Cosmic art

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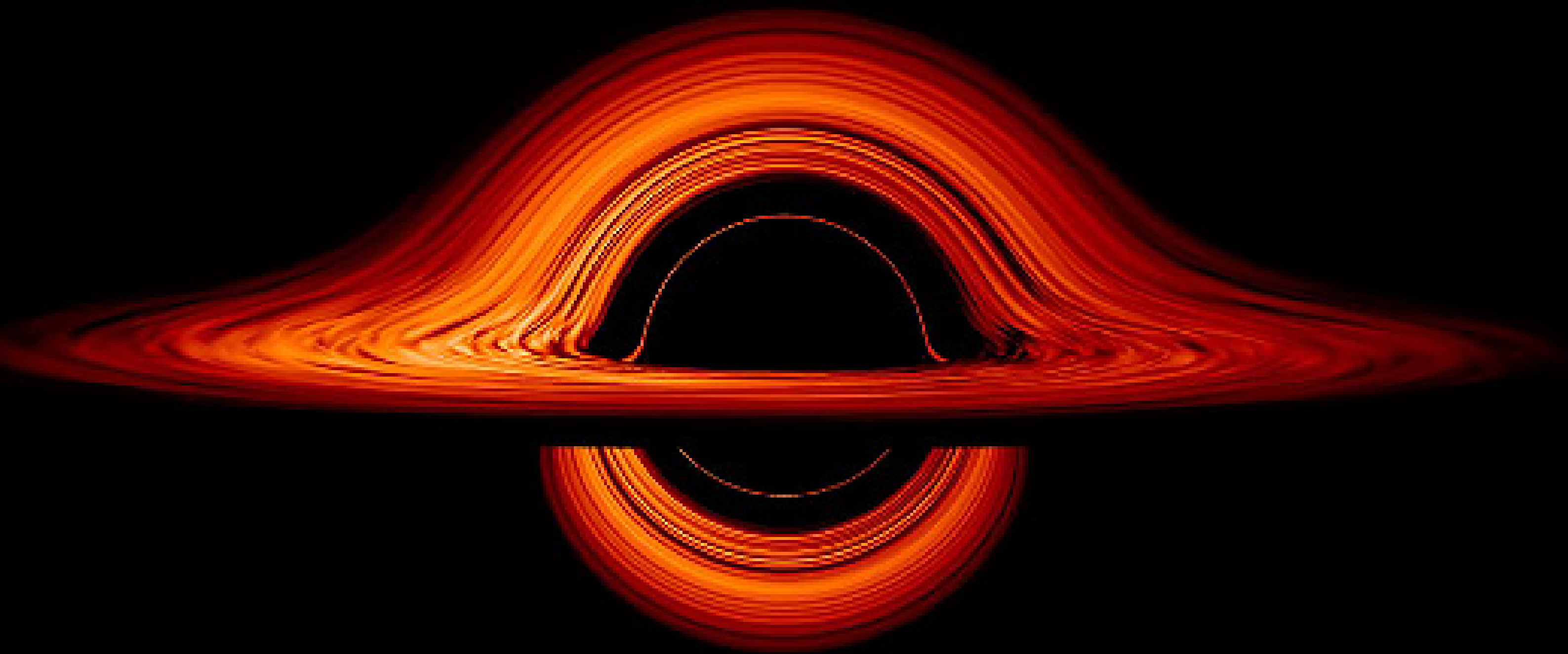
THE ART OF SPACE MAGAZINE



Into the void

The mysteries of Black Holes

The Big Bang:

The birth of the universe

Hidden worlds:

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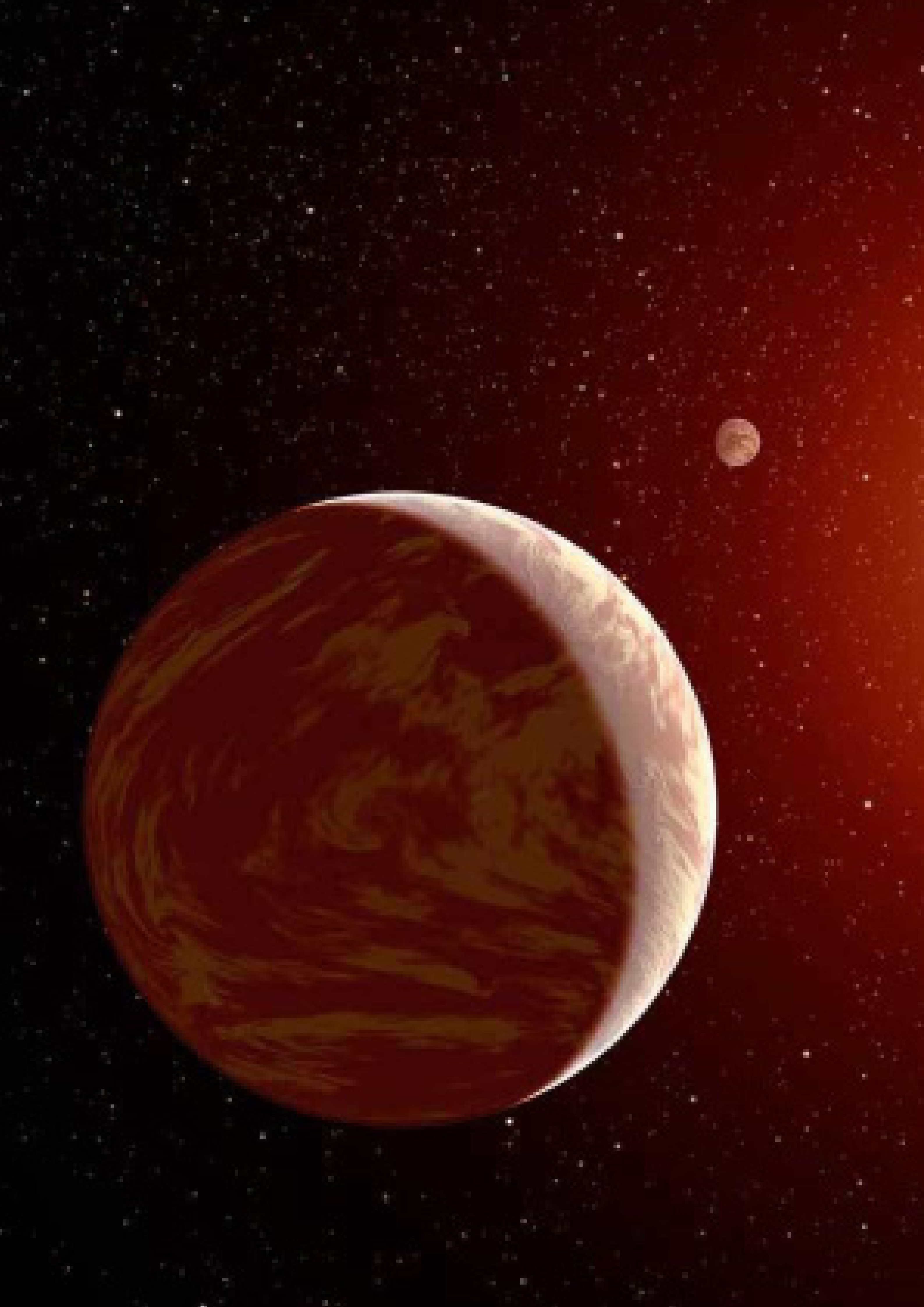
The dark puzzle:

Clue to dark matter



Editorial

Dear Stargazers,
Welcome to the very first issue of Cosmic Art, a magazine born from a passion for space, science, and creativity.
My name is Nour Touihri, and as the editor-in-chief and creative force behind this project, I'm excited to take you on a journey through the stars — from the origins of astronomy with pioneers like Galileo, to the frontiers of modern space exploration with black holes, exoplanets, and dark matter.
in this issue, we dive into:
The history of astronomy, including infrared discoveries, the Big Bang, and key moments in cosmic science.
The mysteries of the universe, from stellar evolution to the unseen forces shaping galaxies.
The latest space news, including insights from the James Webb Space Telescope, and missions to the Moon and Mars.
Most of our content is inspired by trusted sources like NASA and ESA, bringing their knowledge to life through articles and illustrations.
Thank you for exploring the universe with us. [Nour Touihri]
Editor-in-Chief

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CONTENT

Explore the wonders of space through our articles !

Image from ‘Explorations and Mysteries of the univers’ p.20

THE HISTORY OF ASTRONOMY

The history of astronomy

The secret of Infrared astronomy

«What if the universe is hiding worlds, stars, and galaxies we can't see—waiting to be uncovered by infrared eyes?»

Discovery of infrared : In 1800, William Herschel conducted an experiment measuring the difference in temperature between the colors in the visible spectrum. He placed thermometers within each color of the visible spectrum. The results showed an increase in temperature from blue to red. When he noticed an even warmer temperature measurement just beyond the red end of th visible spectrum, Herschel had discovered infrared light!

SEEING INTO THE DUST :

Infrared waves have longer wavelengths than visible light and can pass through dense regions of gas and dust in space with less scattering and absorption. Thus, infrared energy can also reveal objects in the universe that cannot be seen in visible light using optical telescopes.

TheJames Webb Space Telescope (JWST) has three infrared instruments to help study the origins of the universe and the formation of galaxies, stars, and planets.zz

INFRARED IN EVERYDAY LIFE:

Beyond astronomy, infrared technology plays a crucial role in daily life. Infrared cameras are used in night vision, medical imaging, climate monitoring, and remote sensing. Infrared thermography is commonly used to detect heat leaks in buildings, study wildlife behavior, and even diagnose medical conditions by measuring body temperature variations.

FUTURE OF INFRARED ASTRONOMY:

The future of infrared exploration is exciting, with upcoming missions like the Nancy Grace Roman Space Telescope set to expand our understanding of dark matter and exoplanets.

“ Infrared light reveals the hidden structures of the universe, invisible to our eyes. ”

Infrared observations help astronomers uncover celestial bodies hidden from visible light.

Text and image credit: NASA/ESA

REVEALING THE INVISIBLE UNIVERS :

Infrared astronomy allows scientists to detect celestial objects that are too cool and faint to be observed in visible light, such as planets, cool stars, and nebulae. By studying the infrared waves these objects emit, researchers are uncovering new details about the universe.

