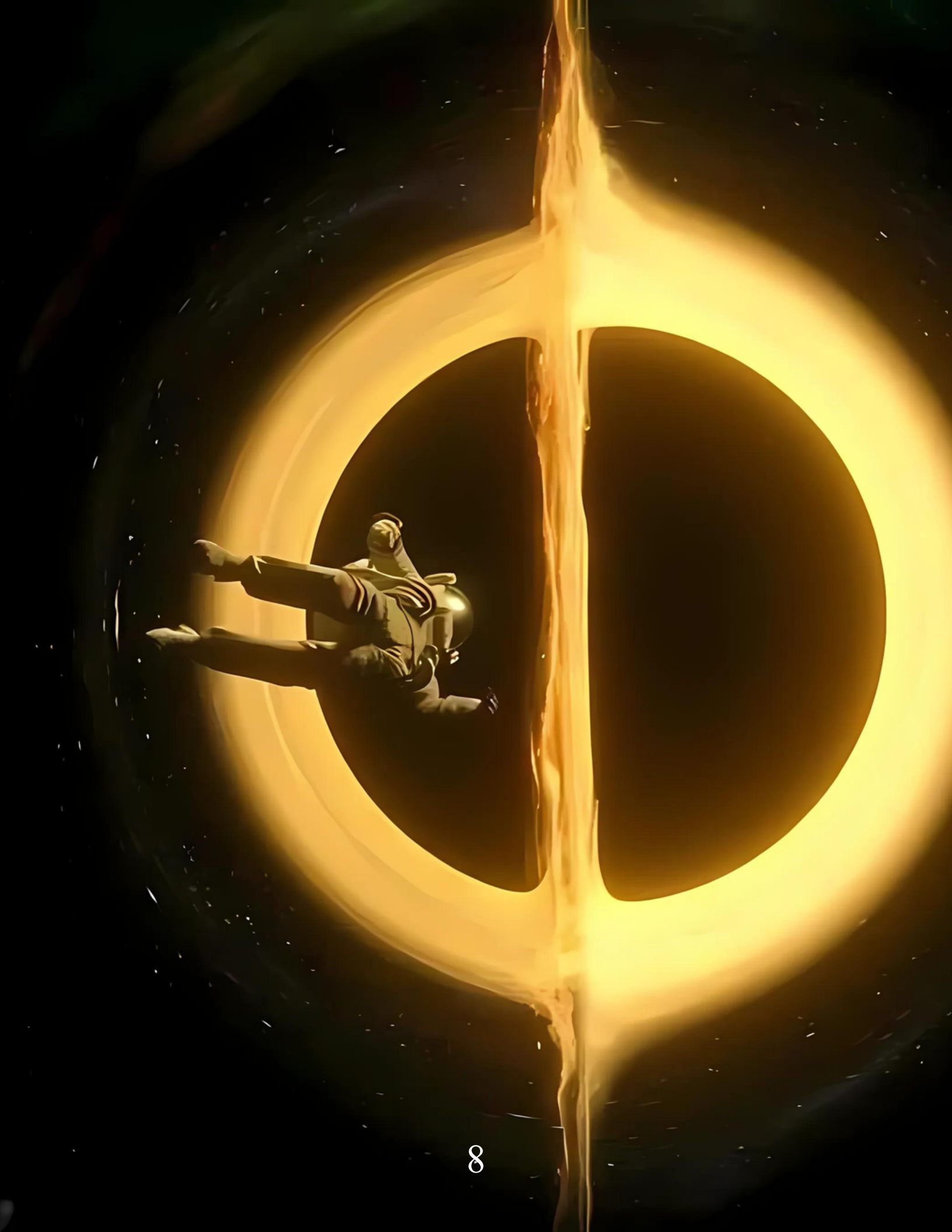
The Role of Dark Matter and Dark Energy in the Universe

Dark matter and dark energy form approximately 95% of the universe's total mass and energy, comprising two of its intriguing and essential components.

Dark matter is invisible to conventional telescopes because it does not emit, absorb, or reflect light because of the way it influences visible objects like stars and galaxies, we are aware that it exists. Galaxies spin at a faster than estimated speed, but are prevented from colliding by the additional gravity of dark matter. While dark matter pulls things together, dark energy works in the opposite way pushing the universe apart. Discovered in the late 1990s, dark energy is responsible for 68% of the universe's total energy. Prior to this discovery, scientists thought that gravity would eventually cause the universe to expand at a slower pace. Observations of far-off supernovae, however, showed that galaxies are drifting apart faster and faster. This expansion is being driven by dark energy, which opposes the forces of gravity.

The structure and final outcome of the universe are shaped by dark matter and dark energy. While dark energy controls the universe's large-scale motion, dark matter helps in the formation of galaxies and galaxy clusters. Galaxies will separate more quickly if dark energy keeps the universe expanding at an accelerated rate, resulting in a distant, chilly future known as the "Big Freeze." Among the most important problems facing modern astronomers are the nature of these substances and their mechanisms.

