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Astronomy & Physics Weekly News

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Top News

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Is it aliens? Scientists detect more mysterious radio signals from distant galaxy

Researchers using the Green Bank Telescope in West Virginia announced the detection of 15 pulses of radio energy from an object known to the astronomy community as FRB 121102.Andrew Caballero-Reynolds / AFP-Getty Images

For the past decade, scientists have been puzzling over powerful, millisecond-long flashes of energy from deep space. Some scientists think these "fast radio bursts," or FRBs, come from natural sources, such as newborn neutron stars or black holes. Others think they could be signals from alien civilizations.

One thing's for sure: FRBs are more common than we realized. In the latest discovery, scientists working as part of a $100-million initiative known as Breakthrough Listen used artificial intelligence to detect dozens of additional FRBs coming from FRB 121102, an as-yet-uncharacterized source in a galaxy 3 billion light-years from Earth.

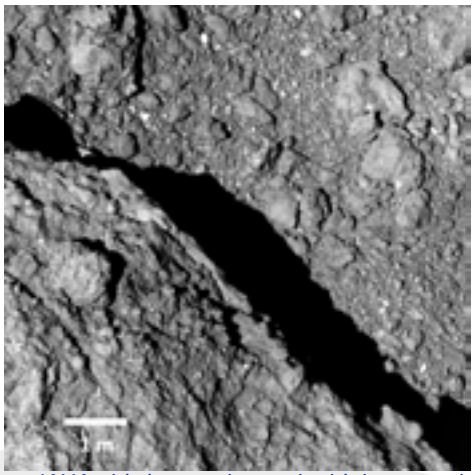
The work is the first step in the initiative's grander plans for using AI to find hidden patterns in the bigger sea of cosmic signals that come our way — research that could finally provide an answer to that eternal question: Are we alone in the universe?

"It's a great way of developing the kinds of techniques that we ultimately want to use to find other types of signals that might come from extraterrestrial intelligence," says Andrew Siemion, principal investigator for Breakthrough Listen and director of the Search for Extraterrestrial Intelligence (SETI) Research Center at the University of California, Berkeley.

In August 2017, the Breakthrough Listen team discovered 21 fast radio bursts from FRB 121102 during five hours of observations made by a radio telescope in Green Bank, West Virginia. In their latest study, which will be published in an upcoming issue of the Astrophysical Journal, the researchers deployed a specialized AI technique known as deep learning to see if any signals had been overlooked in their initial research.

Siemion gave Yunfan "Gerry" Zhang, a doctoral student at Berkeley, the job of training a deep learning algorithm to hunt for the additional bursts. The trained AI was turned loose to sort through 400 terabytes of observational data — a huge trove containing about as much data as is contained in 40,000 hours of 4K video. ...Read More...

Latest images via Japanese rovers on asteroid Ryugu



According to JAXA, this image shows the highest resolution so far of the surface of asteroid Ryugu. It was captured as Hayabusa2 was descending on September 21, 2018 for the deployment of the rovers. Altitude was about 210 ft (64 meters) from the space rock. Bottom left is a large boulder. Image via JAXA, University of Tokyo, Kochi University, Rikkyo University, Nagoya University, Chiba Institute of Technology, Meiji University, Aizu University, AIST).

Japan's space agency JAXA released new images from the rovers set down on the surface of asteroid Ryugu by the Hayabusa2 spacecraft.

A video depicts the sun passing overhead as seen from the surface of asteroid Ryugu. Isn't it amazing? It was made from images acquired by the MINERVA II-1 rover 1B, one of two rovers carried to the asteroid by the Japanese Hayabusa2 spacecraft. JAXA, Japan's space agency, announced on Saturday, September 22, 2018, that two rovers had set down successfully on asteroid Ryugu, hundreds of millions of miles from Earth. It released more new images on September 27, which we've included on this page.