NICMOS *and the Planetary Nebula* NGC *7027:*

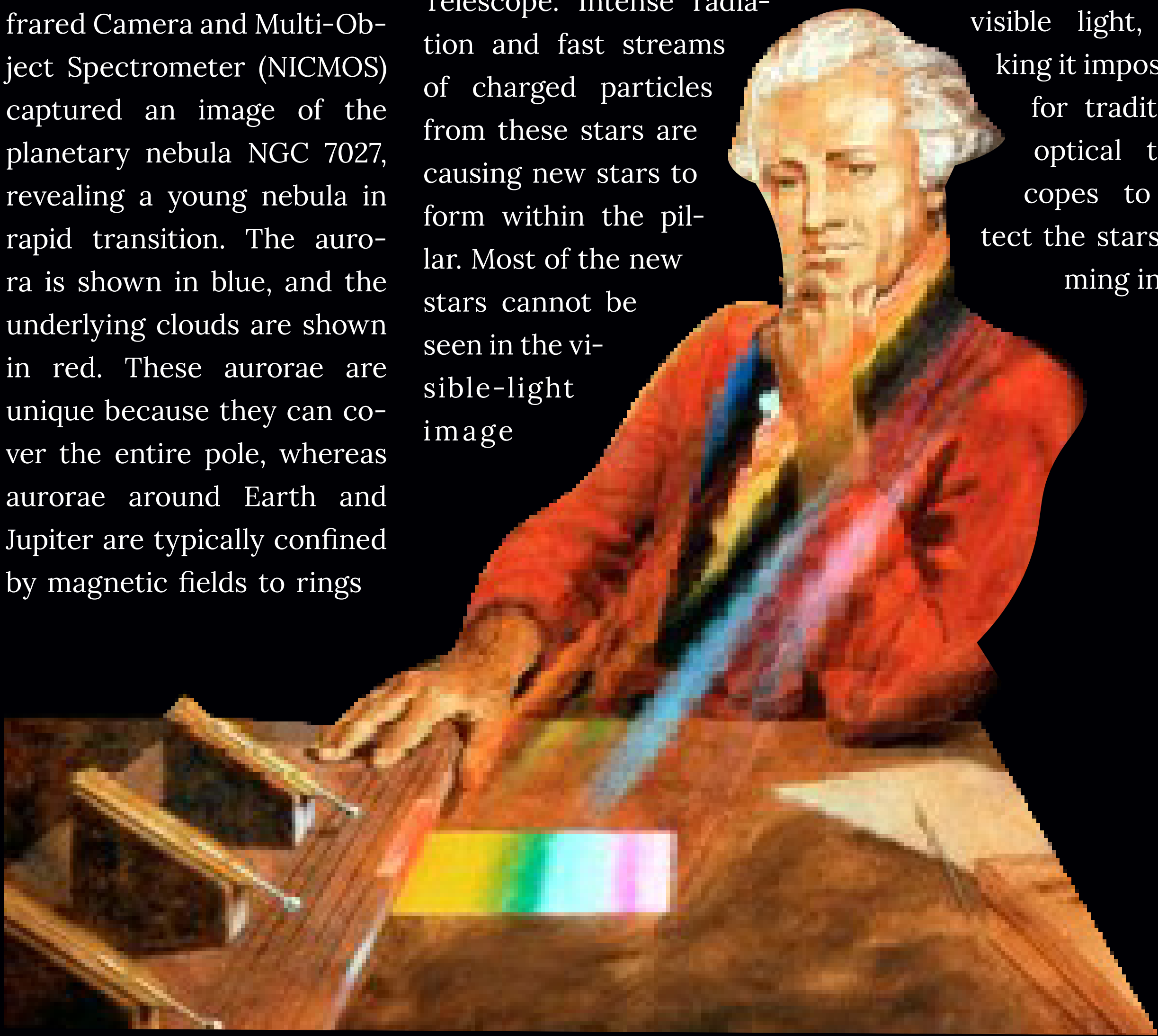
For instance, the Hubble Space Telescope's Near Infrared Camera and Multi-Object Spectrometer (NICMOS) captured an image of the planetary nebula NGC 7027, revealing a young nebula in rapid transition. The aurora is shown in blue, and the underlying clouds are shown in red. These aurorae are unique because they can cover the entire pole, whereas aurorae around Earth and Jupiter are typically confined by magnetic fields to rings surrounding the magnetic poles. The large and variable nature of these aurorae indicates that charged particles streaming in from the Sun are experiencing some type of magnetism above Saturn that was previously unexpected

STAR BIRTH HIDDEN IN THE CARINA NEBULA :

A pillar composed of gas and dust in the Carina Nebula is illuminated by the glow from nearby massive stars shown below in the visible light image from the Hubble Space Telescope. Intense radiation and fast streams of charged particles from these stars are causing new stars to form within the pillar. Most of the new stars cannot be seen in the visible-light image (left) because dense gas clouds block their light.

INFRARED LIGHT REVEALS THE HIDDEN STARS :

However, when the pillar is viewed using the infrared portion of the spectrum (right), it practically disappears, revealing the baby stars behind the column of gas and dust. However, in the visible-light image (left), most of these newly forming stars remain hidden. The dense gas clouds act as a barrier, absorbing and scattering visible light, making it impossible for traditional optical telescopes to detect the stars forming inside.



Galileo the stargazer

«What if the universe had secrets that challenged everything we knew? Galileo's revelations rewrote the story of the cosmos forever..»

Galileo Galilei (1564-1642) was an Italian mathematician, physicist, astronomer, and natural philosopher. He created a superior telescope with which he made new observations of the night sky, notably that the surface of the Moon has mountains, that Jupiter has four satellite moons, and that the sunspots of the Sun, under careful observation, reveal that it is a moving sphere. Besides astronomy, Galileo conducted many other scientific experiments over his long lifetime as he was greatly interested in physics. Testing age-old theories and coming up with new ones after meticulous experimentation, the scientist fell foul of the Catholic Church for questioning the accepted Ptolemaic view of the universe. Found guilty of heresy in a trial in 1633, Galileo was obliged to live his final years under house arrest at his villa in Tuscany. His discoveries and, above all, his approach to experimentation and testing hypotheses made Galileo an influential figure in the Scientific Revolution. Galileo Galilei was born on February 15, 1564, in Pisa, Italy.

Although his family was of minor nobility, they faced financial struggles. Initially studying medicine at the University of Pisa, Galileo became more interested in mathematics and left without completing his degree.

GALILEO'S LEGACY: A NEW VISION OF THE COSMOS :

Galileo changed the way we look at our solar system. When the spacecraft plunged into Jupiter's crushing atmosphere on Sept. 21, 2003, it was being deliberately destroyed to protect one of its own discoveries—a possible ocean beneath the icy crust of the moon Europa.

GALILEO MISSION OVERVIEW:

NASA's Galileo spacecraft orbited Jupiter for almost eight years and made close passes by its major moons. The spacecraft was launched from the cargo bay of space shuttle Atlantis on Oct. 18, 1989. It started orbiting Jupiter in December 1995. The primary mission was completed in December 1997 and then was extended three times. Galileo was the first spacecraft to orbit an outer planet. It was the first spacecraft to deploy an entry probe into an outer planet's atmosphere. It completed the first flyby and imaging of an asteroid (Gaspra, and later, Ida). It made the first, and so far only, direct observation of a comet colliding with a planet's atmosphere (Shoemaker-Levy 9).

GALILEO GALILEI: THE OBSERVER WHO CHANGED THE SKY :

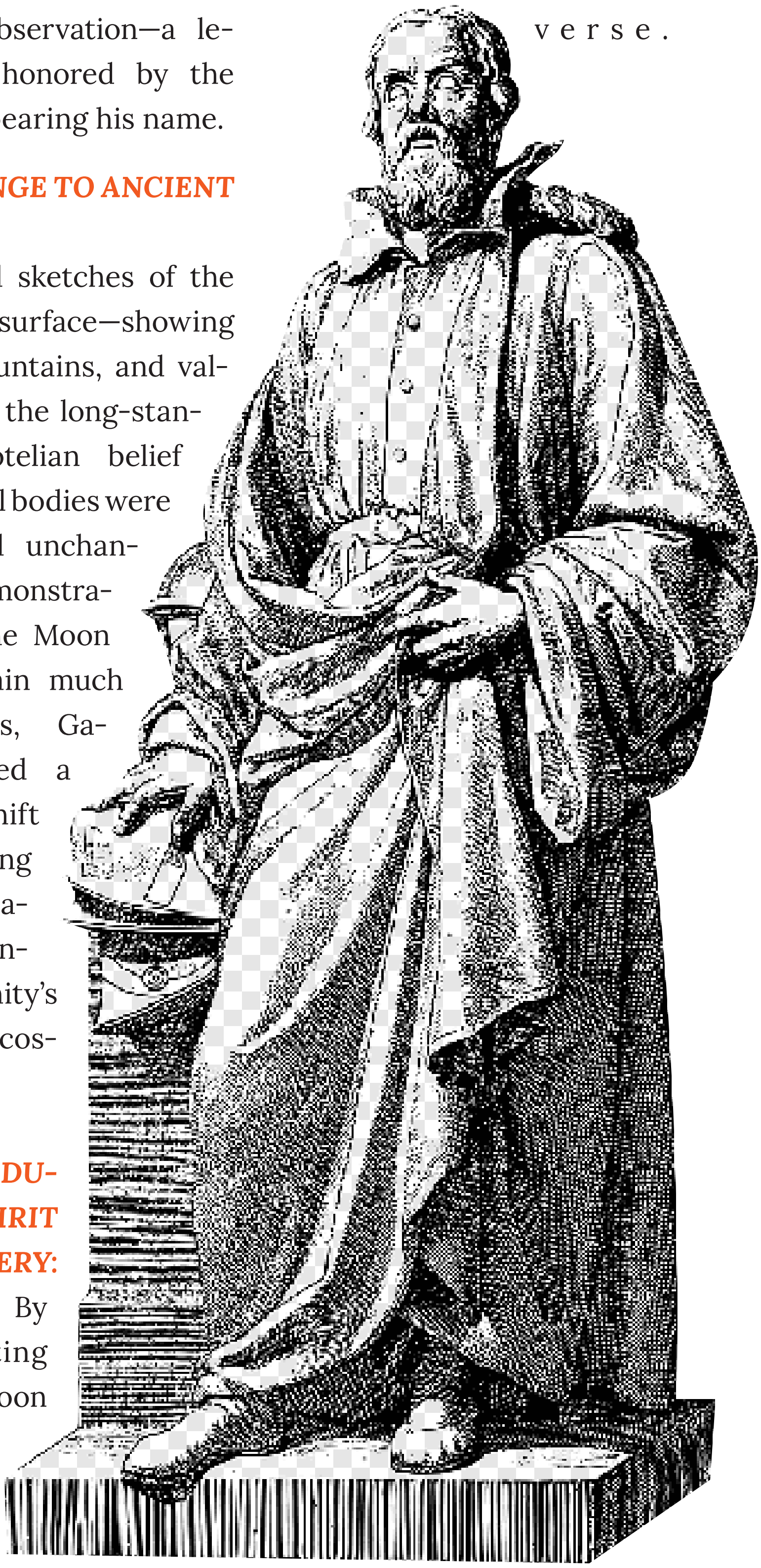
In 1609, Galileo Galilei's telescopic sketches of the Moon challenged ancient beliefs about the heavens and laid the foundation for modern scientific observation—a legacy later honored by the spacecraft bearing his name.

