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أكاديمية الشارقة لعلوم وتكنولوجيا الفضاء والفلك

Astronomy & Physics

IAU 100 Years: Under One Sky

Top News

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Our solar system's mysterious 'Planet 9' may actually be a tiny, ancient black hole

This artistic rendering shows the distant view from Planet Nine back toward the sun. The planet is thought to be gaseous, similar to Uranus and Neptune. Hypothetical lightning lights up the night side.Caltech / R. Hurt

Astronomers have long suspected that an enigmatic cosmic object known as Planet 9 may be orbiting the sun in the far reaches of the solar system. Now, new research suggests that this hypothetical world may not be a planet after all, but a bowling ball-size black hole left over from the earliest days of the universe.

In a new paper published on the preprint website arXiv, two scientists introduce a new theory that the so-called primordial black hole beyond Neptune may explain unusual gravitational effects in the outer solar system that first led to the Planet 9 hypothesis.

Unlike black holes that form out of the remains of collapsed stars, primordial black holes are tiny — "somewhere between a baseball and a bowling ball," said Jakub Scholtz, a postdoctoral fellow at the Institute for Particle Physics Phenomenology at Durham University in the United Kingdom, and one of the authors of the new study.

Though they have not been directly observed, primordial black holes are thought to have developed shortly after the Big Bang, when density fluctuations across the early universe created small, superdense pockets of matter.

"Sometimes they're said to be relics of the Big Bang," said study co-author James Unwin, a theoretical particle physicist at the University of Illinois at Chicago.

Unwin and Scholtz say that such a phenomenon could explain the odd orbits of "trans-Neptunian objects" — clusters of asteroids and comets in a region of the solar system known as the Kuiper Belt that lies beyond Neptune. These objects circle the sun on a highly elliptical path that scientists thought could only plausibly be explained by the gravitational effects of a planet in the outer solar system that is up to 15 times more massive than Earth.
But so far, the hunt for Planet 9 has come up empty. Scholtz said the new primordial black hole theory could open up new ways to hunt for the mysterious object that lurks in the outer solar system."At this stage, it would be difficult for anyone to say it's more likely to be one thing or another," Scholtz said. "We've never seen a planet ...Read More...

First Emirati Astronaut Returns to Earth with Russian-US Space Station Crew

From left: Astronauts Hazzaa AlMansoori (UAE), Aleksey Ovchinin (Roscosmos) and Nick Hague (NASA)are seen shortly after landing on board Soyuz MS-12. (Image credit: NASA/Bill Ingalls)

UAE astronaut Hazzaa Ali Almansoori spent 8 days in space. The first Emirati astronaut has returned to Earth after an eight day mission to the International Space Station, landing with Russian and American crewmates were were in orbit for seven months.

Hazzaa AlMansoori of the United Arab Emirates' (UAE) Mohammed bin Rashid Space Centre (MBRSC) touched down with Aleksey Ovchinin of Roscosmos and Nick Hague of NASA aboard Russia's Soyuz MS-12 spacecraft. Descending under a parachute and slowed by braking thrusters, the capsule landed on the steppe of Kazakhstan, near the town of Dzhezkazgan, at 6:59 a.m. EDT (1059 GMT or 4:59 p.m. local time) on Thursday (Oct. 3).

Met by Russian recovery forces and members of their respective space agencies, Ovchinin, Hague and AlMansoori were helped out of their spacecraft and given brief medical exams as they began adjusting to being back on Earth. The three appeared to be in good health, smiling and talking to family members by phone.

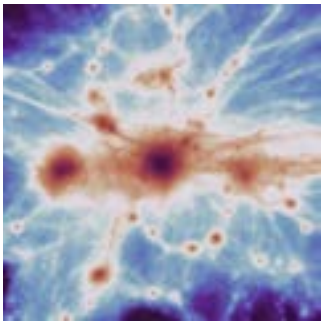
The landing brought to a close Ovchinin and Hague's 203-day mission, during which they served on the space station's 59th and 60th expedition crews. The two arrived at the orbiting lab on March 14, 2019, five months after they survived an inflight abort on their first attempt at reaching the station.