-Divyanshi Shah , P/2578 XC

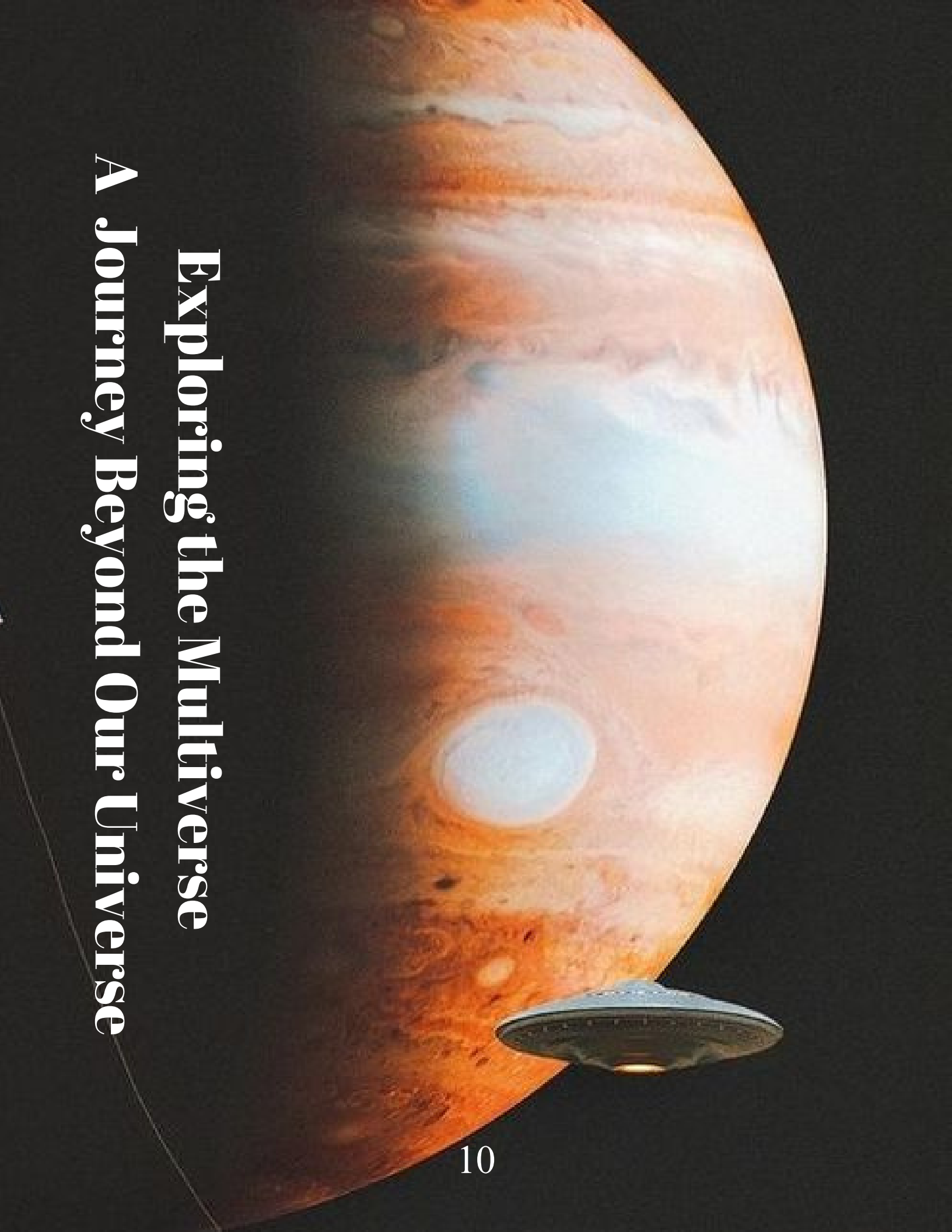


Think of a scene at the coastline where the waves come rushing to the shore. Each wave in this case will depict a particular universe, and all will be diverse in its own way. Understanding this pleasing concept brings out the multiversal dynamic, whereby the universe is no longer considered solitary but one of many, each having its own unique laws and dimensions.

The cosmological approach of the multiverse traces its genealogy down to the theories in quantum physics and cosmology. The concept started to gain prominence more than from the notion that our universe began with the Big Bang. But what happens if there are other explosions—many other explosions—that cause a new universe's formation each time? This implies that every time we make a conscious decision or some sort of event occurs, there is a new start in the form of a new universe. Consider a universe where dinosaurs are still roaming the earth or even consider the possibility of a universe where people never existed—such scenarios could just be a scraping of what really is each reality, probably more based on fiction.

