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Astronomy & Physics Weekly News

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Top News

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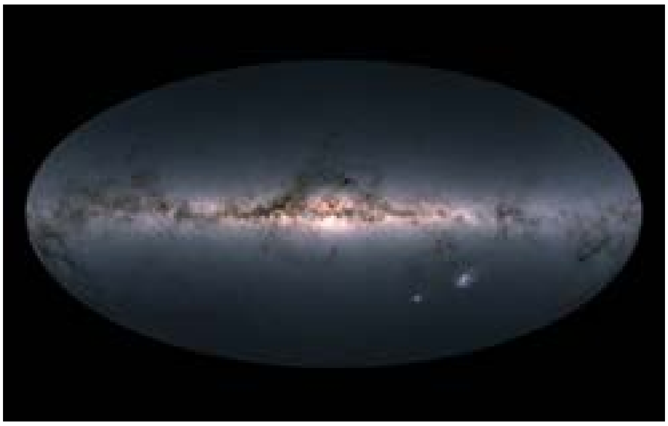
Gaia creates richest star map of our Galaxy—and beyond

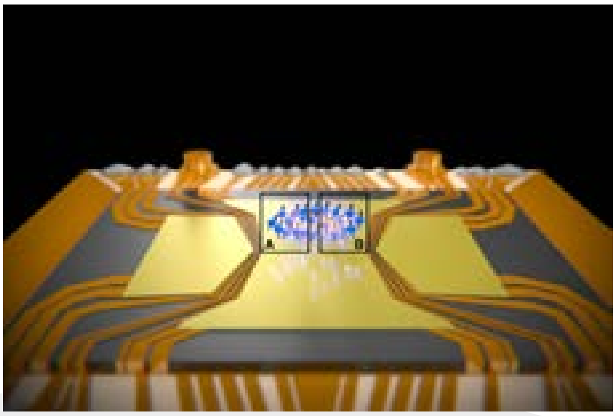


Gaia's all-sky view of our Milky Way Galaxy and neighbouring galaxies, based on measurements of nearly 1.7 billion stars. The map shows the total brightness and colour of stars observed by the ESA satellite in each portion of the sky between July 2014 and May 2016. Brighter regions indicate denser concentrations of especially bright stars, while darker regions correspond to patches of the sky where fewer bright stars are observed. The colour representation is obtained by combining the total amount of light with the amount of blue and red light recorded by Gaia in each patch of the sky. The bright horizontal structure that dominates the image is the Galactic plane, the flattened disc that hosts most of the stars in our home Galaxy. In the middle of the image, the Galactic centre appears vivid and teeming with stars. Darker regions across the Galactic plane correspond to foreground clouds of interstellar gas and dust, which absorb the light of stars located further away, behind the clouds. Many of these conceal stellar nurseries where new generations of stars are being born. Sprinkled across the image are also many globular and open clusters – groupings of stars held together by their mutual gravity, as well as entire galaxies beyond our own. The two bright objects in the lower right of the image are the Large and Small Magellanic Clouds, two dwarf galaxies orbiting the Milky Way. In small areas of the image where no colour information was available – to the lower left of the Galactic centre, to the upper left of the Small Magellanic Cloud, and in the top portion of the map – an equivalent greyscale value was assigned. The second Gaia data release was made public on 25 April 2018 and includes the position and brightness of almost 1.7 billion stars, and the parallax, proper motion and colour of more than 1.3 billion stars. It also includes the radial velocity of more than seven million stars, the surface temperature of more than 100 million stars, and the amount of dust intervening between us and of 87 million stars. There are also more than 500 000 variable sources, and the position of 14 099 known Solar System objects – most of them asteroids – included in the release. Credit: Gaia Data Processing and Analysis Consortium (DPAC); A. Moitinho / A. F. Silva / M. Barros / C. Barata, University of Lisbon, Portugal; H. Savietto, Fork Research, Portugal.

ESA's Gaia mission has produced the richest star catalogue to date, including high-precision measurements of nearly 1.7 billion stars and revealing previously unseen details of our home Galaxy.