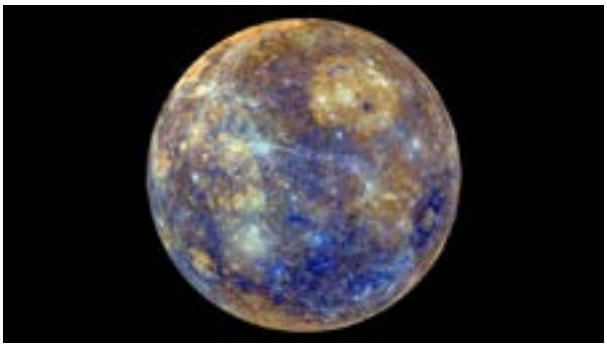
Ryugu is a space rock with a diameter of less than a mile (about 1 km) and classified as a potentially hazardous asteroid, with an orbit that occasionally brings it into Earth's vicinity.

The spacecraft traveled for four years before encountering Ryugu. The images on this page have been released over the past week by JAXA, some taken by the rovers as they were ejected from the mother spacecraft, and others captured as one of the probes bounced or hopped on the asteroid's surface.

The encounter and release of the small rovers occurred early on September 21 at a distance of 194 million miles (313 million km) from Earth.

Hayabusa2 arrived at asteroid Ryugu on June 27, 2018. Afterwards, for several weeks, the spacecraft remained at a distance of about 12 miles (20 km) above the asteroid. During the week of July 16, operations were begun to lower this hovering altitude, eventually bringing the spacecraft to less than 4 miles (6 km) from the ...Read More...

Mercury's strange chemistry revealed



Mercury in false color, to visually enhance the chemical, mineralogical and physical differences between the rocks that make up Mercury's surface. Image via NASA/JHU-APL/Carnegie Institution of Washington.

Mercury, the smallest terrestrial (rocky) planet and closest to the sun, is relatively close to Earth, yet there is much that we still don't know about it. Next month, the joint ESA-JAXA BepiColombo mission will be launched to this enigmatic world – but in the meantime, there are two new peer-reviewed studies that are helping to shed more light on Mercury's mysteries. The new findings were announced by Europlanet on September 18, 2018 and presented at the European Planetary Science Congress 2018 in Berlin by Bastien Brugger and Thomas Ronnet, both of whom are scientists at the University of Aix Marseille in France.

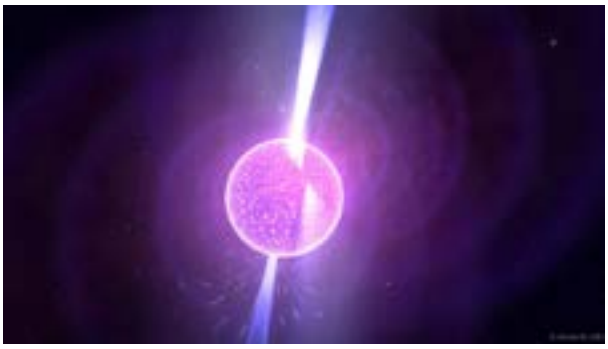
Scientists have known for some time that Mercury is rather strange – it is significantly smaller than the other terrestrial planets, it is very dense, it has an oversized molten core and it was formed under chemical conditions that determined it would contain much less oxidized material than the other rocky planets. Mercury even has ice deposits near its north pole, despite the fact that most of the surface is hot enough to melt lead. Because there is virtually no atmosphere to speak of, permanently shadowed areas can be as cold as -274° F (-170° C). Brrr!

When thinking of Mercury's climate, it's good to recall that its axis of rotation is perpendicular to the plane in which it orbits the sun. In other words, Mercury has almost no axial tilt, compared to Earth's axial tilt of 23.4 degrees.

The first study helps to explain why Mercury is so weird. The research, by a team at the University of Aix Marseille, shows that the planet may have formed very early in the solar system's history, from condensed vapor from planetesimals. There may also be more iron within Mercury's mantle than measurements of the surface had previously suggested. Earlier studies, thanks to the MESSENGER mission, had suggested that Mercury is very rich in iron, but also contains more sulphur than should have been available in the material from which the bulk of the solar system formed – another puzzle. As explained by Ronnet:

We think that very early in the solar system, planetesimals in the innermost region of the solar system could have formed from reprocessed material that ...Read More...