Practically, the explanation of the multiverse phenomenon is poorly because of the intuitive causations provided to us by our inner selves along with positive interpretation. This actually explains a lot about the way rationality is instilled in human beings. People who perform actions given and programmed to them by their culture—because they make use of free will. What ultimately is realized is that even among reasonable people, strange ideas may hold some power. And parallel universes—or transformations and migrations of consciousness—populate the biosphere, awaiting investigation. What is put across is a quite fragile but yet sturdy image of human reason. The agony and ecstasy of managing people in organizations and surrealistic art, except perhaps, does exist. However, it does get more interesting as the story goes to uni-dimensional time. Would such duplication be ethical?

-Anushree Deva , P/3011 XC



Exploring the Multiverse

A Journey Beyond Our Universe

ANCIENT ASTRONOMY

The stars were highly connected with the afterlife in ancient Egypt. For instance, the constellation Orion was associated with the god of the underworld, Osiris, and the stars of the Milky Way were thought to be a river that leads into the heavens. Precise constructions of pyramids are built in the star alignments to offer direct passage to the pharaohs of the afterlife. The orientation of the Great Pyramid at Giza was with great accuracy toward the cardinal points, a fact that is representative of how advanced their knowledge in astronomy was and how important the domain was to them.

Various indigenous cultures in every part of the world also found deep meaning within the night sky. In Australia, Aboriginal peoples used the stars to know how to navigate and when to perform seasonal activities, thus creating rich oral traditions along with stories of constellations. The stories were not only forms of entertainment but a means of teaching survival skills and perpetuating cultural values. To these communities, stars were a living entity combined with identity and ways of life.

The really amazing thing about ancient astronomy is how it furnished the grounds for modern science. The neat recordings done by Babylonian astronomers and the geometric accuracy of the Egyptian pyramid building inspire our current ideas about the universe. These beliefs and tales of the signs in the heavens clarify that our ancestors did not simply see stars but connections: between life and death, earth and heavens, the physical and spiritual.

We stand under the same stars as those that have cast their light upon our ancestors, and instantly, we are taken to a place of reminder: of a common humanity shared between us and them. Their explanations speak of such curiosity and desire in an attempt to understand our place in the universe. The night sky, an unknown region, still holds that capacity to inspire us and fuel our quest to understand and travel through it.

And so the next time you look up to the star-filled sky, remember that you're contributing to a tradition as old as time. From ancient Egypt through to the Mayan civilization, our ancestors looked to the heavens for answers, and in their stories and discoveries, we find echoes of our own wonder and curiosity about the cosmos.

LIFE CYCLE OF A STAR

Stars tell stories of the universe; each goes on a merry journey that encompasses millions up to billions of years. Stars start their lives in a huge cloud of gas and dust called a nebula, where gravity pulls matter together, starting nuclear fusion at the core. It is at this point that the star is born, starting life as a protostar, growing in size, and accumulating mass until it attains stability. This is because it is this stability that defines the longest phase of a star, which is the main sequence, whereby it shines by converting hydrogen into helium. An example is our Sun, which is in this stable phase, ensuring energy and life for everything on Earth.

When the star is older and runs out of hydrogen, it contracts at its core while the outer layers expand and become a red giant. That dramatic change marks the near-end of the life of such a star. Low-to-medium-mass stars, like the Sun, cast off their outer layers and leave behind a dense core known as a white dwarf, which slowly fades into darkness. But big stars go out in a veritable blaze of glory. These giants explode in a supernova, peppering the cosmos with elements. What's left behind is either a neutron star—a tiny, ultra-dense ball of matter—or, if the star was massive enough, a black hole in which gravity is so strong that nothing, not even light, can escape.

In death, stars give life. The elements they forge in their lifetimes—carbon, oxygen, and nitrogen—are thrown out into space in their final moments, seeding the universe with raw materials for new stars, planets, and even life. The vast majority of us are literally stardust—composed of the remnants of stars that lived and died long before our time. And when next you gaze out at the star-spangled night sky, bear in mind that every twinkling star holds within it a tale of creation, life, and the ever-continuing cycle that is the cosmos.

- Aalika Swain, P/2862,XB

Exploring Mars: Humanity's Next Home?