A CHALLENGE TO ANCIENT BELIEFS:

His detailed sketches of the Moon's surface—showing craters, mountains, and valleys—defied the long-standing Aristotelian belief that celestial bodies were perfect and unchanging. By demonstrating that the Moon had a terrain much like Earth's, Galileo sparked a radical shift in thinking that ultimately challenged humanity's place in the cosmos.

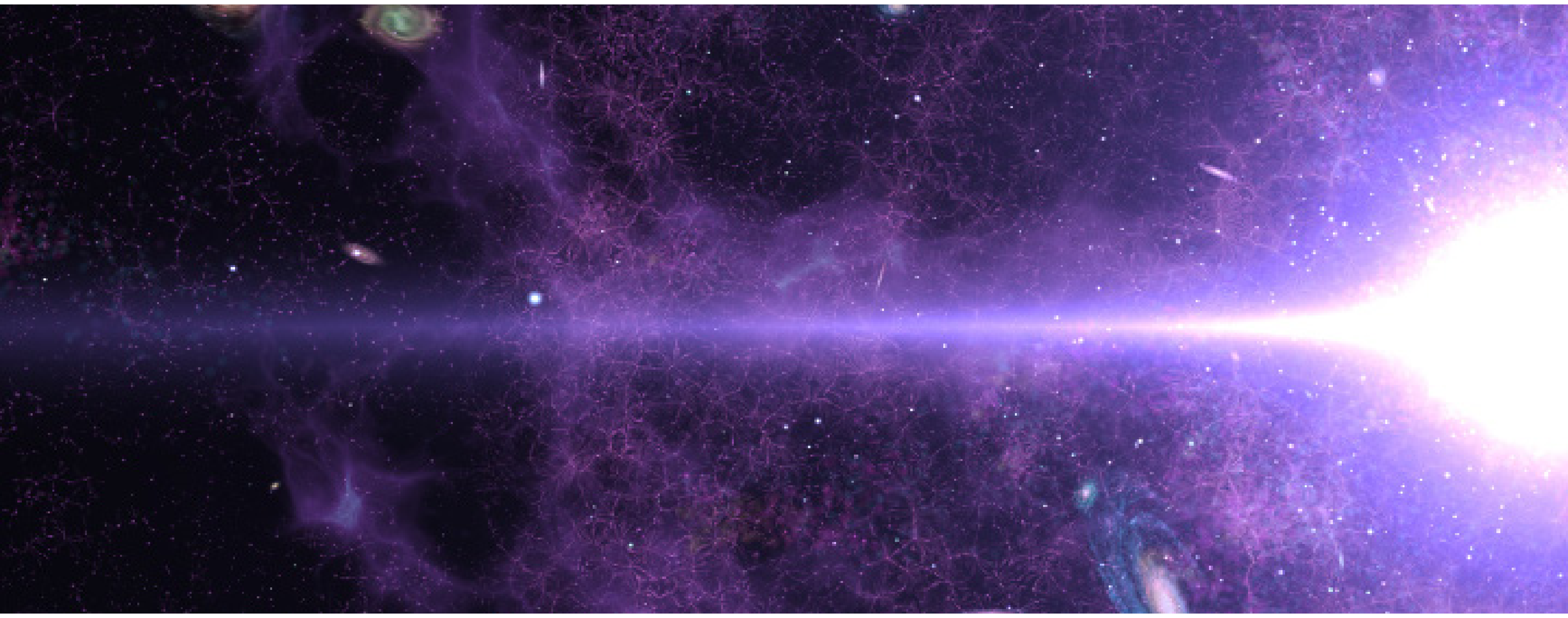
THE ENDURING SPIRIT OF DISCOVERY:

changing. By demonstrating that the Moon had a terrain much like Earth's, Galileo sparked a radical shift in thinking that ultimately challenged humanity's place in the cosmos. It was a groundbreaking discovery that redefined how people viewed the universe.



The big bang:the birth of the univers

«What if the universe began with a singular explosion, birthing everything we know—waiting to be unraveled through the echoes of the Big Bang?»



Some 13.8 billion years ago, the universe was a dense, tremendously hot (too hot for the existence of atoms), extremely tiny point that rapidly surged outward in all directions. For a fraction of a second, the universe expanded faster than the speed of light. We do not know what triggered that initial, rapid expansion, but this period, called cosmic inflation, explains much of what we see in the universe today. About one second after the big bang, the rapid expansion slowed. The universe was an extremely hot, uniform, cosmic soup of subatomic particles and light. As the universe continued to expand, its temperature and density decreased. A few minutes after the big bang, the universe had cooled enough for subatomic particles to form atomic nuclei. Protons and neutrons formed the nuclei of hydrogen and helium, the basic building blocks of stars, but it would be some 380,000 years before the universe cooled enough for these nuclei to capture electrons, forming the atoms we are familiar with today. As they became part of atoms, the captured electrons slowed down, releasing some of their energy that we detect as cosmic microwave background radiation today.

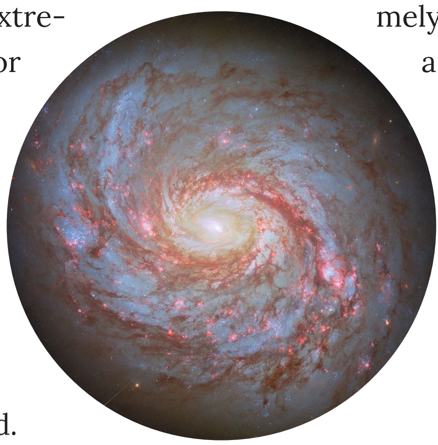
HUBBLE SPIESBIG BANG FRONTIERS :

Observations by the NASA/ESA Hubble Space Telescope have taken advantage of gravitational lensing to reveal the largest sample of the faintest and earliest known galaxies in the universe. Some of these galaxies formed just 600 million years after the big bang and are fainter than any other galaxy yet uncovered by Hubble. The team has determined for the first time with some confidence that these small galaxies were vital to creating the universe that we see today.

An international team of astronomers, led by Hakim Atek of the Ecole Polytechnique Fédérale de Lausanne, Switzerland, has discovered over 250 tiny galaxies that existed only 600-900 million years after the big bang— one of the largest samples of dwarf galaxies yet to be discovered at these epochs.

The BIG BANG

FROM SINGULARITY TO STARS: THE ORIGIN OF THE UNIVERS:



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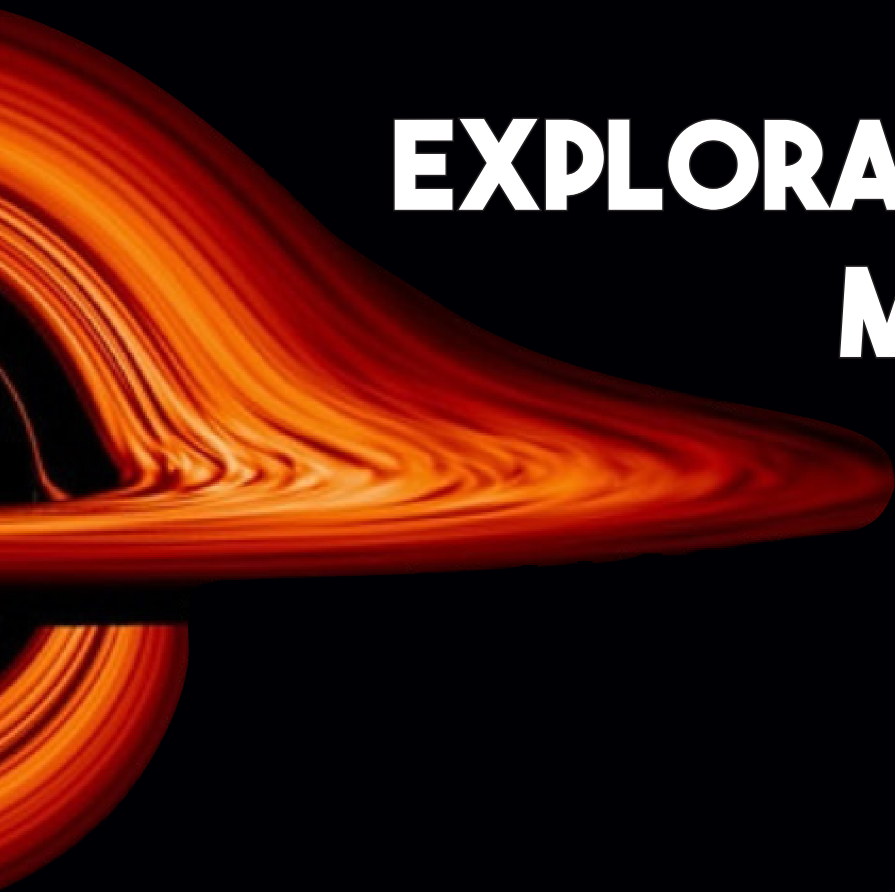
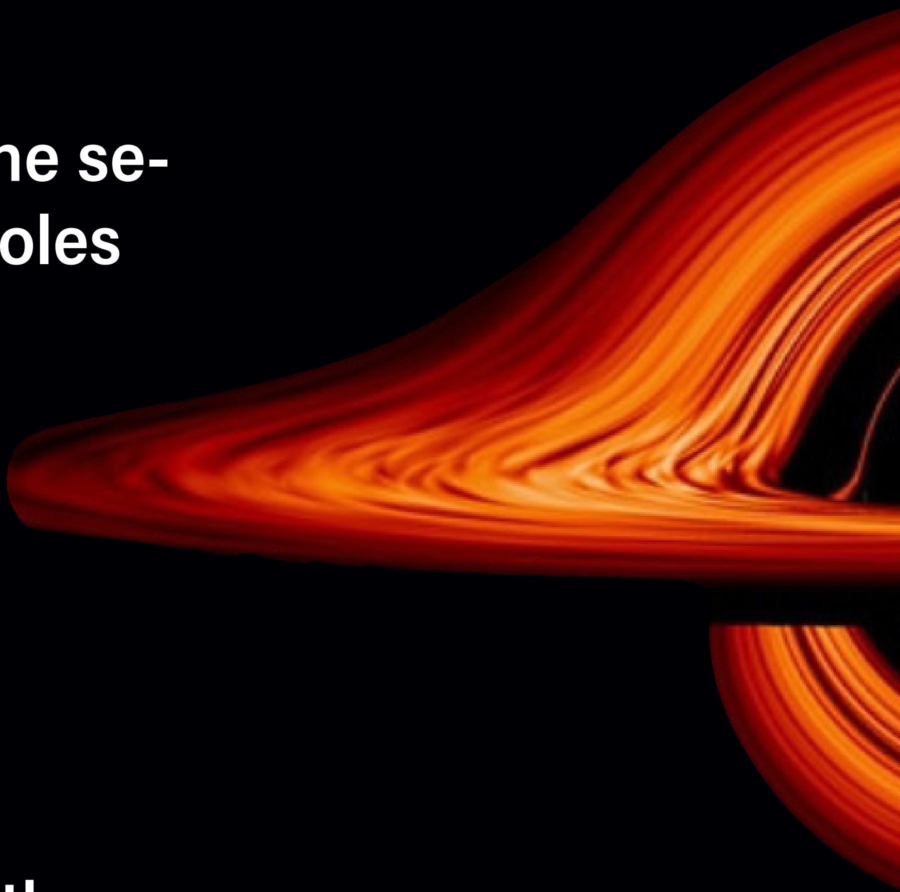