A multitude of discoveries are on the horizon after this much awaited release, which is based on 22 months of charting the sky. The new data includes positions, distance indicators and motions of more than one billion stars, along with high-precision measurements of asteroids within our Solar System and stars beyond our own Milky Way Galaxy. ...Read More...

Einstein-Podolsky-Rosen paradox observed in many-particle system for the first time



A cloud of atoms is held above a chip by electromagnetic fields. The EPR paradox was observed between the spatially separated regions A and B. Credit: University of Basel, Department of Physics

Physicists from the University of Basel have observed the quantum mechanical Einstein-Podolsky-Rosen paradox in a system of several hundred interacting atoms for the first time. The phenomenon dates back to a famous thought experiment from 1935. It allows measurement results to be predicted precisely and could be used in new types of sensors and imaging methods for electromagnetic fields. The findings were recently published in the journal Science.

How precisely can we predict the results of measurements on a physical system? In the world of tiny particles, which is governed by the laws of quantum physics, there is a fundamental limit to the precision of such predictions. This limit is expressed by the Heisenberg uncertainty principle, which states that it is impossible to simultaneously predict the measurements of a particle's position and momentum, or of two components of a spin, with arbitrary precision.

A paradoxical decrease in uncertainty

In 1935, however, Albert Einstein, Boris Podolsky, and Nathan Rosen published a famous paper in which they showed that precise predictions are theoretically possible under certain circumstances. To do so, they considered two systems, A and B, in what is known as an "entangled" state, in which their properties are strongly correlated.

In this case, the results of measurements on system A can be used to predict the results of corresponding measurements on system B with arbitrary precision. This is possible even if systems A and B are spatially separated. The paradox is that an observer can use measurements on system A to make more precise statements about system B than an observer who has direct access to system B (but not to A). First observation in a many-particle system In the past, experiments have used light or individual atoms to study the EPR paradox ..Read More...

Black hole and stellar winds shut down star formation in galaxy

Illustration only

Researchers at the University of Colorado Boulder have completed an unprecedented "dissection" of twin galaxies in the final stages of merging.

The new study, led by CU Boulder research associate Francisco Muller-Sanchez, explores a galaxy called NGC 6240. While most galaxies in the universe hold only one supermassive black hole at their center, NGC 6240 contains two--and they're circling each other in the last steps before crashing together.

The research reveals how gases ejected by those spiraling black holes, in combination with gases ejected by stars in the galaxy, may have begun to power down NGC 6240's production of new stars. Muller-Sanchez's team also shows how these "winds" have helped to create the galaxy's most tell-tale feature: a massive cloud of gas in the shape of a butterfly.

"We dissected the butterfly," said Muller-Sanchez of CU Boulder's Department of Astrophysical and Planetary Sciences (APS). "This is the first galaxy in which we can see both the wind from the two supermassive black holes and the outflow of low ionization gas from star formation at the same time."

The team zeroed in on NGC 6240, in part, because galaxies with two supermassive black holes at their centers are relatively rare. Some experts also suspect that those twin hearts have given rise to the galaxy's unusual appearance.

Unlike the Milky Way, which forms a relatively tidy disk, bubbles and jets of gas shoot off from NGC 6240, extending more than 30,000 light years into space and resembling a butterfly in flight.

"Galaxies with a single supermassive black hole never show such a phenomenal structure," Muller-Sanchez said.

In research that will be published April 18 in Nature, the team discovered that two different forces have given rise to the nebula. The butterfly's northwest ...Read More...

ESA and NASA to investigate bringing martian soil to Earth

Illustration only.

ESA and NASA signed a statement of intent today to explore concepts for missions to bring samples of martian soil to Earth.

Spacecraft in orbit and on Mars's surface have made many exciting discoveries, transforming our understanding of the planet and unveiling clues to the formation of our Solar System, as well as helping us understand our home planet.

The next step is to bring samples to Earth for detailed analysis in sophisticated laboratories where results can be verified independently and samples can be reanalysed as laboratory techniques continue to improve.

Bringing Mars to Earth is no simple undertaking-it would require at least three missions from Earth and one never-been-done-before rocket launch from Mars.

A first mission, NASA's 2020 Mars Rover, is set to collect surface samples in pen-sized canisters as it explores the Red Planet. Up to 31 canisters will be filled and readied for a later pickup - geocaching gone interplanetary.