AlMansoori, as a spaceflight participant flying under a contract between Russia and the UAE, lifted off with his landing crewmates' replacements, Oleg Skripochka of Roscosmos and Jessica Meir of NASA, on Soyuz MS-15 on Sept. 25. For eight days, he, Skripochka, Meir, Ovchinin and Hague worked together with Expedition 60 crew members Alexander Skvortsov of Roscosmos, Andrew Morgan of NASA and Luca Parmitano of the European Space Agency (ESA).

On Tuesday (Oct. 2), Ovchinin handed over command of the station to Parmitano, a first for an astronaut from Italy.

"This has been a long and interesting flight," said Ovchinin during a brief televised change of command ceremony. "It has been exciting, it has been a thrill ...Read More...

Faint Filaments of Universe-Spanning 'Cosmic Web' Finally Found



A massive galaxy cluster from the C-EAGLE simulation, providing a view of a region comparable to the one where the filaments have been detected. The color map represents the same emission from the gas filaments as the one detected in observations. At the convergence of these filaments, a massive cluster of galaxies is assembling. (Image credit: Joshua Borrow using C-EAGLE)

Most of the hydrogen formed during the Big Bang resides in these threads.

The faintly glowing wisps of gas that make up the intergalactic filaments of a universe-spanning cosmic web may have finally been detected for the first time, a new study reports.

This gas is apparently helping fuel the growth of young galaxies, shedding light on how the universe has evolved over time, researchers said.

Previous research suggests that, after the universe was born in the Big Bang 13.8 billion years ago, much of the hydrogen gas that makes up most of the known matter of the cosmos collapsed to form colossal sheets. These sheets then broke apart to form the filaments of a vast cosmic web.

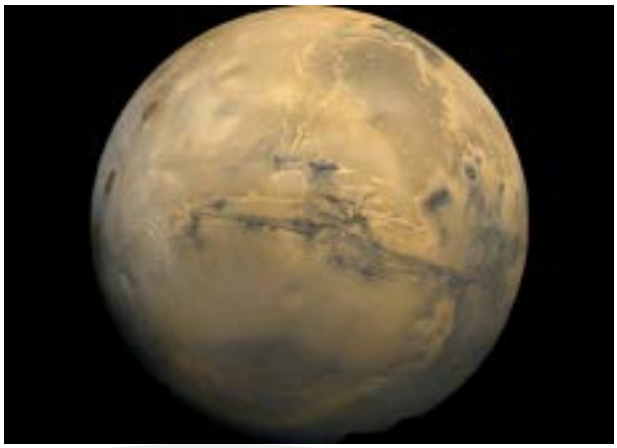
Cosmological simulations have predicted that more than 60% of the hydrogen created during the Big Bang lies within these giant filaments. Prior work also indicates that, where these filaments cross, galaxies form and are fed by rivers of gas.

Much of the evidence for the cosmic web has remained circumstantial, however. Direct observations of these filaments have remained elusive because the gas within them is barely detectable.

Now astronomers have directly detected the cosmic web with the help of intense light from young, star-forming galaxies.

"I originally did not expect to see such cosmic web filaments ... they were thought to be much fainter and very hard to see," study lead author Hideki Umehata, an astronomer at the RIKEN Cluster for Pioneering Research in Saitama, Japan, told Space.com. The scientists focused on the SSA22 Protocluster, which lies about 12 billion light-years away from Earth in the constellation Aquarius. A protocluster is a group of hundreds to ....Read More...

We could feed one million people living in colonies on Mars



NASA

With bugs, algae and other resource-efficient foods we could feed one million people on Mars within a century of arriving there. Scientists even invented a martian diet.

In the science fiction novel and movie The Martian, a stranded astronaut survives more than 500 days on Mars by growing potatoes. A permanent human settlement on Mars would need to do much better. And according to a computer model created by planetary scientists, that's actually an attainable goal. With the right food sources, we could grow a million-person population on Mars that doesn't depend on food shipped from Earth in about a hundred years, a recent paper in the journal New Space reports.