What's going on around this strange neutron star?



Neutron stars are the hot, rapidly rotating remnants of massive stars. Many are pulsars, which send out radio signals that happen to coincide with Earth, like seeing the light from a lighthouse. Kevin Gill

Astronomers just discovered an unusual heat signature around an isolated neutron star for the first time, and they're not sure what's causing it.

Neutron stars, the end-stage remnants of massive stars, are high-energy objects. They're usually studied in X-rays, some of the most energetic light in the universe. Neutron stars also give off radio emissions, most famously as pulsars. But now, infrared emission around a neutron star detected with the Hubble Space Telescope has sparked curiosity, indicating that astronomers may want to add infrared light to their neutron star-studying toolkit.

Heat sensor

Infrared detectors are the night-vision goggles of astronomy. These instruments pick up heat, which allows astronomers to punch through dust (which is cool) and view objects that are otherwise hidden from sight. Infrared light can also come from "reprocessed" emission, or higher-energy light that is absorbed by dust and then re-emitted at longer wavelengths.

In a paper published September 17 in the Astrophysical Journal, a team of researchers reports the discovery of infrared emission from an area around the pulsar RX J0806.4-4123. "This particular neutron star belongs to a group of seven nearby X-ray pulsars — nicknamed 'the Magnificent Seven'," said Bettina Posselt of Penn State and the lead author of the paper in a press release. The Magnificent Seven, she said, "are hotter than they ought to be."

That's already unusual, but in addition, "we observed an extended area of infrared emissions around this neutron star ... the total size of which translates into about 200 astronomical units (or 2.5 times the orbit of Pluto around the Sun) at the assumed distance of the pulsar," she said. While extended emission around neutron stars has been seen before, RX J0806.4-4123 is the first neutron star to show this type of emission only in the infrared, rather than at other wavelengths. That's unique, and spurred the researchers to develop two possible theories for what's going on around the distant stellar ember. ...Read More...

Milky Way nearly collided with a smaller galaxy in cosmic fender bender

A new study of stars in the Milky Way reveals evidence of a cosmic near miss collision with a smaller galaxy sometime in the last billion years.
ESA

In a contest between our galaxy and the Sagittarius dwarf, the winner is clear... unless you were an unlucky star. Our Milky Way galaxy holds hundreds of billions of stars. Many of those suns were formed locally from clouds of gas — at the rate of handful every year —over billions of years. But our home galaxy gets stars another way, too. It steals them.

The Milky Way has cannibalized smaller galaxies throughout the eons, adding them to our cosmic ranks whenever one strays too close. But sometime in the past billion years, one of those meals got away — though the struggle left a mark.

A new study published Wednesday in Nature has tracked the motion of more than six million stars in our galaxy using the European Space Agency's Gaia spacecraft. The research reveals that the Milky Way nearly collided with another nearby galaxy — called the Sagittarius dwarf galaxy — sometime in the past 300 to 900 million years. This cosmic "fender bender" set millions of stars moving like ripples on a pond, the authors say.

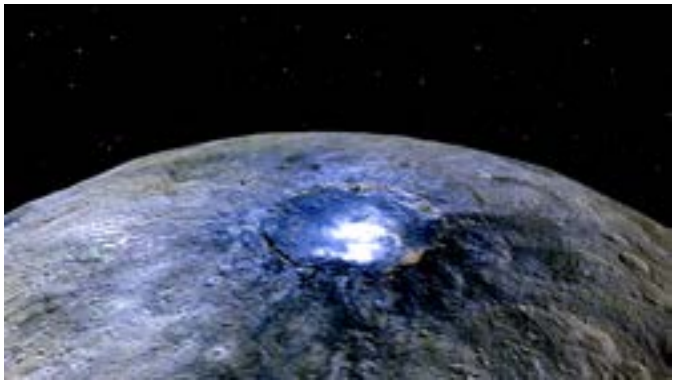
Gaia Mapping

The European team of astronomers behind the discovery says they were able to pick out the event because the Gaia spacecraft doesn't just accurately measure the positions of stars; it also precisely picks out how fast they're traveling across the sky.