EXPLORATION AND MYSTERIES OF THE UNIVERS



The dark puzzle: clue to dark matter

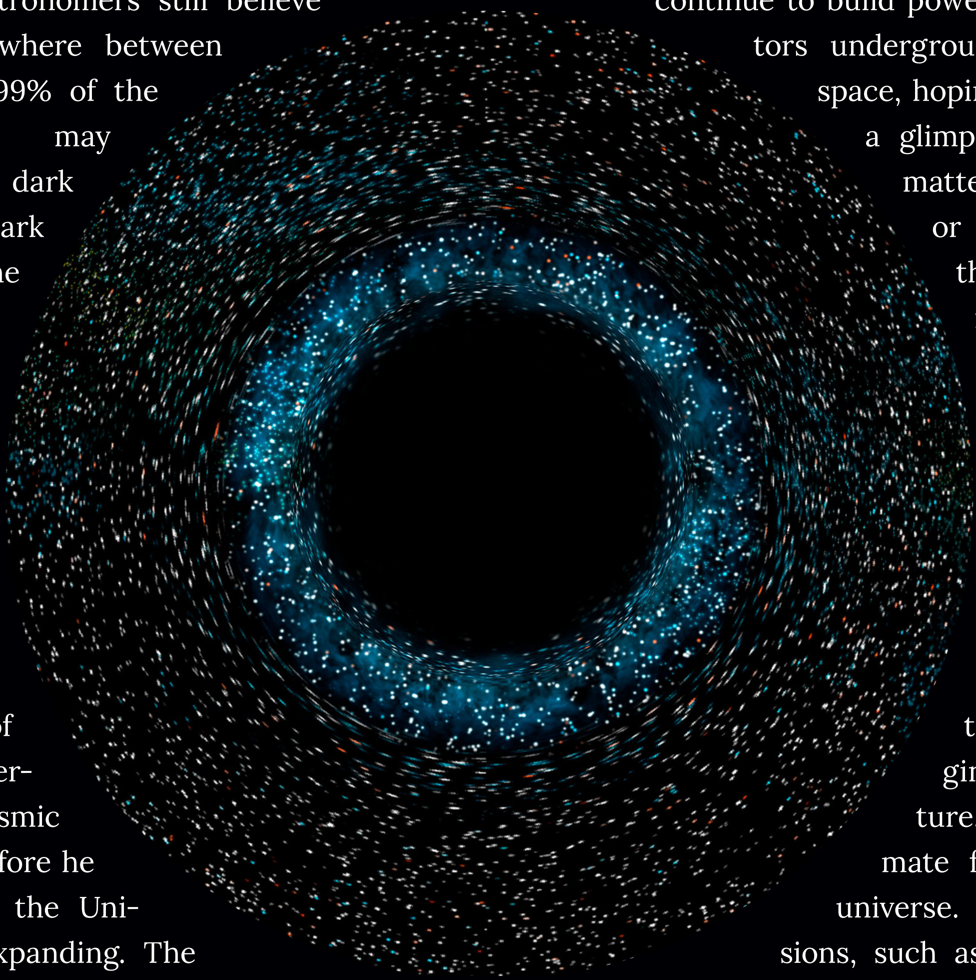
«What if most of the universe is made up of something we can't see or touch? Dark matter is a mysterious force that makes up a large part of the cosmos, yet scientists still don't fully understand it. Could it hold the key to unlocking the universe's biggest secrets ?»

Clue to dark matter

Like ordinary matter, dark matter takes up space and holds mass. But it doesn't reflect, absorb, or radiate light – at least not enough for us to detect yet. While scientists have measured that dark matter makes up about 27% of the cosmos, they're not sure what it is. Theories include several kinds of as-yet unidentified types of particles that rarely interact with normal matter. Astronomers didn't even know dark matter existed until the 20th century. In the 1930s, Swiss astronomer Fritz Zwicky coined the term while studying the Coma galaxy cluster, which contains more than 1,000 galaxies. The speed at which galaxies within a galaxy cluster move depends on the cluster's total mass and size. Zwicky noticed that galaxies in the Coma cluster were moving faster than could be explained by astronomers.

today think dark matter exists in a vast, web-like structure that winds through the whole universe – a gravitational scaffold that attracts most of the cosmos' normal matter. They've determined that dark matter isn't composed of known particles of matter because the universe would look very different if it were. The search for what makes up dark matter continues. Normal matter consists of the atoms that make up stars, planets, human beings and every other visible object in the Universe. As humbling as it sounds, normal matter almost certainly accounts for the smallest proportion of the Universe, somewhere between 1% and 10%. The more astronomers observed the Universe, the more matter they needed to find to explain it all.

At the same time, physicists trying to further the understanding of the forces of nature were starting to believe that new and exotic particles of matter must be abundant in the Universe. These would hardly ever interact with normal matter and many now believe that these particles are the dark matter. At the present time, even though many experiments are underway to detect dark matter particles, none have been successful. Nevertheless, astronomers still believe that somewhere between 30% and 99% of the Universe may consist of dark matter. Dark energy is the latest addition to the contents of the Universe. Originally, Albert Einstein introduced the idea of an all-pervading 'cosmic energy'; before he knew that the Universe is expanding. The expanding Universe did not need a 'cosmological constant' as Einstein had called his energy. However, in the 1990s observations of exploding stars in the distant Universe suggested that the Universe was not just expanding but accelerating as well. The only way to explain this was to reintroduce Einstein's cosmic energy in a slightly altered form, called 'dark energy'. No one knows what the dark energy might be. In the currently popular 'concordance model' of the Universe, 70% of the cosmos is thought to be dark energy, 25% dark matter and 5% normal matter. This means that everything we can see—stars, galaxies, planets, and even ourselves—makes up only a tiny fraction of what actually exists. The vast majority of the universe remains invisible and undetectable, except through its gravitational effects. Scientists continue to build powerful detectors underground and in space, hoping to catch a glimpse of dark matter particles or measure the mysterious push of dark energy. These invisible forces may hold the answers to the origin, structure, and ultimate fate of the universe. New missions, such as the ESA's Euclid telescope and NASA's Nancy Grace Roman Space Telescope, are designed to map the large-scale structure of the cosmos with unprecedented precision. By observing how galaxies cluster and light bends through space, these observatories aim to uncover how dark energy influences the universe's expansion and how dark matter shapes cosmic evolution.



Exploration and mysteries of the univers

Into the void :the secrets of black holes

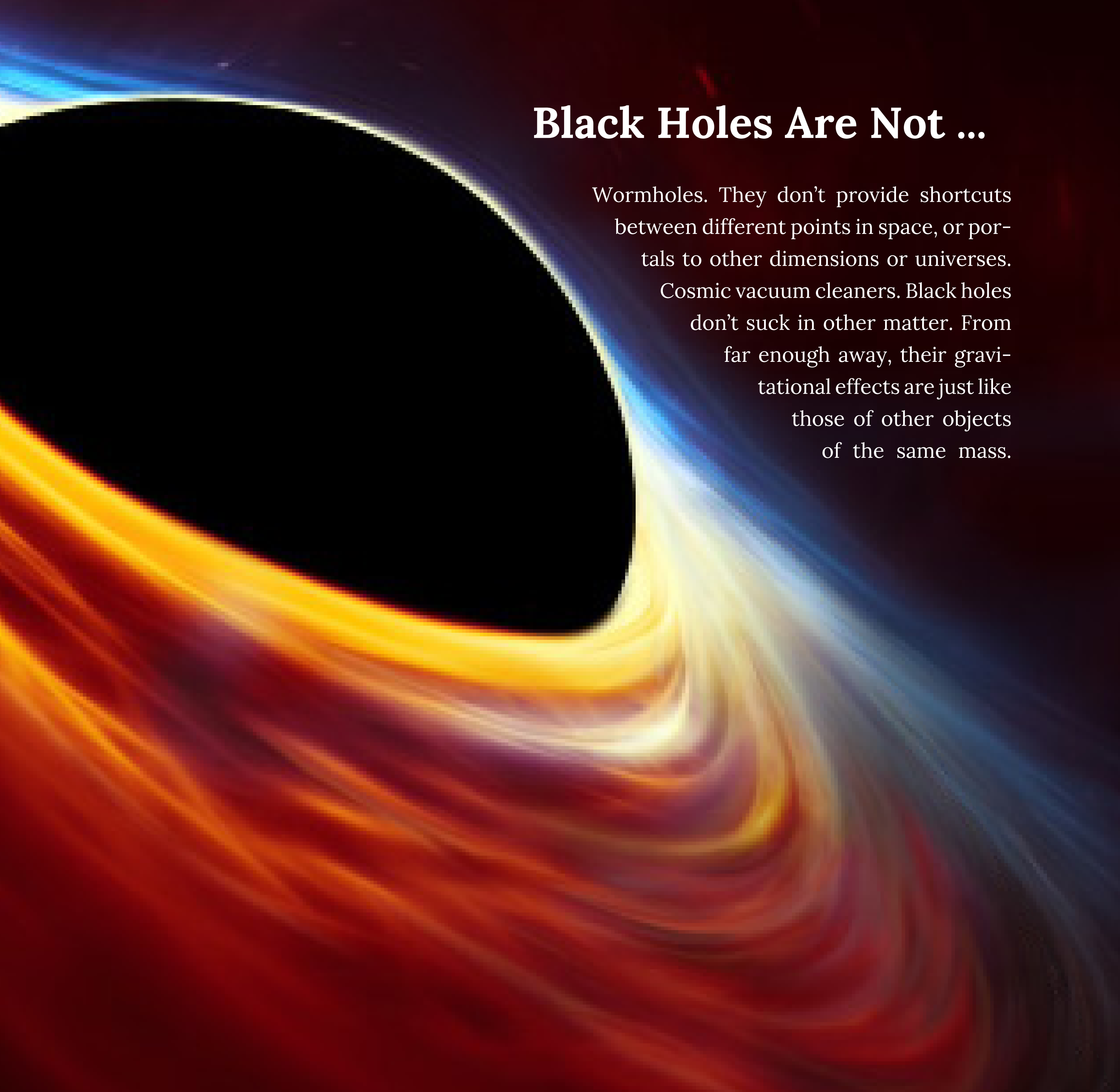
«What if black holes aren't just voids but gateways to the unknown? Could they rewrite the rules of time and space as we know them?»