Companies like SpaceX have made exciting steps toward the possibility of humans on Mars, says Kevin Cannon, a planetary scientist at the University of Central Florida and lead author of the study. But beyond the challenge of getting humans to Mars in the first place, there's a lot of work left to figure out how to make a self-sufficient, functioning society there.

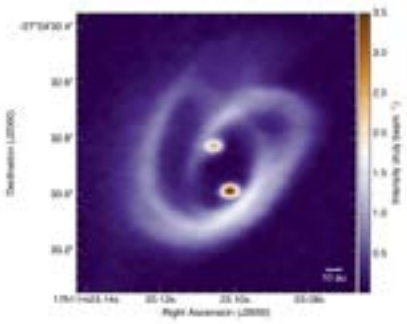
"I think, looking in the long term, the real challenge is to start producing everything you need from the local materials on Mars," Cannon says.

Farming on Mars

Cannon and colleagues modeled the food needs of a human population on Mars that grows to one million over about a hundred Earth years through a combination of immigration and reproduction. Though the settlement would need to import a lot of food at the start, it could transition to an entirely Martian-grown diet in about a century with the right food choices, they found.

The major limiting factor is space — or rather, the ability to create spaces suitable for growing food. On Earth, the amount of available arable land restricts our ability to grow food, whether plants, animals or something else. On Mars, we'd have to create these spaces — enclosed, pressurized and heated structures. For efficiency's sake...Read More...

Astronomers observe how two suns collect matter in a binary system



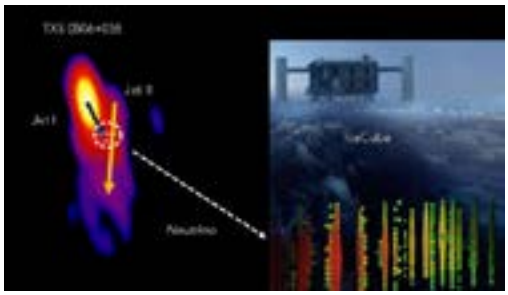
Cosmic delivery room: This picture shows Barnard 59, part of a vast dark cloud of interstellar dust called the Pipe Nebula. The proto-binary systems [BHB2007] 11 studied with high-resolution images is embedded in dense clouds, but can be observed at longer wavelengths with the radio telescope ALMA (Atacama Large Millimeter/submillimeter Array). Credit: ESO

Stars are born in the midst of large clouds of gas and dust. Local densifications first form "embryos," which then collect matter and grow. But how exactly does this accretion process work? And what happens when two stars form in a disk of matter? High-resolution images of a young stellar binary system for the first time reveal a complex network of accretion filaments nurturing two protostars at the center of the circumbinary disk. With these observations, an international team of astronomers led by the Max Planck Institute for Extraterrestrial Physics was able to identify a two-level accretion process, circumbinary disk to circumstellar disk to stars, constraining the conditions leading to the formation and evolution of binary star systems.

Most stars in the universe come in the form of pairs—binaries—or even multiple star systems. Now, the formation of such a binary star system has been observed for the first time with high-resolution ALMA (Atacama Large Millimetre/submillimeter Array) images. An international team of astronomers led by the Max Planck Institute for Extraterrestrial Physics targeted the system [BHB2007] 11, the youngest member of a small cluster of young stellar objects in the Barnard 59 core in the Pipe nebula molecular cloud. While previous observations showed an accretion envelope surrounding a circumbinary disk, the new observations now also reveal its inner structure.

"We see two compact sources, that we interpret as circumstellar disks around the two young stars," explains Felipe Alves from MPE, who led the study. "The size of each of these disks is similar to the asteroid belt in our Solar System, and their mutual distance is about 28 times the distance between the Earth and the Sun." Both protostars are surrounded by a circumbinary disk with a total mass of about 80 Jupiter masses, which shows a complex network of dust structures distributed in spiral shapes. The shape of the filaments suggest streamers of in-falling material, which is confirmed by the observation of molecular emission lines. ...Read More...