Teresa Antoja of the University of Barcelona led the team. And she says she could hardly believe her eyes after she plotted the star positions and their movement on her computer. A surprising, snail shell-like pattern appeared on her screen that looked unlike anything astronomers had seen before.

"At the beginning the features were very weird to us," Antoja said in a media release. "I was a bit ..Read More...

Volcanoes of mud erupt from dwarf planet Ceres



NASA/JPL-Caltech/UCLA/MPS/DLR/IDA

The largest object in the asteroid belt is an active world unlike any other in the solar system.

Nothing is normal on Ceres — least of all its mud volcanoes.

In new research published in Nature Astronomy, a large team of astronomers has laid out a new view of the weirdest world in our solar system. It seems that Ceres has had a busy last few billion years — including random smatterings of volcanism, but of a type seen nowhere else in the solar system.

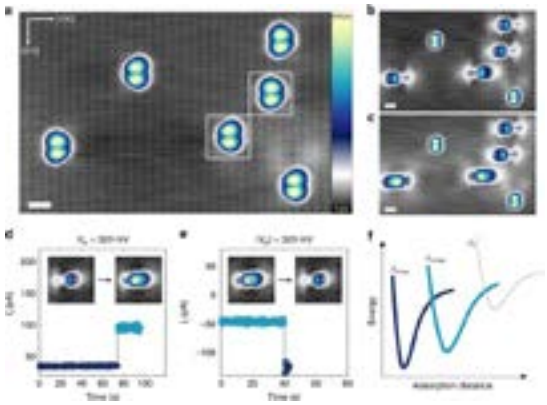
Ceres is the largest world in the asteroid belt, and is believed to be a remnant proto-planet, or the kind of small worlds that served as the building blocks of the planets we see today. There's abundant evidence that Ceres may have once had an ocean that's since frozen over, and the tantalizing clues to a geologically active history.

Ceres even appears to have a form of volcanism. There are two types of volcanism in the solar system, typically: the kinds of magma eruptions seen on Earth and Jupiter's moon Io, where heated rock wells up from the core to the surface. And then there's the kind of volcanism seen on Europa and Enceladus, where large plumes of frozen water erupt. Scientists call this cryovolcanism.

Ceres' Mud Volcanoes

Hanna Sizemore, a Planetary Science Institute research scientist and author on the paper, says Ceres' volcanoes are a weird mix of the two. "The big difference on Ceres is that you're in this hybrid between the inner rocky solar system and the icy outer solar system," she says. That means that while water may be a driving mechanism for the volcanoes, the actual material could include rock, salt, and heated material from the interior of Ceres, which is both a rocky and an icy world at once. When those volcanoes explode, "It would probably look superficially like lava extrusion on the earth, but it would be mud oozing out of cracks or fissures on the surface," Sizemore says.
..Read More...