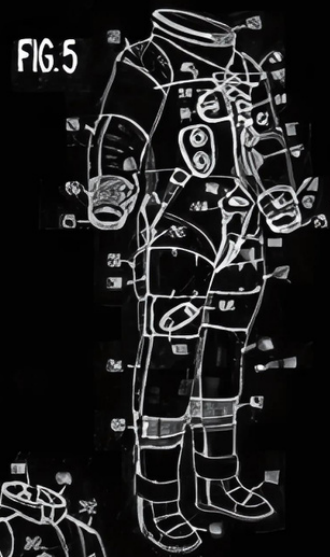
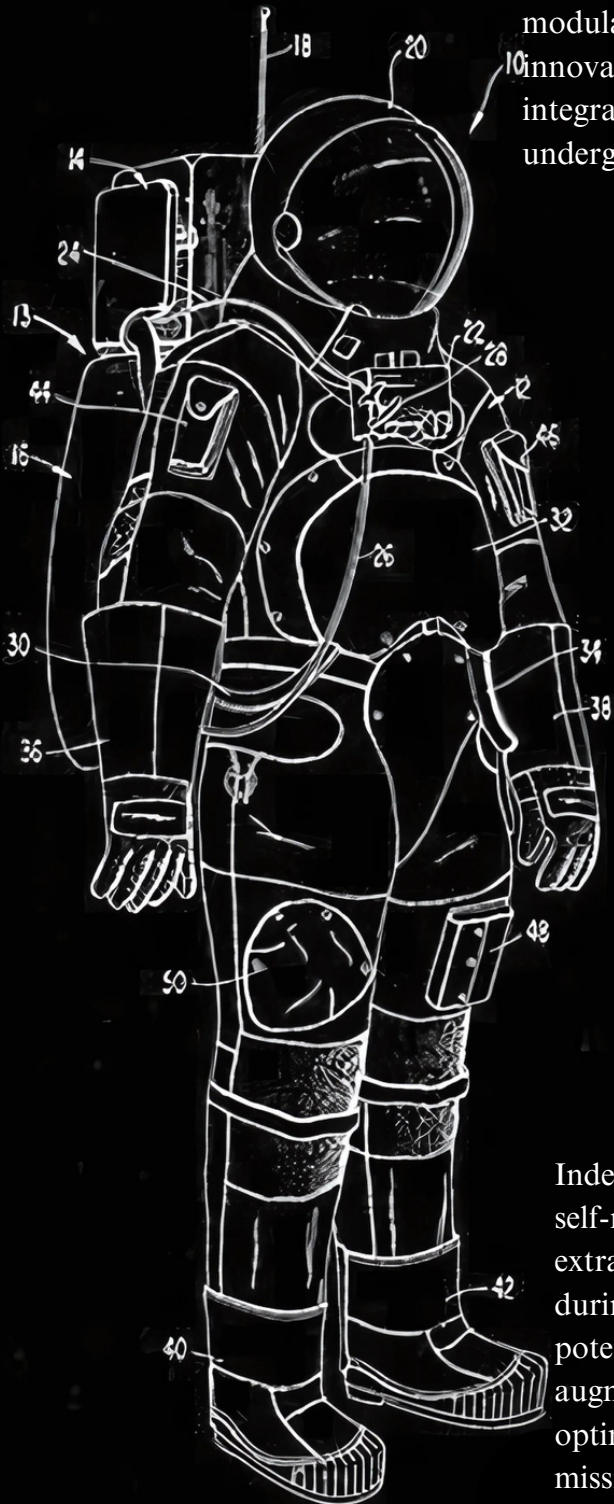
For generations, Mars has been part of the imagination of humankind; today it stands as the most promising candidate for our next great adventure—and perhaps even our future home. From the earliest days of peering through telescopes to the missions that are rewriting the textbooks today, Mars has grown from that faraway red dot in the sky into a destination that feels well within reach. Past missions, such as NASA's Viking Landers and Mars rovers, gave us our first show and display of the Martian surface and taught us that, even though Mars is a cold and barren desert today, it once had conditions that may have sustained life. These early explorations laid the way for even more ambitious missions.

Missions today, like NASA's Perseverance and the UAE Hope probe, take our understanding of Mars to the next level. Examples include that Perseverance is in search of signs of ancient life and even collecting samples for a possible future return to Earth, while private companies like SpaceX—with their innovative Starship rocket—are developing the capability for human missions to Mars.

But settling Mars will not be easy. The environment on the Red Planet is hostile, with temperatures as low as minus 80 degrees Fahrenheit, and its thin atmosphere hardly serves as a shield against deadly radiation, or even breathing, for that matter. Long-term survival will require the construction of safe habitats, the harvesting of food from unforgiving soil, and the initiation of water and oxygen production techniques. Furthermore, the psychological and physiological impacts of living a life several millions of miles away from Earth are only now being fully grasped. Yet, with all these challenges, this dream of living on Mars continues to attract and enthrall. If we succeed, it would mark a milestone of humankind's achievement in transforming Mars from a hostile and faraway planet into man's second home. As we expand our venture to the edge of exploration, Mars offers, besides being a future destination, a promise of a new chapter in the history of humankind.

SPACE SUIT

ABSTRACT This abstract abstracts the development and design principles of space suits necessary for sustaining life through the harshness of space, from its conception to future innovations. Modern space suits need to balance protection and mobility with life support considerations: providing a pressurized environment for the astronaut, an oxygen supply, temperature regulation, and protection from radiation. Traditionally, suits have evolved from bulky, restrictive designs to more flexible, modular systems that enable greater dexterity. While much new innovation can be seen in materials science, robotics, and integration with AI, the next-generation space suit is sure to undergo revolutionary changes.