Neutrino produced in a cosmic collider far away



TXS 0506+056. The neutrino event IceCube 170922A appears to originate in the interaction zone of the two jets. Credit: IceCube Collaboration, MOJAVE, S. Britzen, & M. Zajaček

The neutrino event IceCube 170922A, detected at the IceCube Neutrino Observatory at the South Pole, appears to originate from the distant active galaxy TXS 0506+056, at a light travel distance of 3.8 billion light years. TXS 0506+056 is one of many active galaxies and it remained a mystery why and how only this particular galaxy generated neutrinos so far.

An international team of researchers led by Silke Britzen from the Max Planck Institute for Radio Astronomy in Bonn, Germany, studied high-resolution radio observations of the source between 2009 and 2018, before and after the neutrino event. The team proposes that the enhanced neutrino activity during an earlier neutrino flare and the single neutrino could have been generated by a cosmic collision within TXS 0506+056. The clash of jet material close to a supermassive black hole seems to have produced the neutrinos.

The results are published in Astronomy & Astrophysics, October 02, 2019.

On July 12, 2018, the IceCube collaboration announced the detection of the first high-energy neutrino, IceCube-170922A, which could be traced back to a distant cosmic origin. While the cosmic origin of neutrinos had been suspected for quite some time, this was the first neutrino from outer space whose origin could be confirmed. The 'home' of this neutrino is an Active Galactic Nucleus (AGN)—a galaxy with a supermassive black hole as central engine. An international team could now clarify the production mechanism of the neutrino and found an equivalent to a collider on Earth: a cosmic collision of jetted material.

AGNs are the most energetic objects in our Universe. Powered by a supermassive black hole, matter is being accreted and streams of plasma (so-called jets) are launched into intergalactic space. BL Lac objects form a special class of these AGNs, where the jet is directly pointing at us and dominating the observed radiation. The neutrino event IceCube-170922A appears to originate from the BL Lac object TXS 0506+056, a galaxy at a redshift of z=0.34, corresponding to a light travel distance of 3.8 billion light years. An analysis of archival IceCube data by the IceCube Collaboration had revealed evidence of an enhanced neutrino acitvity earlier, between September ..Read More...

Beyond Einstein: Physicists solve mystery surrounding photon momentum

A photo of the COLTRIMS reaction microscope built by Alexander Hartung as part of his doctoral research in the experiment hall of the Faculty of Physics. Credit: Alexander Hartung

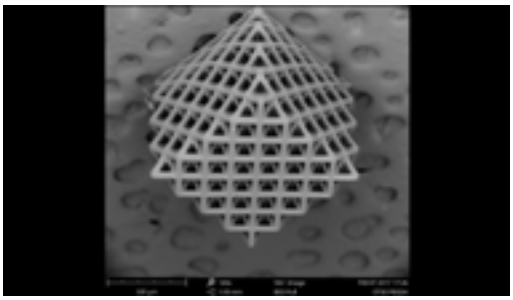
Albert Einstein received the Nobel Prize for explaining the photoelectric effect: in its most intuitive form, a single atom is irradiated with light. According to Einstein, light consists of particles (photons) that transfer only quantised energy to the electron of the atom. If the photon's energy is sufficient, it knocks the electrons out of the atom. But what happens to the photon's momentum in this process? Physicists at Goethe University are now able to answer this question. To do so, they developed and constructed a new spectrometer with previously unattainable resolution.

Doctoral student Alexander Hartung became a father twice during the construction of the apparatus. The device, which is three meters long and 2.5 meters high, contains approximately as many parts as an automobile. It sits in the experiment hall of the Physics building on Riedberg Campus, surrounded by an opaque, black tent inside which is an extremely high performing laser. Its photons collide with individual argon atoms in the apparatus, and thereby remove one electron from each of the atoms. The momentum of these electrons at the time of their appearance is measured with extreme precision in a long tube of the apparatus.

The device is a further development of the COLTRIMS (Collision Optical Laser Testing Reaction Interacting Momentum System) principle that was invented in Frankfurt and has meanwhile spread across the world: it consists of ionising individual atoms, or breaking up molecules, and then precisely determining the momentum of the particles. However, the transfer of the photon momentum to electrons predicted by theoretic calculations is so tiny that it was previously not possible to measure it. And this is why Hartung built the "super COLTRIMS."