Black Holes

Black holes are among the most mysterious cosmic objects, much studied but not fully understood. These objects aren't really holes. They're huge concentrations of matter packed into very tiny spaces. A black hole is so dense that gravity just beneath its surface, the event horizon, is strong enough that nothing – not even light – can escape. The event horizon isn't a surface like Earth's or even the Sun's. It's a boundary that contains all the matter that makes up the black hole. There is much we don't know about black holes, like what matter looks like inside their event horizons. However, there is a lot that scientists do know about black holes.

Finding Black Holes

Black holes don't emit or reflect light, making them effectively invisible to telescopes. Scientists primarily detect and study them based on how they affect their surroundings: Black holes can be surrounded by rings of gas and dust, called accretion disks, that emit light across many wavelengths, including X-rays. A supermassive black hole's intense gravity can cause stars to orbit around it in a particular way. Astronomers tracked the orbits of several stars near the center of the Milky Way to prove it houses a supermassive black hole, a discovery that won the 2020 Nobel Prize. When very massive objects accelerate through space, they create ripples in the fabric of space-time called gravitational waves. Scientists can detect some of these by the ripples' effect on detectors.

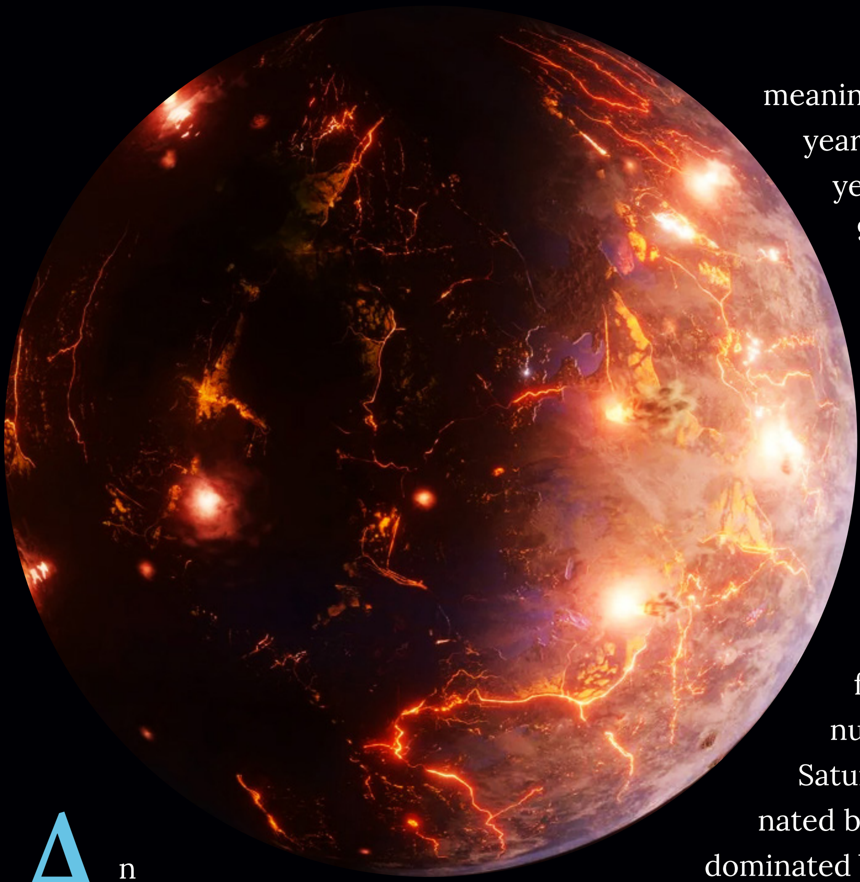


Black Holes Are Not …

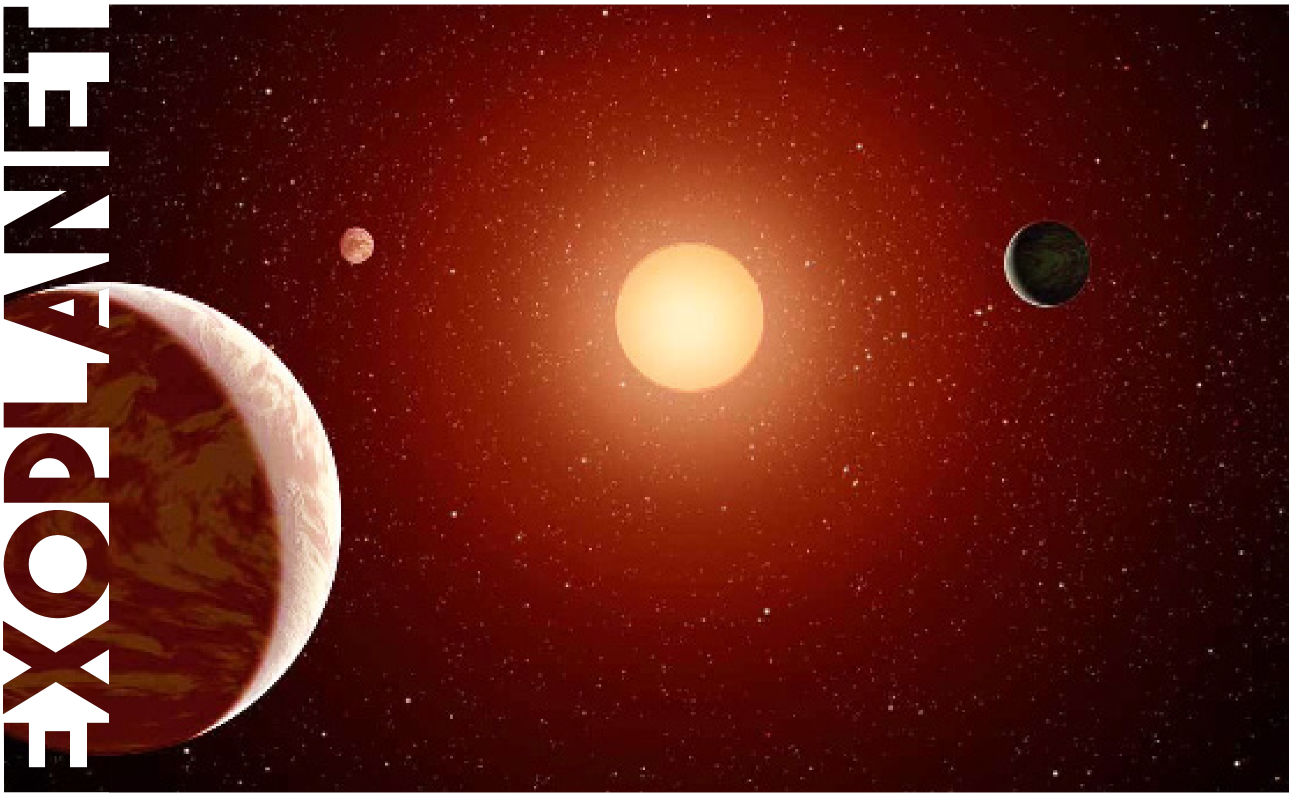
Wormholes. They don't provide shortcuts between different points in space, or portals to other dimensions or universes. Cosmic vacuum cleaners. Black holes don't suck in other matter. From far enough away, their gravitational effects are just like those of other objects of the same mass.

Hidden worlds: the search of exoplanets

«What if planets beyond our solar system could harbor life, and how many of them are out there waiting to be found?»



An exoplanet is any planet beyond our solar system. Most of them orbit other stars, but some free-floating exoplanets, called rogue planets, are untethered to any star. We've confirmed more than 5,800 exoplanets out of the billions that we believe exist. Most of the exoplanets discovered so far are in a relatively small region of our galaxy, the Milky Way. ("Small" meaning within thousands of light-years of our solar system; one light-year equals 5.88 trillion miles, or 9.46 trillion kilometers.) Even the closest known exoplanet to Earth, Proxima Centauri b, is still about 4 light-years away. We know there are more planets than stars in the galaxy. By measuring exoplanets' sizes (diameters) and masses (weights), we can see compositions ranging from rocky (like Earth and Venus) to gas-rich (like Jupiter and Saturn). Some planets may be dominated by water or ice, while others are dominated by iron or carbon. We've identified lava worlds covered in molten seas, puffy planets the density of Styrofoam and dense cores of planets still orbiting their stars. ESA's exoplanet missions : One of the central questions of ESA's Cosmic Vision is: "What are the conditions for planet formation and the emergence of life?" ESA's past, present and future exoplanet missions are designed to tackle this question.



Text and image credit: NASA/ESA

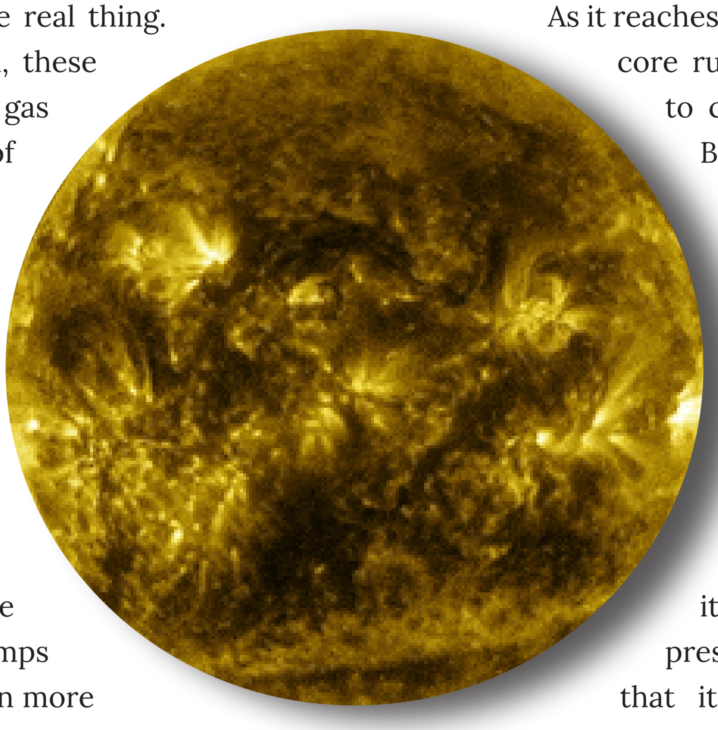
Exoplanet mission timeline Our current and future exoplanet missions could not have been possible without their predecessors discovering the exoplanets they will be characterising. Ever since the first confirmation of an exoplanet in the 1990s, numerous missions and ground-based observatories have dedicated their time to discovering new candidates using a variety of detection methods. These methods consist of creative ways of deducing the presence of exoplanets around stars in the Milky Way. Some methods focus on the gravitational effects that planets cause on the motion of their host stars. Others look at the variation in brightness of stars as planets cross their face. An exoplanet can also be discovered by the effect it has on the light from an object in the background. There are also exoplanets which could be imaged directly by telescopes. So far scientists have categorized exoplanets into the following types: Gas giant, Neptunian, super-Earth, and terrestrial. The planets beyond our solar system are called "exoplanets," and they come in a wide variety of sizes, from gas giants larger than Jupiter to small, rocky planets about as big around as Earth or Mars. They can be hot enough to boil metal or locked in deep freeze. They can orbit their stars so tightly that a "year" lasts only a few days; they can orbit two suns at once. Some exoplanets are even sunless rogues, wandering solo through the galaxy in permanent darkness. Exoplanet discovery – and mystery. The first exoplanets were discovered in the early 1990s, but the first exoplanet to burst upon the world stage was 51 Pegasi b, a "hot Jupiter" orbiting a Sun-like star 50 light-years away. The watershed year was 1995. Since then we've discovered thousands more. Size and mass play a crucial role in determining planet types. There are also varieties within the size/mass classifications.