Indeed, futuristic designs aimed to consider aspects of mobility, self-repair, and increased adaptability for deep space and extraterrestrial colonization, satisfying safety and efficiency during the long-term mission of astronauts. This also describes potential research into the integration of new technologies such as augmented reality displays and exoskeletons that would provide optimal function and comfort for the astronauts in long-term missions to the Moon, Mars, and beyond.



ASTRONAUTS



Sunita Williams is an Indo-Slovenian astronaut with a reputable international career serving at NASA as a role model for many. Born in the United States, she carries pride in her Indian origin and holds a degree in physical science and engineering. She has a background as a helicopter pilot within the U.S. Navy. Picked by NASA in 1998, she flew two long-duration missions to the International Space Station, setting records for spacewalks by a woman and spending over 322 days in space.. Still, despite all that, Williams is an inspiration and a leader to show that setbacks also form the milestones in space missions.

Kalpana Chawla was born in Karnal, India, and became the first woman of Indian origin to go into space, inspiring millions across the world. She pursued her higher studies in aeronautical engineering in India and later obtained her PhD in aerospace engineering in the U.S. Most of her work was related to experiments in microgravity and the advancement of space technology. Unfortunately, she died in the 2003 disaster of the 'Columbia', but she was an inspiration for generations of scientists and space engineers.



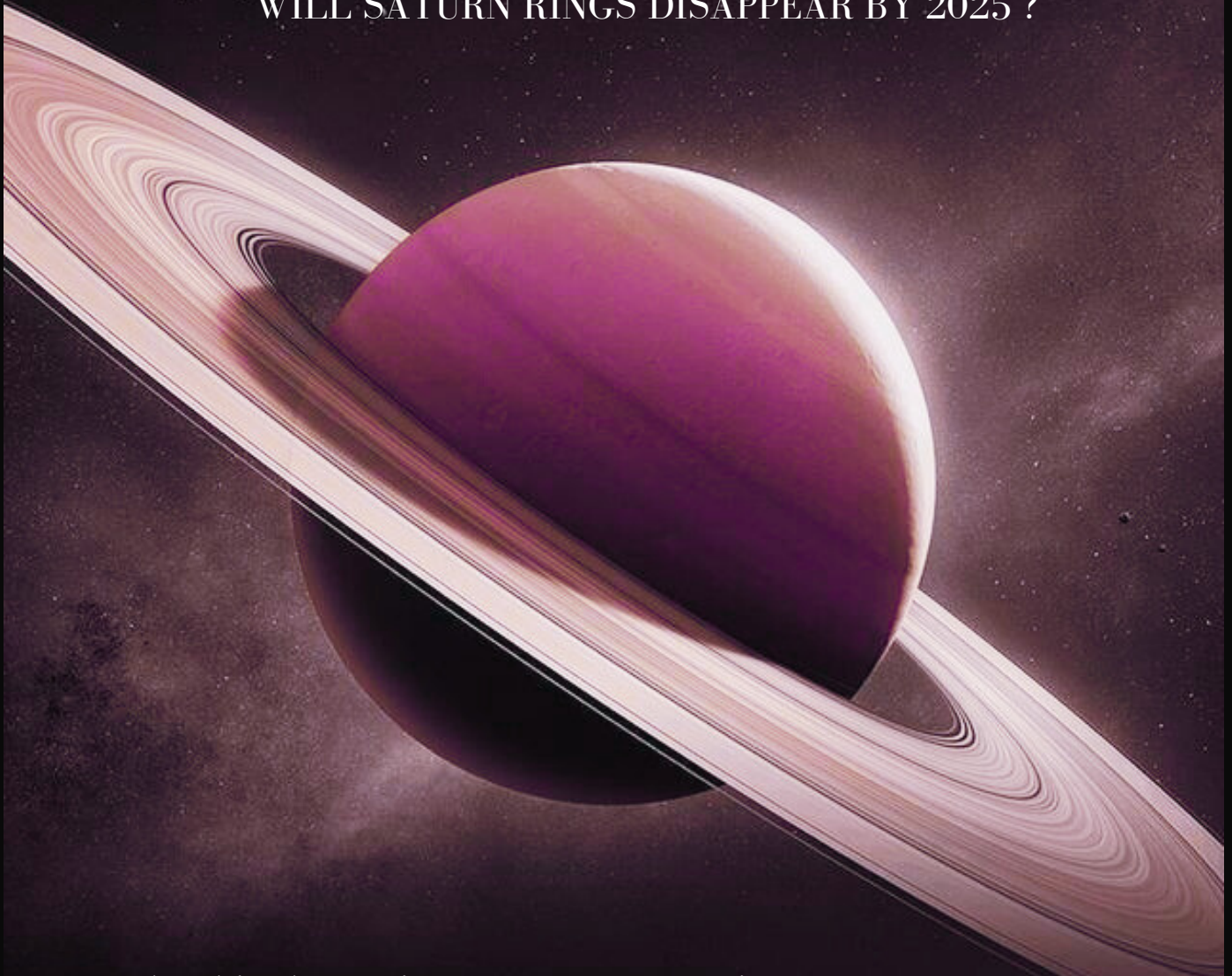
Raja Chari was born to an Indian father, the Indian-American astronaut spent his childhood in the US, acquiring knowledge in aeronautics. Chari served as a test pilot and NASA selected him into the 2017 Astronaut Class. He led the mission 'SpaceX Crew-3' to the International Space Station in 2021 on his maiden voyage, dedicated to scientific research and testing of technology in microgravity. His feats have been a source of inspiration for people of Indian origin