When numerous photons from a laser pulse bombard an argon atom, they ionise it. Breaking up the atom partially consumes the photon's energy. The remaining energy is transferred to the released electron. The question of which reaction partner (electron or atom nucleus) conserves the momentum of the photon has occupied physicists for over 30 years. "The simplest idea is this: as long as the electron is attached to the nucleus, the momentum..Read More...

New 3-D-printed lattice designs defy conventional wisdom on metamaterials



Scanning electron microscopy images of a classic octet lattice and topologically optimized, isotropic oblate and quasi-spherical octahedral lattice built with a projection micro-stereolithography 3-D-printing technique. Credit: Lawrence Livermore National Laboratory

Lawrence Livermore National Laboratory (LLNL) researchers have designed a new class of 3-D-printed lattice structures that combine lightweight and high stiffness, despite breaking a rule previously thought to be required to exhibit such properties. One of the new structures additionally displays perfectly uniform response to forces in all directions.

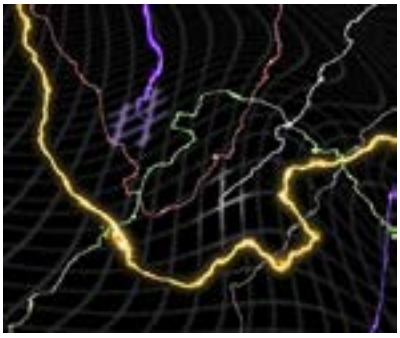
As described in a paper published today by Science Advances, an LLNL team co-led by engineer Seth Watts used topology optimization software that Watts wrote to create two unique unit cell designs composed of micro-architected trusses, one of which was designed to have isotropic (identical and omnidirectional) material properties. These new structures were then fabricated and tested, and were found to outperform the octet truss, a standard geometric pattern for 3-D-printed lattice structures.

To the researchers' surprise, the trusses appeared to violate the Maxwell criterion, a theory of structural rigidity used in mechanical design that posits that the most efficient load-bearing structures deform only by stretching. In such structures, stiffness scales linearly with density—cutting the structure's weight in half only reduces its stiffness by half, as opposed to less efficient structures whose stiffness would be reduced by three-quarters or seven-eighths. This linear scaling enables the creation of ultra-lightweight, ultra-stiff mechanical metamaterials.

"We have found two trusses that have linear scaling of stiffness with density when the conventional wisdom—this Maxwell criterion rule—is not satisfied," co-lead author Watts explained. "It had been believed that the Maxwell criterion was both necessary and sufficient to show that you had high stiffness at low density. We've shown that it is not a necessary condition. In other words, there is a larger class of trusses that have this linear scaling property.

"It shows that what was the previous orthodoxy is not firm," Watts added. "There are exceptions, and the exceptions actually can get you better properties." ...Read More...

Is it possible to borrow energy from an empty space?



According to quantum physics, empty space is more complicated than one might think.

Energy is a quantity that must always be positive - at least that's what our intuition tells us. If every single particle is removed from a certain volume until there is nothing left that could possibly carry energy, then a limit has been reached. Or has it? Is it still possible to extract energy even from empty space?

Quantum physics has shown time and again that it contradicts our intuition - and this is also true in this case. Under certain conditions negative energies are allowed, at least in a certain range of space and time.

An international research team at the TU Vienna, the Universite libre de Bruxelles (Belgium) and the IIT Kanpur (India) have now investigated the extent to which negative energy is possible. It turns out that no matter which quantum theories are considered, no matter what symmetries are assumed to hold in the universe, there are always certain limits to "borrowing" energy. Locally, the energy can be less than zero, but like money borrowed from a bank, this energy must be "paid back" in the end.