Exploration and mysteries of the univers

The birth and death of stars

«What if every star we see was once born in a cosmic nursery—and one day, each will die in fire or fade into darkness?»

Who among us doesn't covertly read tabloid headlines when we pass them by? But if you're really looking for a dramatic story, you might want to redirect your attention from Hollywood's stars to the real thing. From birth to death, these burning spheres of gas experience some of the most extreme conditions our cosmos has to offer. All stars are born in clouds of dust and gas like the Pillars of Creation in the Eagle Nebula pictured below. In these stellar nurseries, clumps of gas form, pulling in more and more mass as time passes. As they grow, these clumps start to spin and heat up. Once they get heavy and hot enough (like, 27 million degrees Fahrenheit or 15 million degrees Celsius), nuclear fusion starts in their cores. This process occurs when protons, the nuclei of hydrogen atoms, squish together to form helium nuclei. This releases a lot of energy, which heats the star and pushes against the force of its gravity. A star is born. A low-mass star has a mass eight times the Sun's or less and can burn steadily for billions of years.



As it reaches the end of its life, its core runs out of hydrogen to convert into helium. Because the energy produced by fusion is the only force fighting gravity's tendency to pull matter together, the core starts to collapse. But squeezing the core also increases its temperature and pressure, so much so that its helium starts to fuse into carbon, which also releases energy. Eventually, the star swells into a red giant as its outer layers expand from the heat of helium fusion in the core. During this phase, the star can engulf nearby planets and shine with a reddish hue as its surface cools. But this dramatic display doesn't last forever.

STARS LIFE

THE LIFE CYCLE OF STARS

From then on, stars' life cycles depend on how much mass they have. Scientists typically divide them into two broad categories: low-mass and high-mass stars. (Technically, there's an intermediate-mass category, but we'll stick with these two to keep it straightforward!) Low-mass stars, like our Sun, burn their fuel slowly and can live for billions of years, while high-mass stars burn through their fuel quickly, leading to much shorter, more explosive lives. This difference plays a huge role in the way stars end their journeys—some fade gently, while others end in dramatic supernovae or collapse into black holes.

Text and image credit: NASA/ESA

> “ Infrared light reveals the hidden structures of the universe, invisible to our eyes. ”

Cosmic Forecast

Your Intergalactic Horoscope Dispatch

Live from the edge of the galaxy, our cosmic correspondents are back with planetary gossip and solar-system scoops for every sign. Buckle up, stargazer—it's time to find out what the universe has in orbit for you this month!

Aries

(Mar 21 – Apr 19)

Fast, fiery, and impossible to ignore—you're streaking through May like a meteor storm. Take advantage of your momentum, but watch out for crash landings. A new project could light up your path.

Taurus

(Apr 20 – May 20)

Stability is your orbit, Taurus. This month, you're building beautiful boundaries. Something long-term is aligning in your favor—stay grounded, but don't be afraid to reach higher.

Gemini

(May 21 – Jun 20)

Your ideas are bursting like solar flares. It's a brilliant time for conversation and connection, but pace yourself—too much energy can short-circuit your systems.

Cancer

(Jun 21 – Jul 22)

Your emotional tides are rising. Use this moment to nurture yourself and others. Someone might need your calm light—offer it, but keep your own gravity in check.

Leo

(Jul 23 – Aug 22)

Fast, fiery, and imposYou're glowing at full power, Leo. Everyone sees it, and they're drawn in. Just be careful not to burn out or blind others. Humble stardust can still sparkle.

Virgo

(Aug 23 – Sep 22)

Stability is your orbit, You're organizing your universe, Virgo, one cosmic file at a time. Precision brings peace. This month is perfect for planning something stellar—just don't micromanage the stars.

Libra

(Sep 23 – Oct 22)

It's all about balance—especially in your relationships. Whether it's love, friendship, or collaboration, seek the harmony you crave, but be sure you're not orbiting the wrong partner.

Scorpio

Oct 23 – Nov 21)

You're intense, mysterious, and drawing everything in. Secrets surface now—will you face them or hide them deeper? This is your moment to transform, not to self-destruct.

Sagittarius

(Nov 22 – Dec 21)

You're ready to blast off—new adventures, ideas, and perspectives await. Say yes to something spontaneous, but check your fuel tank before you leap.

Capricorn

(Dec 22 – Jan 19)

You're juggling more than usual. But your focus and strategy will keep you in orbit. Trust your slow climb—success is building, even if you can't see it yet.

Aquarius

(Jan 20 – Feb 18)

You're tuned into something others can't hear. Let your weird shine this month—your ideas might seem strange now, but soon they'll echo through the galaxy.

Pisces

(Feb 19 – Mar 20)

Your emotional tides are rising. Use this moment to nurture yourself and others. Someone might need your calm light—offer it, but keep your own gravity in check.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SPACE NEWS AND RECENT DISCOVERIES

space news and recent discoveries

Cosmic clock's: time across the univers

«How do we track time in a universe that stretches for billions of years? From pulsars to light-years, scientists are decoding the cosmic rhythms that shape space and time.»

The Hubble Space Telescope is many things. It's an observatory, a satellite, and an icon of cultural and scientific significance – but perhaps most interestingly, Hubble is also a time machine.

Hybble isn't that far away :

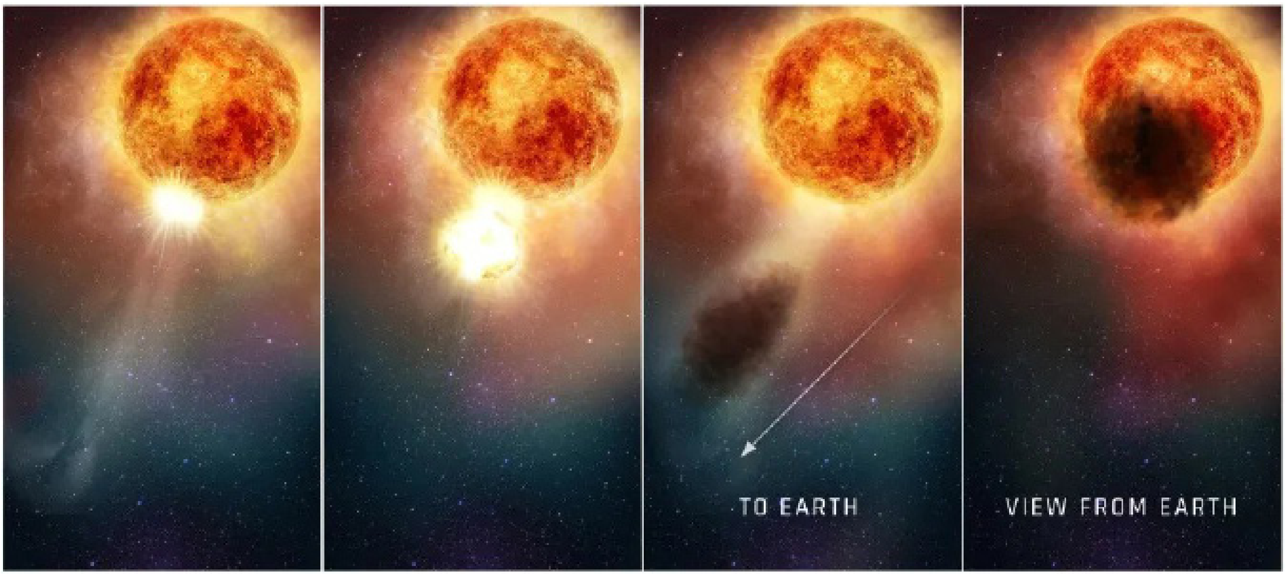
locked in a low-Earth orbit just a few hundred miles up that takes about 90 minutes to complete. But with its position just above Earth's murky atmosphere, Hubble's transformative view of our universe literally lets us witness our universe's past. It allows us to effectively travel back in time. How does that work? After all, Hubble doesn't travel beyond our solar system, or even our home planet's gravity. It certainly doesn't have any sci-fi elements you might find in Doctor Who or Back to the Future.

Light travel:

The answer is simply light. The term "light-year" shows up a lot in astronomy. This is a measure of distance that means exactly what it says – the distance that light travels in one year.

"To measure time in the cosmos is to look into the past—each beam of light a message from billions of years ago."

Given that the speed of light is 186,000 miles (299,000 kilometers) per second, light can cover some serious ground over the course of 365 days. To be precise, almost 6 trillion miles (9.5 trillion kilometers)! Traveling Back in Time: 8 minutes Hubble works by gathering light from objects in our universe – some as close as our Moon, and some as distant as galaxy clusters that are billions of light-years away. All that light takes time to reach the telescope, just as it takes time for light to travel from its source to our eyes. For example, our Sun is located about 93 million miles (150 million kilometers) from Earth. Traveling Back in Time: 8 minutes. Hubble works by gathering light from objects in our universe – some as close as our Moon, and some as distant as galaxy clusters that are billions of light-years away.