Scientists discover new mechanism for information storage in one atom

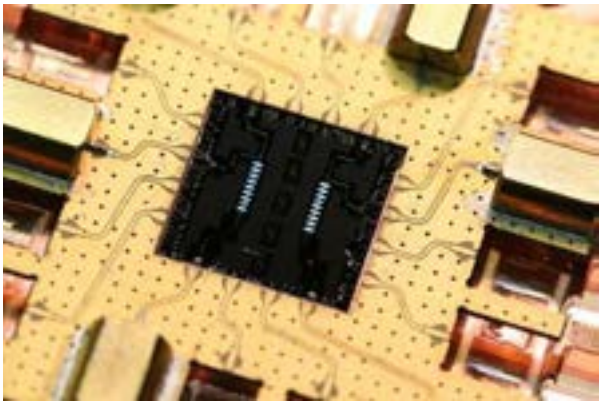


Adsorption and switching of Co on BP. a Six Co species on BP as deposited at T < 5 K (Vs = −400 mV, It = 20 pA, scale bar = 1 nm). Boxed atoms show species related through mirror plane along [010]. b Four atoms from a have been switched into JH,low (Vs = −400 mV, It = 20 pA, scale bar = 1 nm). c Two atoms from b have been switched into JH,high (Vs = −400 mV, It = 20 pA, scale bar = 1 nm). d Switching characteristics from JH,low to JH,high with Vs = 420 mV and e JH,high to JH,low with Vs = −680 mV. Approximate threshold biases for switching (Vth) are noted. Orange circles indicate the tip position during the switching sequence. The inset images showing before and after configurations are 4 nm × 4 nm in size. f Schematic representation of adsorption energy curves for Co species on BP. Credit: Nature Communications (2018). DOI: 10.1038/s41467-018-06337-4

Scientists at Radboud University discovered a new mechanism for magnetic storage of information in the smallest unit of matter: a single atom. While the proof of principle was demonstrated at very low temperatures, this mechanism shows promise for room temperature operation. In this way, it will be possible to store a thousands of times more information than in current hard drives. Their findings are published today in Nature Communications.

As our current computing architecture is not getting much faster and using a lot of power, combined with the exploding demands to store information, researchers are interested in new strategies to store more information in an energy efficient way. One potential pathway is to store information at the ultimate scaling limit: a single atom. "Computers have reached fundamental limitations as to how much better they can get, creating a huge demand in materials research for alternatives. Modern computers use a lot of electricity, currently demanding more than 5 percent of the world's electricity. Fundamental science says we can gain a lot more in energy efficiency. We are focusing on a very basic component of modern computers: a bit of memory. We use atoms, because they are the smallest unit of matter and also enable us to further understand the fundamental science behind their behavior. Our current question: how can we store information within a single atom and how stable can we make that piece of information?", first author Brian Kiraly explains. ..Read More...

Superconducting metamaterial traps quantum light



A superconducting metamaterial chip mounted into a microwave test package. The purplish-violet reflection in the center is an optical effect that can seen by the naked eye, and is the result of the diffaction of light by the periodic patterning of the microwave metamaterial. Credit: Oskar Painter/Caltech

Conventional computers store information in a bit, a fundamental unit of logic that can take a value of 0 or 1. Quantum computers rely on quantum bits, also known as a "qubits," as their fundamental building blocks. Bits in traditional computers encode a single value, either a 0 or a 1. The state of a qubit, by contrast, can simultaneously have a value of both 0 and 1. This peculiar property, a consequence of the fundamental laws of quantum physics, results in the dramatic complexity in quantum systems.

Quantum computing is a nascent and rapidly developing field that promises to use this complexity to solve problems that are difficult to tackle with conventional computers. A key challenge for quantum computing, however, is that it requires making large numbers of qubits work together—which is difficult to accomplish while avoiding interactions with the outside environment that would rob the qubits of their quantum properties.

New research from the lab of Oskar Painter, John G Braun Professor of Applied Physics and Physics in the Division of Engineering and Applied Science, explores the use of superconducting metamaterials to overcome this challenge.

Metamaterials are specially engineered by combining multiple component materials at a scale smaller than the wavelength of light, giving them the ability to manipulate how particles of light, or photons, behave. Metamaterials can be used to reflect, turn, or focus beams of light in nearly any desired manner. A metamaterial can also create a frequency band where the propagation of photons becomes entirely forbidden, a so-called "photonic bandgap."

The Caltech team used a photonic bandgap to trap microwave photons in a superconducting quantum circuit, creating a promising technology for building future quantum computers. "In principle, this is a scalable and flexible substrate on which to build complex circuits for interconnecting certain types of qubits," says Painter ...Read More...

Ancient Mars had right conditions for underground life, new research suggests

New research shows that ancient Mars likely had ample chemical energy to support the kinds of underground microbial colonies that exist on Earth. Credit: NASA / JPL

A new study shows evidence that ancient Mars probably had an ample supply of chemical energy for microbes to thrive underground.