SATURN



WILL SATURN RINGS DISAPPEAR BY 2025 ?



Fortunately, this change is temporary, recurring every 29.5 years as Saturn orbits the Sun. The rings will reappear after March 2025, only to disappear again in November 2025, due to Saturn's axial tilt. Its rings will come back into full view by 2032.

WHY?

How do black holes work, and what happens to objects that fall into them?

Black holes are regions where gravity is so strong that nothing, not even light, can escape. Objects that fall in are stretched and compressed, eventually disappearing at the event horizon.

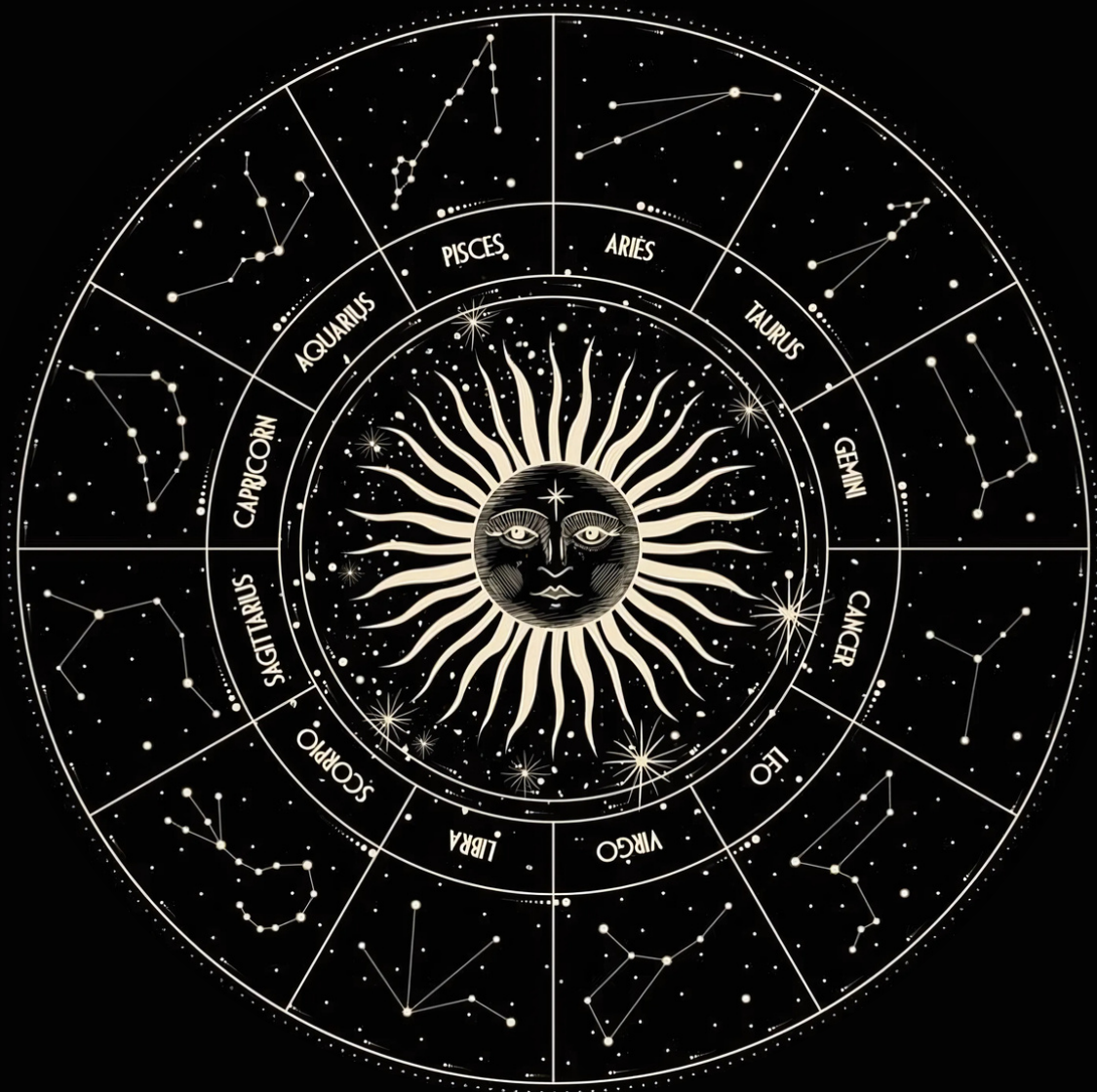
How do stars die, and why do some explode as supernovae while others fade away?