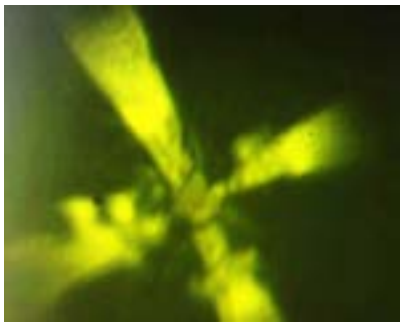
Repulsive Gravity

"In the theory of general relativity, we usually assume that the energy is greater than zero, at all times and everywhere in the universe," says Prof. Daniel Grumiller from the Institute for Theoretical Physics at the TU Wien (Vienna). This has a very important consequence for gravity: Energy is linked to mass via the formula E=mc. Negative energy would therefore also mean negative mass. Positive masses attract each other, but with a negative mass, gravity could suddenly become a repulsive force.

Quantum theory, however, allows negative energy. "According to quantum physics, it is possible to borrow energy from a vacuum at a certain location, like money from a bank," says Daniel Grumiller. "For a long time, we did not now about the maximum amount of this kind of energy credit and about possible interest rates that have to be paid. Various assumptions about this "interest" (known in the literature as "Quantum Interest") have been published, but no comprehensive result has been agreed upon.

The so-called "Quantum Null Energy Condition" (QNEC), which was proven in 2017, prescribes certain limits for the "borrowing" of energy by linking relativity theory and quantum physics: An energy smaller than ..Read More...

Molecular hydrogen becomes semimetallic at pressures above 350 GPa



Credit: Eremets et al.

According to condensed matter physics predictions, at a high enough pressure, hydrogen should dissociate and transform into an atomic metal. However, the exact pressure range at which this occurs has not yet been ascertained, and the process through which hydrogen becomes a metal is still somewhat unclear.

In a recent study, researchers at the Max Planck Institute of Chemistry demonstrated that at a pressure of 350-360 GPa and at temperatures below 200K, molecular hydrogen starts to conduct and becomes semimetallic. Their paper, published in Nature Physics, provides interesting new insight about the transition of hydrogen at high pressures, unveiling some of the properties it acquires.

"Typically, metallic hydrogen is considered to be atomic hydrogen—a crystal built from protons after dissociation of the molecules," Mikhail Eremets, one of the researchers who carried out the study, told Phys.org. "However, hydrogen can also transform into a metal in the molecular state—in this case, electronic bands of molecular hydrogen crystal broaden and eventually overlap so that the band gap closes, free electrons and holes appear—this is metallic state."

The initial state in which the electronic bands of molecular hydrogen crystal overlap is known as semimetal. In this state, the metal has poor conductivity, as the number of carriers is low. If the pressure is increased further, however, this poorly conducting metal turns into a normal metal and eventually into atomic hydrogen.

"Our objective was to find the pressure at which metallic electrical conductivity appears, and if this results in a molecular or atomic metal," Eremets said. "We thus performed electrical measurements, as this is the only method that directly tells us whether hydrogen conducts and if it is a metal. A metal typically conducts to the lowest temperatures; a semiconductor can also conduct, but at lower temperatures, conductivity exponentially decreases and disappears."

In their experiments, the researchers gathered Raman measurements up to 480 GPa to identify changes that take place in hydrogen at different pressures. They found that hydrogen started to conduct at pressures above 360 GPa, but it remained a semimetal up until 440 GPa. ...Read More..

Elon Musk's Starship may be more moral catastrophe than bold step in space exploration

An artist concept of the Starship following separation from the first stage Super Heavy. Credit: SpaceX/flickr

Elon Musk, founder of private space-faring company SpaceX, recently unveiled his new Starship craft. Amazingly, it is designed to carry up to 100 crew members on interplanetary journeys throughout the solar system, starting with Mars in 2024.

The announcement is exciting, invoking deep emotions of hope and adventure. But I can't help having a number of moral reservations about it.

Musk has declared a fascinatingly short time line to achieve orbit with this rocket. He wants to build four or five versions of the vehicle in the next six months. The first rocket will do a test launch to 20km within a month, and the final version will orbit the Earth.

Whether this is possible remains to be seen. Bear in mind that in the early 1960s when the then US president, John F Kennedy, announced the race to the moon, it took nearly a decade to achieve and several crew members died during the testing phases.

Despite this, it has been an important goal since the beginning of the space age for people to travel between planets—helping us to explore, mine and colonize the solar system.