In the same period, ESA's ExoMars rover, which is also set to land on Mars in 2021, will be drilling up to two meters below the surface to search for evidence of life.

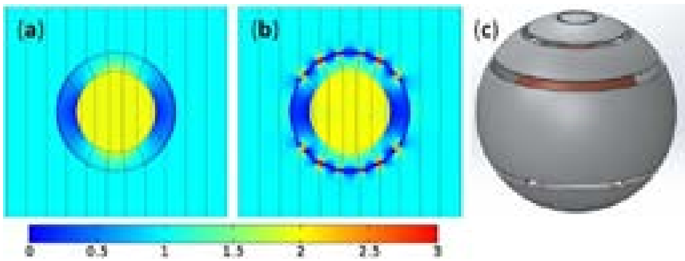
A second mission with a small fetch rover would land nearby and retrieve the samples in a martian search-and-rescue operation. This rover would bring the samples back to its lander and place them in a Mars Ascent Vehicle - a small rocket to launch the football-sized container into Mars orbit.

A third launch from Earth would provide a spacecraft sent to orbit Mars and rendezvous with the sample containers. Once the samples are safely collected and loaded into an Earth entry vehicle, the spacecraft would return to Earth, release the vehicle to land in the United States, where the samples will be retrieved and placed in quarantine for detailed analysis by a team of international scientists.

Studying concepts

The statement signed today at the ILA Berlin air show by ESA's Director of Human and Robotic Exploration, David Parker, and NASA's Associate Administrator ...Read More...

Invisible magnetic sensors measure magnetic fields without disturbing them



Simulation of a spherical shell that cancels the distortions caused by a ferromagnetic sphere, making the sphere invisible (magnetically undetectable) from the outside. Credit: Mach-Batlle et al. ©2018 American Institute of Physics

Currently, most of the magnetic sensors used in today's computers, airplanes, cars, and other systems distort the magnetic fields that they are measuring. These distortions can cause major problems for some applications, in particular biomedical techniques, that require highly accurate measurements, and can also cause cross-talk in sensor arrays.

In a new study, researchers have designed "invisible" magnetic sensors—sensors that are magnetically invisible so that they can still detect but do not distort the surrounding magnetic fields. The researchers, Rosa Mach-Batlle, Carles Navau, and Alvaro Sanchez at the Autonomous University of Barcelona, have published a paper on the invisible magnetic sensors in a recent issue of Applied Physics Letters.

"This is the first proposal to render a magnetic sensor invisible," Mach-Batlle told Phys.org. "The invisibility can even be made exact in some cases, something never achieved before, to our knowledge."

Many magnetic sensors are made of ferromagnetic materials, which have the advantage of enhanced sensor detectability compared to other materials. However, the downside of ferromagnetic materials is that they attract magnetic fields, causing distortions in the same magnetic fields that the sensors are detecting.

The challenging part of making invisible magnetic sensors is to simultaneously cancel these distortions while still allowing the sensors to detect the magnetic fields. Previously, researchers have designed magnetic cloaks for cloaking magnetic objects that make it impossible to magnetically detect them from the outside. However, these cloaks work both ways, so that the cloaked magnetic objects are completely isolated from and unable to detect any external magnetic fields. So a cloaked sensor could no longer function as a sensor.

In the new study, the researchers have proposed a method for making a sensor magnetically ...Read More...

Entanglement observed in near-macroscopic objects

Illustration of the 15-micrometre-wide drumheads prepared on silicon chips used in the experiment. The drumheads vibrate at a high ultrasound frequency, and the peculiar quantum state predicted by Einstein was created from the vibrations. Credit: Aalto University/Petja Hyttinen & Olli Hanhirova, ARKH Architects.

Perhaps the strangest prediction of quantum theory is entanglement, a phenomenon whereby two distant objects become intertwined in a manner that defies both classical physics and a common-sense understanding of reality. In 1935, Albert Einstein expressed his concern over this concept, referring to it as "spooky action at a distance."

Today, entanglement is considered a cornerstone of quantum mechanics, and it is the key resource for a host of potentially transformative quantum technologies. Entanglement is, however, extremely fragile, and it has previously been observed only in microscopic systems such as light or atoms, and recently in superconducting electric circuits.