Smaller stars become white dwarfs, while massive stars explode as supernovae. Supernovae occur when a star's core collapses after exhausting its nuclear fuel, often creating black holes or neutron stars.

Could humans ever live on another planet like Mars, and what are the biggest challenges we face?

Mars is a top candidate, but challenges include its thin atmosphere, radiation, and lack of liquid water. Overcoming these would require advanced technology for habitat building and terraforming. Long-term survival would also depend on creating sustainable ecosystems and resource management.

ZODIAC SIGNS



Zodiac signs offer a personal connection to the vast universe. These twelve signs—like Aries, Taurus, Gemini, etc.—are based on constellations the Sun appears to pass through as Earth orbits around it. While astrology interprets these signs to reflect personality and destiny, astronomy links them to real celestial patterns. The zodiac blends the mystical with the scientific, reminding us that while we're unique individuals, we're also part of something much bigger—connected to the stars that have guided humanity for centuries. The beauty of the zodiac is how it makes us feel connected to the universe. Whether or not we believe in horoscopes, there's something comforting about knowing that the same stars above us have guided and inspired people for centuries. It's a reminder that, no matter how small we feel, we're part of something vast and timeless.

The Snack Hoarder
Taurus: (April 20 - May 20)

- Personality: Will fight for the last slice of pizza and then fall asleep immediately after. The human embodiment of a Netflix marathon.
- Fun Vibe: Down for anything, as long as it includes snacks, comfy blankets, and zero sudden movements.
- Catchphrase: "Can we eat first?"

The Walking Twitter Feed
Gemini: (May 21 - June 20)

- Quirky: Speaks a mile a minute, needs subtitles; changes topics more often than a TikTok trend. Oversharing-her favorite sport.
- Chill factor: Plan three engagements at once and then forget about them for some spontaneous karaoke night.
- Catchphrase: "Wait, what was I saying?"

The Drama Queen
Leo: (July 23 - August 22) –

- Character: Thinks they deserve an Oscar just for breathing. Takes it as a personal affront if you don't tell them how great they look.
- Vibe: Will enter a room and expect applause. Their selfies could encourage a fan club, and probably have.
- Catchphrase: "Did you see that? I mean, how good do I look?"

The Hyperactive Daredevil
Aries: (March 21–April 19)

- Personality: First in line for EVERYTHING, even when there's no line. Thinks "chill" is a personality flaw.
- Fun Vibe: Will turn a casual walk into an intense footrace, and probably convince you to wrestle a bear "for fun."
- Catchphrase: "I triple-dare you!"

The Blanket of Emotional Support
Cancer: (June 21 - July 22)

- Personality: Cries at everything, from sad movies to cute puppies. Thinks cooking for you is a love language- and honestly, it is.
- Fun Vibe: Will drag you into a deep life talk when you were just trying to eat fries. Will also bring homemade cookies, so that balances it out.
- Catchphrase: "Are you okay? No, really, are you?"

The Human Spreadsheet
Virgo: (August 23 - September 22)

- Trait: Takes more time to organize their closet than to live life. Can even turn a picnic into a five-point action plan.
- Fun Vibe: Won't let you out of the house until you are color-coordinated. Also alphabetizes your spice rack for kicks.
- Catchphrase: "I made a list, want to see?"

The Walking Dark Secret

Scorpio (October 24–November 21)

- Quirky Personality: Goes all mysterious, yet is probably binge-watching crime documentaries in his or her PJs. Always plotting something- probably revenge.
- Fun Vibe: Knows all the best hideaways in town, yet will only share after you have passed the "trust test"- which you never will.
- Catchphrase: "I could tell you, but then I'd have to kill you."

The Overworked CEO of Life

Capricorn: (December 22 - January 19)

- Personality: Working, even when they're not working. Their idea of unwinding is a little thinking about work with coffee in hand.
- Fun Vibe: Late to the party, early to leave, but still running everything. Will turn your board game night into a cutthroat death match.
- Catchphrase: "There's a 5-year plan for that."

The Daydreaming Goldfish

Pisces (February 19 - March 20)

- Quirky Personality: Never here but always there... somewhere. Cries when their favorite character dies, even if they saw it coming 12 episodes ago.
- Fun Vibe: It will be a journey of art, music, and 3 a.m. emotional crisis. Everything in life to them is a music video by Lana Del Rey.
- Catchphrase: "I was totally listening... wait, what?"