Planetary protection

There are many reasons to believe SpaceX will succeed. The company has been extremely impressive in its contribution to space, filling a gap when government agencies such as NASA could not justify the spending. It's not the rocket technology that I doubt, my concern is mainly astrobiological.

If life exists elsewhere in our universe, the solar system is a good place to start looking—enabling us to touch, collect and analyze samples in a reasonably short time. Along with some of Jupiter's and Saturn's moons, Mars is one of the top contenders for hosting some sort ...Read More...

Artemis Generation takes on NASA Student Launch: 64 teams to compete

The rocket named No Promises from North Carolina State University in the 2019 competition roars off the launch pad.

The quiet fields of North Alabama await the high-flying rockets of teams competing in the 20th year of NASA Student Launch. Before those rockets can fly, though, they have to be designed, built and tested by middle and high school, and college and university teams - members of the Artemis generation. These young scientists and engineers will lead the way as we explore first the Moon on the Artemis missions and then Mars.

On Oct. 3, NASA announced the 64 teams from 21 states and Puerto Rico participating in the 2020 NASA Student Launch competition.

The eight-month program requires the student teams to design, build, test and fly a payload and high-powered amateur rocket between 4,000 and 5,500 feet in altitude. All teams must meet multiple documentation and presentation milestones with NASA rocketry experts as they develop their rocket.

New to the competition this year is the college division's payload challenge. In the past, the teams were given payload options to develop - such as a rover or unmanned aerial vehicle. This year, though, the teams must collect 10 milliliters of simulated lunar ice from one of five sample locations around the launch field, then navigate at least 10 feet away from the site with the sample safely stored aboard the vehicle.

How they complete the mission is up to them. The payload task resembles aspects of mission design and planning faced by NASA and industry engineers when exploring planetary bodies, such as the Moon, which has water ice at its south pole.

Teams in the middle/high school division can choose to complete in the college division payload challenge or they can develop a scientific or engineering payload of their own design. In last year's competition, Plantation High School from Plantation, Florida, ran an experiment to test the signal strength difference between a ground station antenna pointing directly at their rocket during its flight versus a ground station antenna that remained vertical during the vehicle's flight. ...Read More...

Special Read:

What is dark energy?

A view of the distant universe produced by the Hubble Space Telescope, combining observations of the field from 2002 to 2012. NASA / ESA / IPAC / CALTECH / STSCI /Arizona State University

The mysterious force is pushing galaxies apart and causing the universe to expand at an accelerating rate.

We've known for decades that the universe is expanding. The idea lies at the heart of the Big Bang model of the cosmos, which dates to the 1920s.

But in 1998, scientists made an astounding discovery: The universe isn't simply expanding but is expanding at an accelerating rate. No one knows exactly what's pushing galaxies apart, but that hasn't stopped physicists from naming this mysterious force.

They call it "dark energy."

We can't see dark energy. We can't feel it or detect it in any way even with sophisticated scientific instruments. But most astronomers are convinced it exists because we can see its effects in the movement of galaxies.

The Big Bang created all of the matter in the universe — from which galaxies eventually formed — and sent it spreading through space at great speed. In the absence of any additional force propelling galaxies apart, their mutual gravitational attraction would cause them to gradually slow down and perhaps reverse course — think of how a baseball thrown straight up into the air slows down and then falls back to Earth.

But astronomical observations show that the galaxies are moving apart from one another at ever-increasing speed. If this continues for trillions of years, the universe could wind up as a cold, dark void utterly devoid of life and even light itself. It's a fate physicists call the heat death of the universe.

Do we have any idea of what dark energy might be?

One possibility is that it's a fundamental aspect of space itself, which despite the way it's ordinarily thought of really isn't empty at all. Instead, physicists think that it's pulsing with subatomic particles that constantly pop into and out of existence — and it's thought that this "quantum foam" gives rise to dark energy.

Not all physicists are on board with this concept. A few doubt the very existence of dark energy, arguing that the movements of the galaxies can be explained by a tweaked version of Einstein's theory of gravity, which is known as general relativity. But to most, that's a long shot.