In work recently published in Nature, a team led by Prof. Mika Sillanpää at Aalto University in Finland has shown that entanglement of massive objects can be generated and detected.

The researchers managed to bring the motions of two individual vibrating drumheads—fabricated from metallic aluminium on a silicon chip—into an entangled quantum state. The macroscopic objects in the experiment are truly massive compared to the atomic scale—the circular drumheads have a diametre similar to the width of a thin human hair.

The team also included scientists from the University of New South Wales Canberra in Australia, the University of Chicago, and the University of Jyväskylä in Finland. The approach taken in the experiment was based on a theoretical innovation developed by Dr. Matt Woolley at UNSW and Prof. Aashish Clerk, now at the University of Chicago.

"The vibrating bodies are made to interact via a superconducting microwave circuit. The electromagnetic fields in the circuit are used to absorb all thermal disturbances and to leave behind only the quantum mechanical vibrations," says Mika Sillanpää, describing the ...Read More...

Uncovering the secret law of the evolution of galaxy clusters

Illustration only.

As science enthusiasts around the world bid farewell to legendary cosmologist Stephen Hawking, researchers continue to make important discoveries about the evolution of galaxy clusters that capture the imagination.

Now, an international collaboration between Yutaka Fujita at Osaka University and researchers from Taiwan, Italy, Japan, and the United States found a new fundamental law that stipulates the evolution of galaxy clusters. They recently reported the study in The Astrophysical Journal.

Galaxy clusters are the largest celestial body in the Universe (Fig.1). However, it has been difficult to measure their size and mass accurately because they mainly consist of dark matter that we cannot observe directly. One way to observe the dark matter indirectly is to use the gravitational lensing effect based on Einstein's theory of relativity.

Light rays from a galaxy behind a cluster are pulled by the gravity of the cluster as they pass through it, and their paths are bent (Fig.2). This is exactly the same effect as a lens, focusing the light of the distant galaxy and distorting its shape. If we can measure the distortion of the shape for many background galaxies, we can reveal the gravitational field of the cluster, and as a result, we can accurately measure its size and mass.

"One difficulty in our research," explains Keiichi Umetsu at Academia Sinica in Taiwan, "was that accurate measurements of the distortion were necessary." To overcome this problem, the research team has used precise observational data from NASA's Hubble Space Telescope and the Subaru Telescope operated by the National Astronomical Observatory of Japan.

Combining with gas temperature data from the Chandra X-ray satellite, the research group statistically examined those latest data and found that they conform to a simple law represented only by the size, mass, and gas temperature of clusters. Moreover, by making full use of computer simulations, they showed that clusters have grown over 4 to 8 billion years according to the law. ..Read More...

Where is the Universe's missing matter?

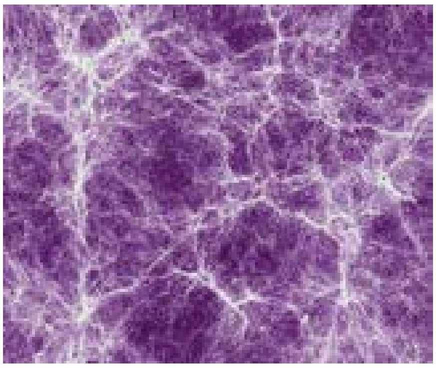


Illustration only.

Astronomers using ESA's XMM-Newton space observatory have probed the gas-filled haloes around galaxies in a quest to find 'missing' matter thought to reside there, but have come up empty-handed - so where is it?

All the matter in the Universe exists in the form of 'normal' matter or the notoriously elusive and invisible dark matter, with the latter around six times more prolific.

Curiously, scientists studying nearby galaxies in recent years have found them to contain three times less normal matter than expected, with our own Milky Way Galaxy containing less than half the expected amount.

"This has long been a mystery, and scientists have spent a lot of effort searching for this missing matter," says Jiangtao Li of the University of Michigan, USA, and lead author of a new paper.

"Why is it not in galaxies - or is it there, but we are just not seeing it? If it's not there, where is it? It is important we solve this puzzle, as it is one of the most uncertain parts of our models of both the early Universe and of how galaxies form."