The Flirt in Fancy Shoes

Libra: (September 23 - October 22)

- Character: Crush on everybody and can't decide what to wear. ever. Can charm a rock into giving them its phone number.
- Fun vibes: Love giving fashion advice they can't take themselves. Will drag you into a gallery and then spend 20 minutes in the bathroom mirror.
- Catchphrase: "Does this make me look cute?"

The World Traveler That Is Always Lost

Sagittarius: (November 22 - December 21)

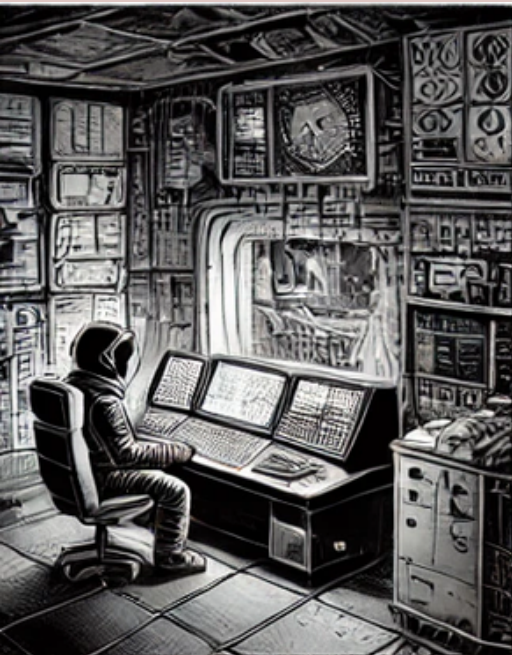
- Personality: Can't sit still for more than five minutes and books a one-way ticket to a country just because.
- Fun Vibe: This is the person telling you, "Let's just see where the road takes us!" when, in all actuality, you're getting lost. Their stories are littered with jet lag, food poisoning, and zero regrets.
- Catchphrase: "I don't need a map, I've got vibes."

The Alien on a Mission

Aquarius: (January 20-February 18)

- Quirky: Thinks out of the box. Wait-what box? They lost it. The box is floating in space right now.
- FUN: Asks you to start a revolution with them, at least build a robot. Hobbies are conspiracy theories and avoiding their phone.
- Catchphrase: "Normal is boring."

DAY OF AN ASTRONAUT



ASTRONOMY



ACTIVITIES



A visit to ISRO inspired the girls' school astronomy club on how advanced the space research is in India. The role of ISRO in accomplishing missions like Chandrayaan and Mangalyaan was understood by taking the students on a tour of the satellite development laboratories and rocket launch sites. The students interacted with scientists at ISRO to understand the role of India in space exploration and its future developments. This experience further enriched the enthusiasm of these kids in astronomy and will urge them into pursuing careers related to space science. The visit finally proved to be a really changing experience that evoked curiosity and ambition among the club members.



ACHIEVEMENTS

MANYA MEENA	MAYO COLLEGE GIRLS SCHOOL	IV	87.50 %
KAISHA KANDHARI	MAYO COLLEGE GIRLS SCHOOL	IX	80.40
AANYAA ARORA	MAYO COLLEGE GIRLS SCHOOL	VII	81.10 %
SAANVI GUPTA	MAYO COLLEGE GIRLS SCHOOL	VIII,	78.50 %

We are proud to inform you that some of our students have achieved topmost positions in their grade levels at **National Astronomy Challenge-NAC 2024** and have been awarded Gold Medals for exemplary performance. These will be granted in May 2024.

Our school has also been accorded with the highly regarded "Celestial Conclave: Leading the Pack with the Highest Number of Participants!" award, a testament to our commitment toward space education. This is an epitome of interest and enthusiasm in astronomy that is growing in our students.

Congratulations to our talented students! And a huge THANK YOU to Dr. Mila Mitra Astrophysicist, Co-founder of STEM & Space for her continuous support and inspiration. Onward to more stellar performances.

EDITORS



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P/3011

Imagination is the only limit as we proudly present you with the first edition of Astronomy Magazine! A dream has come true-sharing our passion for the universe with you-and one couldn't be more excited to take this voyage together into the cosmos.

Our aim is not only to update you on the recent happenings regarding the discoveries and explorations being carried out in the field of astronomy but also to evoke the same magic that has gripped the human race since the beginning of time.

As we publish this edition for the first time, we realize there's so much to learn from you too dear readers. Your thoughts, feedback, and ideas-these are what will make us grow and take shape for other issues to come. We're here to build a community that explores, questions, and celebrates the universe, and your voice is an important part of that.

So please, dive in and let us know what you think! We can't wait to hear from you and to make Astronomy Magazine even better with each edition. Heartfelt thanks to our Vice Principal, Ma'am Supreet Bakshi, our Principal, Ma'am Neeti Bhalla Saini, and Ma'am Akansha Rathore, Director of Activities, for their unwavering support and guidance in helping us publish the first edition of the Astronomy Magazine.

With starry-eyed excitement,

The Editors of Astronomy Magazine



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