"Einstein has been right for 100 years — so to claim that his theory needs a correction is extraordinary," says University of Michigan cosmologist Dragan Huterer. "And extraordinary claims require extraordinary new findings" to be taken seriously.

How much of the universe is dark energy?

A lot. Dark energy is thought to account for most of the stuff (matter and energy) in the universe. "If you think of the universe as a pie, 75 percent of the pie is dark energy, and just 5 percent is the stuff that we. ..Read More...

This Week's Sky at a Glance - Oct. 05-11, 2019

Oct. 05	Sa	20:01	Moon South Dec.: 22.8° S
		20:47	First Quarter
		22:49	Moon Descending Node
Oct. 06	Su	00:48	Moon-Saturn: 0.3° N
Oct. 10	Th	22:29	Moon Apogee: 405900 km

The 15th Gulf Astronomy Colloquium (Sep. 27- 28, 2019)

The 15th Gulf Astronomy Colloquium organized by the Sharjah Academy for Astronomy, Space Sciences, and Technology (SAASST) during the period Sep. 27-29, 2019, has been a great success. During three days, amateurs and professional astronomers, and teachers were presenting, exchanging, and working together to advance the field of astronomy in the Gulf area. Nineteen papers were presented during the three days: three by the amateurs, eleven by the professional, and five for the teachers.

For the amateurs session (Sep. 27), the discussion was about how to teach astronomy to school children and how to use the available tools (planetarium and astronomy centers) to attract students to the field, especially the very young ones. An open discussion concluded the session where all the participants exchanged ideas and means to improve teaching astronomy. The participants emphasized the use of technology (media, tablets, etc.) to attract students to astronomy.

For the professional session (Sep. 28), HE Prof. Hamid Al-Naimiy, the Chancellor of the University of Sharjah and General Director of SAASST opened the meeting with a talk about the five-year strategic plan of the University of Sharjah as well as about the different units (planetarium, research, academics, IT, and administration) of the academy. HE Dr. Eng. Mohamed Al-Ahbabi, the General Director of the UAE Space Agency (UAESA) presented the space sciences vision of the UAESA, emphasizing on the launch of the first Emirati astronaut Mr. Hazza Al-Mansouri, and also the Mars Hope mission of 2020 as well as the Martain City program of 2117. The remaining interventions were related to the different research areas of astronomy, black holes, binary stars, Gamma-Ray Bursts, stellar evolution, and exoplanets. It is to be said that in the Gulf area, astronomy is well covered in terms of all of its research fields and also in terms of instruments. The audience was delighted to see that SAASST was able to build several tools to do space sciences research, i.e., a 5-m radio dish to observe at 1.4 GHz, an optical observatory with three different telescopes (45, 18, and 10 cm) to observe in the visual, a GNSS station to check the GPS signals, a CADI ionosonde to study the ionosphere, the UAE Meteor Monitoring Network to observe space debris, and a 20.1 MHz decametric radio telescope to observe the Sun, Jupiter, the Milky Way background radiation.

The last day (Sep. 29) of the colloquium was the Teachers Workshop. More than 90 teachers from the public and private schools attended a full day of presentation (theoretical and hands-on experiments). The teachers were exposed to the motion of the Sun and Moon, stellar evolution, the use of telescopes, astronomy misconception, and also about digital astronomy and mobile learning. The presentations were given by astronomy professors from the University of Sharjah and by the SAASST planetarium staff. The teachers found the workshop extremely informative and were surprised to see that SAASST has all the tools for their students to come and learn space sciences. A request to see more of these workshops at the academy has been suggested by the teachers.

Memories of 15th Gulf Astronomy Colloquium (Sep. 27-29, 2019)


SHARJAH ACADEMY FOR
ASTRONOMY, SPACE SCIENCES
AND TECHNOLOGY
أكاديمية الشارقة
لعلوم وتكنولوجيا الفضاء
والفلك
World Space
Week UAE
"The Moon: Gateway to the Stars."
Oct. 5, 2019 Time: 16:00 to 21:00
Oct. 6 to 9, 2019 Time: 09:00 to 15:00
Location: SAASST
Strategic Partner
وكالة الإمارات للفضاء
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