Rather than lying within the main bulk of the galaxy, the part can be observed optically, researchers thought it may instead lie within a region of hot gas that stretches further out into space to form a galaxy's halo.

These hot, spherical haloes have been detected before, but the region is so faint that it is difficult to observe in detail - its X-ray emission can become lost and indistinguishable from background radiation. Often, scientists observe a small distance into this region and extrapolate their findings but this can result in unclear and varying results.

Jiangtao and colleagues wanted to measure the hot gas out to larger distances using ESA's XMM-Newton X-ray space observatory. They looked at six similar spiral galaxies and combined the data to create one galaxy with their average properties.

"By doing this, the galaxy's signal becomes stronger and the X-ray background becomes better ...Read More...

Algorithm take months, not years, to find material for improved energy conversion

A new algorithm uses the chemical elements in a crystal to predict its material properties. The algorithm simplifies computational required for material discovery and speeds up the process by about 10,000 times, compared to existing algorithms. Credit: Second Bay Studios/Harvard SEAS

In even the most fuel-efficient cars, about 60 percent of the total energy of gasoline is lost through heat in the exhaust pipe and radiator. To combat this, researchers are developing new thermoelectic materials that can convert heat into electricity. These semiconducting materials could recirculate electricity back into the vehicle and improve fuel efficiency by up to 5 percent.

The challenge is, current thermoelectric materials for waste heat recovery are very expensive and time consuming to develop. One of the state of the art materials, made from a combination of hafnium and zirconium (elements most commonly used in nuclear reactors), took 15 years from its initial discovery to optimized performance.

Now, researchers from the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) have developed an algorithm that can discover and optimize these materials in a matter of months, relying on solving quantum mechanical equations, without any experimental input.

"These thermoelectric systems are very complicated," said Boris Kozinsky, a recently appointed Associate Professor of Computational Materials Science at SEAS and senior author of the paper. "Semiconducting materials need to have very specific properties to work in this system, including high electrical conductivity, high thermopower, and low thermal conductivity, so that all that heat gets converted into electricity. Our goal was to find a new material that satisfies all the important properties for thermoelectric conversion while at the same time being stable and cheap."

Kozinsky co-authored the research with Georgy Samsonidze, a research engineer at the Robert Bosch Research and Technology Center in Cambridge, MA, where both authors conducted most of the research.

In order to find such a material, the team developed an algorithm that can predict electronic ...Read More...

Astronomers witness galaxy megamerger

Artist impression of the 14 galaxies detected by ALMA as they appear in the very early, very distant universe. These galaxies are in the process of merging and will eventually form the core of a massive galaxy cluster. Credit: NRAO/AUI/NSF; S. Dagnello

Peering deep into space—an astounding 90 percent of the way across the observable universe—astronomers have witnessed the beginnings of a gargantuan cosmic pileup, the impending collision of 14 young, starbursting galaxies.

This ancient megamerger is destined to evolve into one of the most massive structures in the known universe: a cluster of galaxies, gravitationally bound by dark matter and swimming in a sea of hot, ionized gas.

Using the Atacama Large Millimeter/submillimeter Array (ALMA), an international team of scientists has uncovered a startlingly dense concentration of 14 galaxies that are poised to merge, forming the core of what will eventually become a colossal galaxy cluster.

This tightly bound galactic smashup, known as a protocluster, is located approximately 12.4 billion light-years away, meaning its light started traveling to us when the universe was only 1.4 billion years old, or about a tenth of its present age. Its individual galaxies are forming stars as much as 1,000 times faster than our home galaxy and are crammed inside a region of space only about three times the size of the Milky Way. The resulting galaxy cluster will eventually rival some of the most massive clusters we see in the universe today.

The results are published in the journal Nature.

"Having caught a massive galaxy cluster in throes of formation is spectacular in and of itself," said Scott Chapman, an astrophysicist at Dalhousie University in Halifax, Canada, who specializes in observational cosmology and studies the origins of structure in the universe and the evolution of galaxies.

"But, the fact that this is happening so early in the history of the universe poses a formidable challenge to our present-day understanding of the way structures form in the universe," he said. During the first few million years of cosmic history, normal matter and dark matter began to aggregate into larger and larger .Read More...