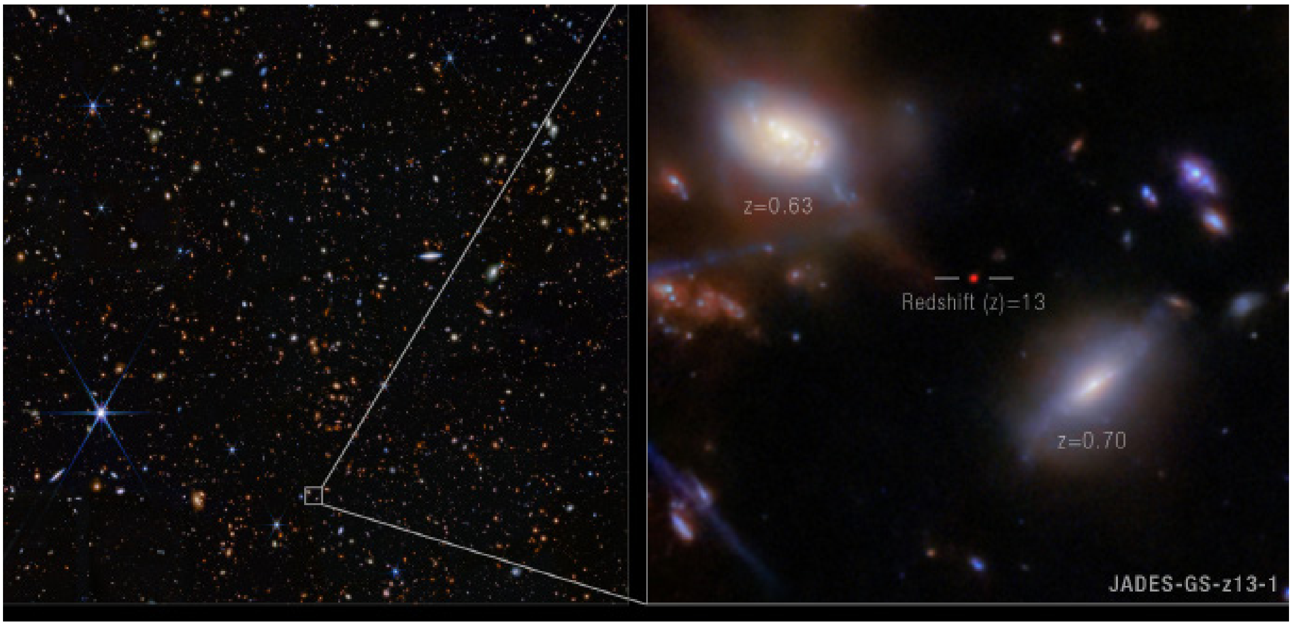
Traveling Back in Time: 700 years Another stellar target of Hubble's is named Betelgeuse, which is about 700 light-years from Earth. Again, this means that when Hubble looks at Betelgeuse, the star appears exactly as it was 700 years ago. As one of the brightest stars in our sky, astronomers believe it's likely that even the earliest humans knew of it, as this star appears in stories from several cultures. This red supergiant star began to dim significantly in the fall of 2019, losing about 60% of its brightness within months. But by April 2020, its regular brightness returned. Hubble studied Betelgeuse and found out that the star "blew its top" – it went through a surface mass ejection, in which the star spewed out a large amount of its surface material into space. When that material in space cooled down, it became a dust cloud that temporarily blocked some of the star's light. Hubble's unique ability to observe in ultraviolet light helped reveal the details of this dimming event and its aftermath. In this range of light, Hubble can better observe the hot layers of atmosphere above a star's surface. The telescope continues to be the go-to observatory for scientists who study Betelgeuse.

Traveling Back in Time: 6,500 years Nebulae are clouds of gas and dust where stars are birthed, or the remnants of a dead or dying star itself. These beautiful, ethereal cosmic objects are the subject of some of Hubble's most iconic images, but they can also teach us more about how our universe behaves and evolves. For example, a favorite target for Hubble is the Crab Nebula, located about 6,500 light-years away.

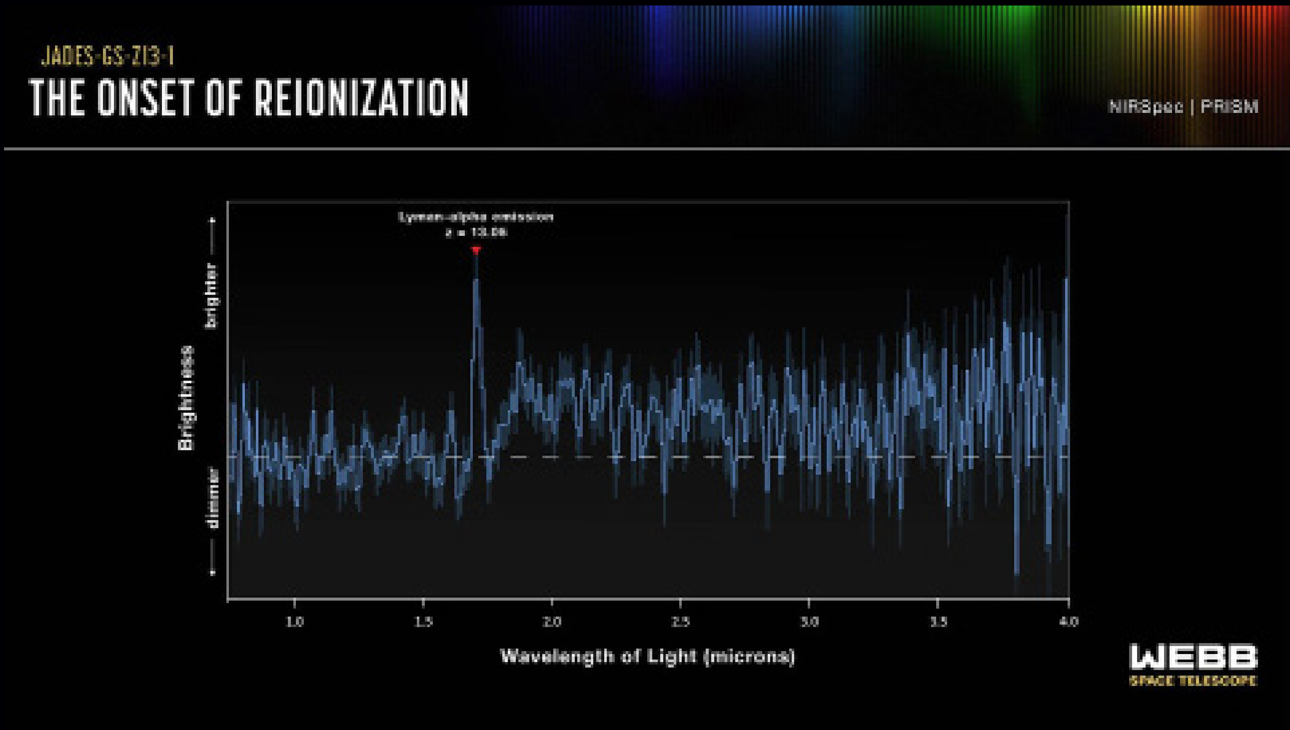
space news and recent discoveries

Webb's Window into Deep Space

«How far can we see into the universe? The James Webb Telescope opens a new window into deep space, revealing the unseen past of stars and galaxies.»



Using the unique infrared sensitivity of NASA's James Webb Space Telescope, researchers can examine ancient galaxies to probe secrets of the early universe. Now, an international team of astronomers has identified bright hydrogen emission from a galaxy in an unexpectedly early time in the universe's history. The surprise finding is challenging researchers to explain how this light could have pierced the thick fog of neutral hydrogen that filled space at that time. The Webb telescope discovered the incredibly distant galaxy JADES-GS-z13-1, observed to exist just 330 million years after the big bang, in images taken by Webb's NIRCam (Near-Infrared Camera) as part of the James Webb Space Telescope Advanced Deep Extragalactic Survey (JADES). Researchers used the galaxy's brightness in different infrared filters to estimate its redshift, which measures a galaxy's distance from Earth based on how its light has been stretched out during its journey through expanding space.



Before and during the era of reionization, the immense amounts of neutral hydrogen fog surrounding galaxies blocked any energetic ultraviolet light they emitted, much like the filtering effect of colored glass. Until enough stars had formed and were able to ionize the hydrogen gas, no such light — including Lyman-alpha emission — could escape from these fledgling galaxies to reach Earth. The confirmation of Lyman-alpha radiation from this galaxy, therefore, has great implications for our understanding of the early universe. "We really shouldn't have found a galaxy like this, given our understanding of the way the universe has evolved," said Kevin Hainline, a team member from the University of Arizona. "We could think of the early universe as shrouded with a thick fog that would make it exceedingly difficult to find even powerful lighthouses peeking through, yet here we see the beam of light from this galaxy piercing the veil. This fascinating emission line has huge ramifications for how and when the universe reionized." The source of the Lyman-alpha radiation from this galaxy is not yet known, but it may include the first light from the earliest generation of stars to form in the universe. "The large bubble of ionized hydrogen surrounding this galaxy might have been created by a peculiar population of stars — much more massive, hotter, and more luminous than stars formed at later epochs, and possibly representative of the first generation of stars," said Witstok. A powerful active galactic nucleus, driven by one of the first supermassive black holes, is another possibility identified by the team. This research was published

space news and recent discoveries

Next stop : missions to the moon and mars

« What's next for space exploration? Missions to the Moon and Mars bring us closer to living and working beyond Earth. »

Since the conclusion of the Apollo program, which saw humanity's first steps on the Moon in the 1960s and 70s, the quest to return human explorers to the lunar surface and continue on to Mars has been a topic of continuous discussion, development, and analysis. Over the last 50 years, the agency has considered many different architectures that would resume crewed missions to the Moon or send them on to the Red Planet. Each approach reflected the goals or focus of the environment or technologies available at that time. However, that interest and desire has not translated into flight missions until NASA's Artemis campaign. Throughout the decades, a variety of plans and initiatives were proposed — from lunar bases and Mars expeditions to asteroid missions — but they often faced major challenges such as shifting political priorities, limited funding, and evolving technical obstacles. Despite advances in spacecraft design, propulsion technologies, and international partnerships, these efforts remained largely conceptual or were eventually cancelled. The desire to push beyond low Earth orbit persisted, but it was not until the Artemis program that a structured, funded, and executable strategy emerged, combining new technology with international and commercial collaboration.

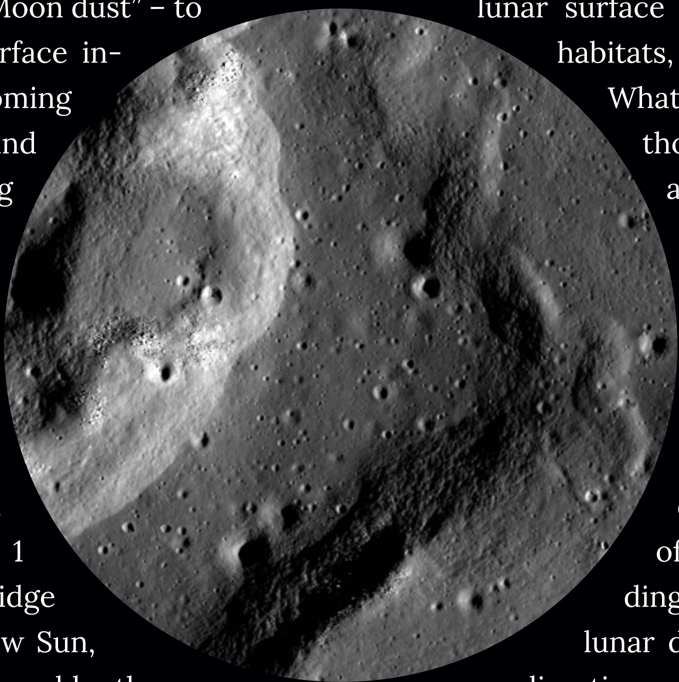
From the Moon to Mars: Building Humanity's Future in Space

"For decades, the Moon was a dream—Artemis is making it real." More than just a series of missions, Artemis represents a bold new chapter in human exploration, rooted in decades of ambition, innovation, and perseverance. It is the realization of countless studies, technological advancements, and lessons learned from past programs such as Apollo, the Space Shuttle, and the International Space Station. Artemis is designed not only to return astronauts to the lunar surface, but to do so in a way that is sustainable, diverse, and collaborative, engaging international partners and private industry in ways never before seen in human spaceflight. Through the development of powerful systems like the Space Launch System (SLS), the Orion spacecraft, and the Gateway — a planned orbiting lunar outpost — Artemis is laying the groundwork for long-term operations in deep space. Its missions aim to establish a continuous human presence on and around the Moon, enabling scientific discoveries, resource utilization, and the development of critical technologies that will ultimately support future missions to Mars and beyond. Artemis is not simply a return to the Moon; it is a strategic step toward making deep space a part of humanity's regular sphere of activity. With each launch, each landing, and each milestone, the dream of reaching farther into the cosmos becomes a tangible reality, bridging generations of visionaries who once gazed at the Moon and imagined what was possible with the explorers who now take those dreams and turn them into history. Each Artemis mission brings us closer to mastering life beyond Earth. By living and working on the Moon, astronauts will develop the skills and technologies needed for the long journey to Mars. Every step on the lunar surface prepares humanity for the challenges of deep space exploration, turning distant dreams into achievable milestones.