The hunt for the Sun's ancient siblings

This photo of the Milky Way, taken from the International Space Station in 2014, shows just a small fraction of the stars in our galaxy. A new study identified the compositions of more than 340,000 stars in an effort to match them with their long-lost galactic siblings. NASA/Reid Wiseman

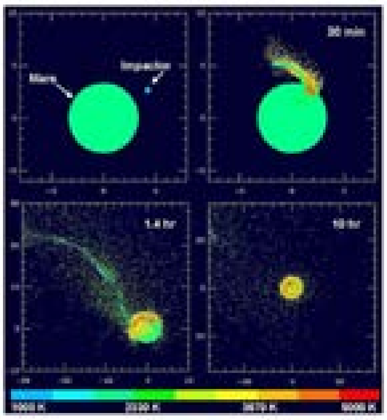
The Sun is quite isolated now, but just like every other star, it was born in a stellar nursery along with thousands of siblings. Once very close knit, the Sun and its galactic brethren were eventually torn apart by the tidal force of the Milky Way, and are now scattered about the galaxy. They may have been torn apart by happenstance, but their shared origin means that the brothers and sisters are still bound by their chemical compositions. In an effort to match stars with their relatives, an international team of researchers collected the chemical profiles of over 340,000 stars in the Milky Way.

The Galactic Archaeology with HERMES (GALAH) survey used a specially designed spectrograph called HERMES to compile spectra of the 340,000 stars, with a goal of examining over a million stars before the survey's completion. In addition to matching stars with their cluster of origin, the research team hopes to gain insight into the Milky Way's history.

"No other survey has been able to measure as many elements for as many stars as GALAH," said HEREMES instrument scientist, Dr. Gayandhi De Silva of Australian Astronomical Observatory (AAO), in a press release. "This data will enable such discoveries as the original star clusters of the Galaxy, including the Sun's birth cluster and solar siblings – there is no other dataset like this ever collected anywhere else in the world."

When starlight reaches a spectrograph, the light is separated into its different wavelengths, which helps astronomers determine the star's chemical composition. HERMES, which is fitted on AAO's 3.9-metre Anglo-Australian Telescope, used spectroscopy to record the abundance of almost two dozen different chemical elements in each star, including aluminum, iron, and oxygen. Since stars born in the same cluster share the same chemical profile, analysis of their makeup helps reveal galactic relations. ...Read More...

Martian moons likely formed after impact with Ceres sized object



As part of the new study, researchers modeled a collision between a Ceres-sized object and Mars. The results of the 3-D simulation show that the impact produces a disk of debris around the Red Planet that is primarily made of material from Mars. The outer rim of the disk eventually coalesces into two small martian moons – Phobos and Deimos.
Southwest Research Institute

According to a new study published today in Science Advances, Mars' two moons – Phobos and Deimos – likely formed following an impact between proto-Mars and a minor planet roughly the size of Ceres, which is 587 miles wide (950 kilometers).

To carry out the study, the researchers created a new model that took into account interactions between martian moons, then simulated how a disk of material would form and evolve around Mars following a collision between the Red Planet and a large object. The novel approach allowed the team to track ejecta from the impact with resolutions a full order of magnitude better than previous studies.

"We used state-of-the-art models to show that a Vesta-to-Ceres-sized impactor can produce a disk consistent with the formation of Mars' small moons," said co-author Julien Salmon, a research scientist at the Southwest Research Institute (SwRI), in a press release.

"The outer portions of the disk accumulate into Phobos and Deimos," said Salmon, "while the inner portions of the disk accumulate into larger moons that eventually spiral inward and are assimilated into Mars. Larger impacts advocated in prior works produce massive disks and more massive inner moons that prevent the survival of tiny moons like Phobos and Deimos."

Astronomers have long debated the origin of Mars' tiny satellites. Some posit that Phobos and Deimos, which have diameters of 14 miles and 7.5 miles respectively, are actually intact asteroids that were captured by the gravity of Mars. But due to the fact that both moons orbit in nearly the same plane and trace almost circular paths, many astronomers lean toward the theory that Phobos and Deimos were produced inside a ...Read More...

Special Read:

NASA teams study Agency's future in astrophysics

Illustration only.

What does NASA's future look like? Will the next-generation telescope investigate the first black holes in the distant universe or will it look for life on an Earth-like planet light-years away? As in past decades, the agency won't make that decision in a vacuum or without understanding the technical obstacles, which are formidable.

Already, teams of experts from across the agency, academia, and industry are studying four potential flagship missions that the science community has vetted as worthy pursuits under the 2020 Decadal Survey for Astrophysics. In March, they submitted interim reports. Next year, they are expected to finish final reports that the National Research Council will then use to inform its recommendations to NASA in a couple years.

"This is game time for astrophysics," said Susan Neff, chief scientist of NASA's Cosmic Origins Program. "We want to build all these concepts, but we don't have the budget to do all four at the same time. The point of these decadal studies is to give members of the astrophysics community the best possible information as they decide which science to do first."

NASA's Goddard Space Flight Center in Greenbelt, Maryland, leads two: the Large Ultraviolet/Optical/Infrared Surveyor (LUVOIR) and the Origins Space Telescope (OST). NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California, and the Marshall Space Flight Center in Huntsville, Alabama, meanwhile, are respectively leading the Habitable Exoplanet Imager (HabEx) and the X-ray Surveyor, known as Lynx (see details of each).

Regardless of which mission NASA ultimately selects or the technologies it flies, the agency and individual centers have begun investing in advanced tools needed to pursue these bold, breakthrough concepts in the future, said Thai Pham, the technology development manager for NASA's Astrophysics Program Office. "I'm not saying it will be easy. It won't be," he continued. "These are ambitious missions, with significant technical challenges, many of which overlap and apply to all. The good news is that the groundwork is being laid now."

Unprecedented Picometer-Level Stability

LUVOIR provides a case in point.
One concept of the observatory envisions a supersized, segmented primary mirror about 49 feet in diameter. With this behemoth, LUVOIR could help answer how life began, what conditions are vital for the formation of stars and galaxies, and perhaps most compellingly, is Earth rare in the cosmos?

"LUVOIR will search for signs of life, but it doesn't stop there. It will tell us how life got there and how rare life is in the cosmos," said Shawn Domagal-Goldman, deputy study scientist. "This mission is ambitious," agreed Study Scientist Aki Roberge, "but finding out if there is life outside the solar system is the prize. All the technology tall ..Read More...

Global Aerospace Summit:
Abu-Dhabi: Apr. 30 - May 02, 2018

SCASS Participation

The sharjah Center for Astronomy and Space Sciences will participate in the forthcoming "Global Aerospace Summit" that will be held in Abu-Dhabi in the period between Apr. 30 and May 01. The Global Aerospace Summit is where corporate, government and military strategies are marked out. What do future aircraft need to look like? How will new processes and technologies revolutionize manufacturing? What threats does a distributed, digital world hold for incumbents' business, and where are the game changing tech platforms and disruptive business models coming from?

The 2018 Summit will focus on what the aerospace industry means for people – how aerospace helps advance mankind and how we can build the human capital we need to develop our industry. In a time of international unpredictability, the Summit will look at what OEMs, airlines and policy makers need to do to enable our people to thrive in a data driven, digital world.

Throughout the Summit the Next Gen Leaders initiative will promote STEM education and inspire young people to pursue careers in aerospace. 2nd May 2018 is a full day dedicated to the development of young professionals and students. Its highlight is the Young Space Leaders Forum which will showcase the next generation of leaders and engineers. Featuring inspirational role models from the international space scene it will celebrate the passion and dedication to science and learning of the future leaders of the Emirati space programme.

Next Gen Leaders will highlight top academic institutions' projects and industry STEM programmes, offer career advice and workshops.