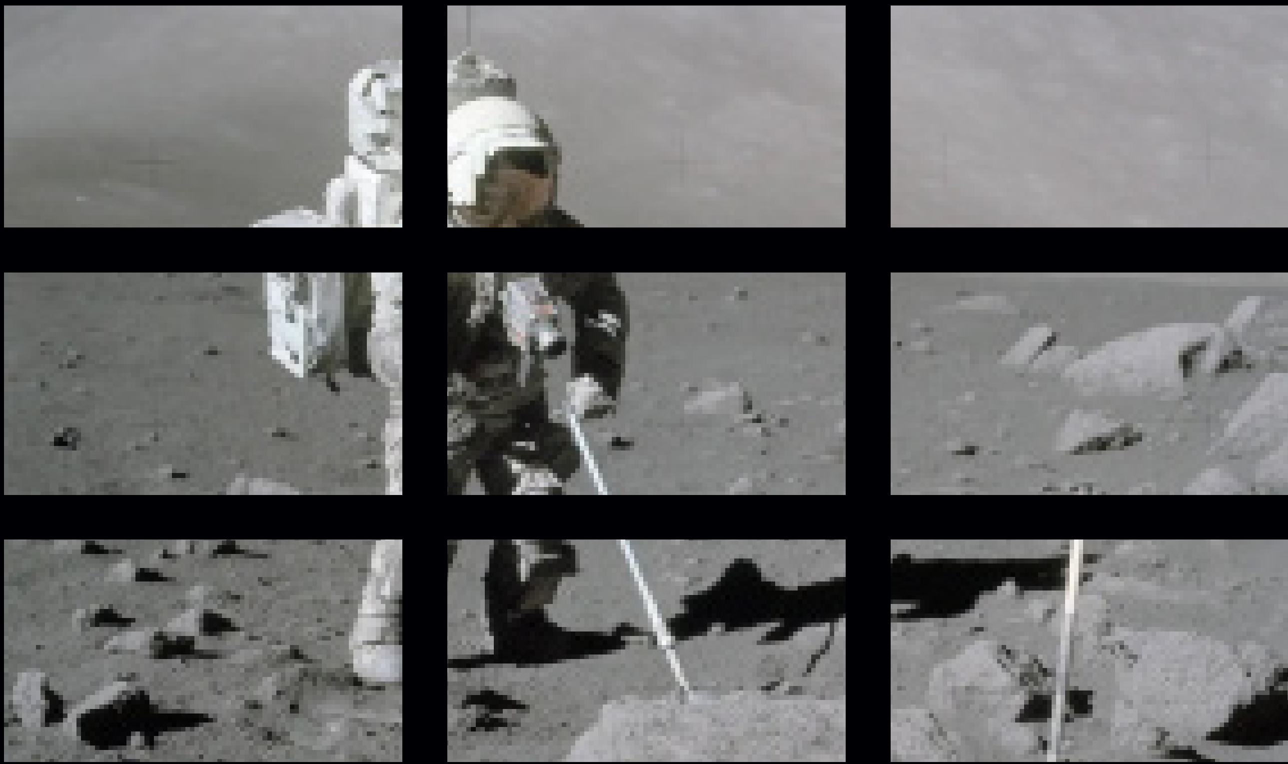
Space Tourism: A New Frontier

«Can anyone really travel to space? As private companies launch civilians beyond Earth's atmosphere, space tourism is transforming from science fiction into a new chapter of human exploration.»

UNASA Space Technology has big travel plans for 2025, starting with a trip to the near side of the Moon! Among ten groundbreaking NASA science and technology demonstrations, two technologies are on a ride to survey lunar regolith – also known as "Moon dust" – to better understand surface interactions with incoming lander spacecraft and payloads conducting experiments on the surface. These dust demonstrations and the data they're designed to collect will help support future lunar missions. Blue Ghost Mission 1 A complex wrinkle ridge in Mare Crisium at low Sun, seen in an image captured by the Lunar Reconnaissance Orbiter Camera. NASA/GSFC/Arizona State University launched at 1:11 a.m. EST on January 15th aboard a SpaceX Falcon 9 rocket from Launch Complex 39A at the agency's Kennedy Space Center in Florida. The company is targeting a lunar landing on Sunday, March 2. Understanding regolith The Moon's dusty environment was one of the greatest challenges astronauts faced during Apollo Moon missions, posing hazards to lunar surface systems, space suits, habitats, and instrumentation.



What was learned from those early missions – and from thousands of experiments conducted on Earth and in space since – is that successful surface missions require the ability to eliminate dust from all kinds of systems. Lunar landings, for example, cause lunar dust to disperse in all directions and collect on everything that lands there with it. This is one of the reasons such technologies are important to understand. The SCALPSS technology will study the dispersion of lunar dust, while EDS will demonstrate a solution to mitigate it.



Dust mitigation technology has come a long way, but we still have a lot to learn to develop surface systems and infrastructure for more complex missions. LSII is actively engaged in this effort, working with the lunar community across sectors to expand knowledge and design new approaches for future technologies. Working alongside the Lunar Surface Innovation Consortium, LSII has a unique opportunity to take a holistic look at dust's role in the development of surface infrastructure with other key capability areas including in-situ resource utilization, surface power, and surviving the lunar night. Learning from the the Moon benefits Mars science and exploration Capabilities for minimizing dust interaction are as important for future missions on Mars as it is for missions on the Moon. Like the Moon, Mars is also covered with regolith, also called Martian dust or Martian soil, but the properties are different than lunar regolith, both in shape and mineralogy. The challenges Mars rovers have encountered with Martian regolith have provided great insight into the challenges we will face during lunar surface missions. Learning is interwoven and beneficial to future missions whether hundreds of thousands of miles from Earth, on the Moon, or millions, on Mars. By investing in dust mitigation technologies now, we lay the groundwork for safer, more efficient operations across multiple planetary environments. Technologies developed through LSII's work not only improve hardware longevity and system reliability, but they also reduce risks to astronaut health and enable long-term habitation strategies. As we move toward a sustainable presence on the Moon and prepare for crewed missions to Mars, solving the dust challenge becomes a critical stepping stone—bridging current research with the future of deep space exploration. Addressing dust mitigation now is key to enabling safe, reliable, and long-term exploration on both the Moon and Mars.

What kind of cosmic phenomenon are you ?

Discover your celestial Phenomenin through the wonders of the univers

Answer the questions and find out

1. What best describes your energy?

A. Calm but intense

B. Radiant and expanding

C. Mysterious and deep

D. Always moving, always creating

2. Your ideal role in the univers

A. Absorb knowledge

B. Make a dramatic impact

C. Remain unseen but powerful

D. Be a source of inspiration and

life

3. People often describe you as...

A. Intense

B. Magnetic

C. Quietly influential

D. Dreamy and creative

4. You shine the most when...

A. In solitude

B. Under pressure

C. Behind the scenes

D. In collaboration

5. Pick a visual mood:

A. Black swirling vortex

B. Bright, explosive cloud

C. Shadowed starlight

D. Colorful gas and dust spiral

The univers speaks : you are ...

Mostly A – You are a Black Hole

Mysterious, intense, and endlessly fascinating. You hold great power in your presence and pull others into your orbit effortlessly.

Mostly B – You are a Supernova

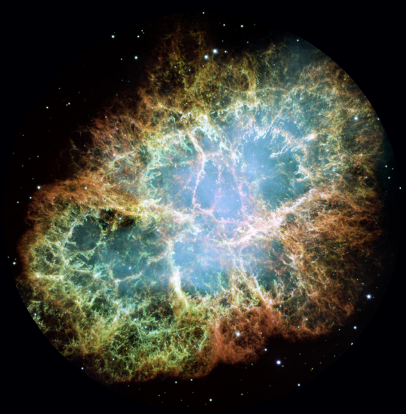
Bright, bold, and full of energy. You create change, shake things up, and leave a lasting impact wherever you go.

Mostly C – You are Dark Matter

Invisible yet vital. You're a quiet force that holds everything together. People may not always see you, but they feel your impact.

Mostly D – You are a Nebula

Creative, ethereal, and always transforming. You're a dreamer who inspires beauty and breathes life into ideas.

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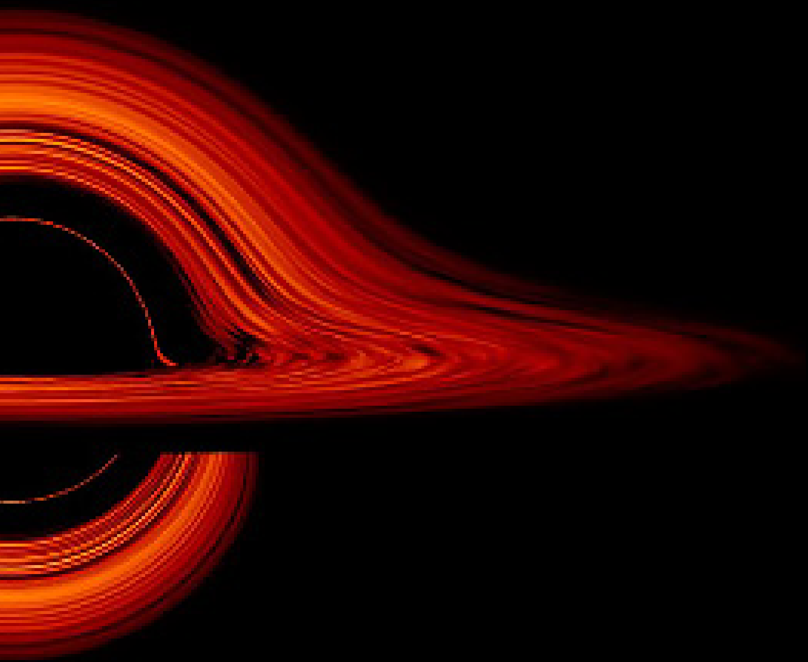
«Space and time are not conditions in which we live, but modes in which we think.»

— Albert Einstein



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