SCASS will showcase its space sciences research through its different laboratories. Below is a list of our displays:

Exoplanet Light Curves Observations - Sharjah Observatory
CubeSat Program at SCASS - CubeSat Laboratory
Martian Ionosphere - Ionosphere Laboratory
Geomagnetic Measurements - Ionospheric Laboratory
Decametric Radio Telescope and 5-meter Radio Telescope - Radio Astronomy Laboratory
Meteorite Identification - Meteorite Center
UAE Meteor Monitoring Network (UAEMMN) - Meteorite Center

Dr. Ilias Fernini, SCASS's Deputy General Director of the Research Laboratories and Obsevatory, will participate on May 01 as a panelist in a special session "National Development - Promoting SMEs and Building a Space Ecosystem." The session will focus on developing the workforce of the future. How do space programmes add value, and how can they inspire people to enter STEM career paths? Where will the space sector find the next generation of leaders in a viciously competitive talent environment? How can the industry work together to make space a compelling and attractive career path and how must we ensure future skills challenges are identified and overcome? What are the opportunities for SMEs?

The moderator of the session will be Allen Herbert, Vice President Business Development and Strategy, Africa & Middle East NanoRacks. The panelists are:

Andrew Nelson, Founder & President, Nelson Aerospace Consulting Associates
Anu Ojha, Director, UK National Space Academy
lias Fernini, SCASS Deputy General Director for Research Laboratories and Observatory
Minoo Rathnasabapathy, Former Executive Director, Space Generation Advisory Council (SGAC)

This Week's Sky at a Glance
Apr. 21-27, 2018

Apr 29	Su	21:59	Mercury Elongation: 27° W
Apr 30	Mo	04:58	Full Moon
		21:16	Moon-Jupiter: 4.1° S
May 02	We	17:29	Venus-Aldebaran: 6.4° N

The Meteor Shower Report:

Eta Aquarid Meteor Shower 2018: When, Where and How to See It

Although the Perseid meteor shower in August may draw the most attention, the Eta Aquarid meteor shower, which occurs from roughly late April to mid-May, offers a long stretch of spectacular "shooting stars" that even a casual observer can spot in the night sky.

The peak of the Eta Aquarid meteor shower, when the most meteors are visible, should happen before dawn on May 7, according to Bill Cooke, who leads NASA's Meteoroid Environment Office. Rates this year can reach 15-20 meteors per hour during that time, Cooke told Space.com, but may be washed out by moonlight.

Where to look

The meteors appear to originate from Eta Aquarii, one of the brighter stars in the constellation Aquarius. (The point meteors appear to come from is called the radiant.) For people in mid-northern latitudes, the radiant won't be very high in the sky, so if that's where you're located, you'll need a dark-sky site with a relatively clear southern horizon to make the most of the meteors.

Observers near the equator will have the best views, but even as far north as Miami, the view will be much better than it will be from New York or San Francisco, for example. Skywatchers in the Southern Hemisphere will have the best view of all and will see the shower's radiant in the north. Nights are also becoming longer in the Southern Hemisphere as the June solstice, and thus the austral winter, is approaching.

This year, the moon will probably wash out the comparatively faint meteor shower during its peak, Cooke said.

How to see them

Although Eta Aquarid meteors will appear to originate from the same point, you shouldn't stare straight at the radiant to find meteors. If you do, you might miss the meteors that create the longest bright streaks across the sky.

The best way to see the meteors, according to Cooke, is to lie flat on your back and look straight up. That way, you get the widest view of the sky, and you won't have to strain your neck.

What causes the Eta Aquarids?

Meteor showers are the flashes of dust grains that burn up in the atmosphere. They occur when the Earth crosses the paths of comets, which leave dust along their orbits. That's why they happen on certain dates and appear to originate from specific points in the sky. The Eta Aquarids are associated with Halley's Comet, but their path separated from the comet long ago.

"All meteors move off the track of the comet orbit," Cooke said. "When they come off the comet, they are at a slightly different speed, and that changes the orbit a bit ... Other things besides gravity mess with it," such as radiation pressure and even interplanetary gas, Cooke explained. [Infographic: How Meteor Showers Work]

The Eta Aquarids don't produce as many meteors per hour as the more famous Perseid meteor shower in August, but they are just as bright, if not brighter. The meteoroids (the actual dust grains) are about a millimeter across, and there's no chance that they'll hit the ground, Cooke said. That's because they are too small and move too fast to endure the plunge through Earth's atmosphere; the heat generated from the friction with the atmosphere obliterates the little pieces of space rock. ...Read More...