"We showed, based on basic physics and chemistry calculations, that the ancient Martian subsurface likely had enough dissolved hydrogen to power a global subsurface biosphere," said Jesse Tarnas, a graduate student at Brown University and lead author of a study published in Earth and Planetary Science Letters. "Conditions in this habitable zone would have been similar to places on Earth where underground life exists."

Earth is home to what are known as subsurface lithotrophic microbial ecosystems—SliMEs for short. Lacking energy from sunlight, these subterranean microbes often get their energy by peeling electrons off of molecules in their surrounding environments. Dissolved molecular hydrogen is a great electron donor and is known to fuel SLiMEs on Earth.

This new study shows that radiolysis, a process through which radiation breaks water molecules into their constituent hydrogen and oxygen parts, would have created plenty of hydrogen in the ancient Martian subsurface. The researchers estimate that hydrogen concentrations in the crust around 4 billion years ago would have been in the range of concentrations that sustain plentiful microbes on Earth today.

The findings don't mean that life definitely existed on ancient Mars, but they do suggest that if life did indeed get started, the Martian subsurface had the key ingredients to support it for hundreds of millions of years. The work also has implications for future Mars exploration, suggesting that areas where the ancient subsurface is exposed might be good places to look for evidence of past life.

Going underground

Since the discovery decades ago of ancient river channels and lake beds on Mars, scientists have been tantalized by the possibility that the Red Planet may once have hosted life. But while evidence of past water ..Read More...

Dust storms on Titan spotted for the first time

Artist's concept of a dust storm on Titan. Credit: IPGP/Labex UnivEarthS/University Paris Diderot - C. Epitalon & S. Rodriguez

Data from NASA's Cassini spacecraft has revealed what appear to be giant dust storms in equatorial regions of Saturn's moon Titan. The discovery, described in a paper published on Sept. 24 in Nature Geoscience, makes Titan the third Solar System body, in addition to Earth and Mars, where dust storms have been observed.

The observation is helping scientists to better understand the fascinating and dynamic environment of Saturn's largest moon.

"Titan is a very active moon," said Sebastien Rodriguez, an astronomer at the Université Paris Diderot, France, and the paper's lead author. "We already know that about its geology and exotic hydrocarbon cycle. Now we can add another analogy with Earth and Mars: the active dust cycle, in which organic dust can be raised from large dune fields around Titan's equator."

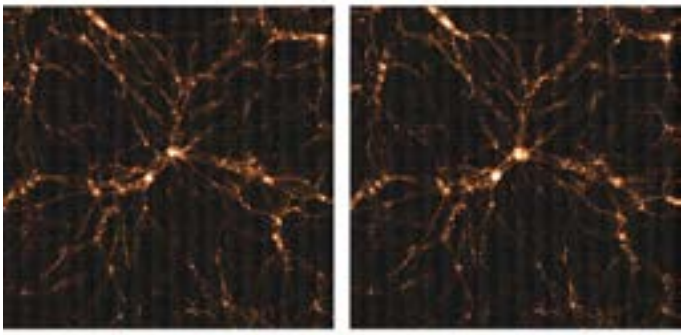
Titan is an intriguing world—in ways quite similar to Earth. In fact, it is the only moon in the Solar System with a substantial atmosphere and the only celestial body other than our planet where stable bodies of surface liquid are known to still exist.

There is one big difference, though: On Earth such rivers, lakes and seas are filled with water, while on Titan it is primarily methane and ethane that flows through these liquid reservoirs. In this unique cycle, the hydrocarbon molecules evaporate, condense into clouds and rain back onto the ground.

The weather on Titan varies from season to season as well, just as it does on Earth. In particular, around the equinox—the time when the Sun crosses Titan's equator—massive clouds can form in tropical regions and cause powerful methane storms. Cassini observed such storms during several of its Titan flybys.

When Rodriguez and his team first spotted three unusual equatorial brightenings in infrared images taken by Cassini around the moon's 2009 northern equinox ...Read More...

Hyper Suprime-Cam survey maps dark matter in the universe



The weak lensing surveys such as HSC prefer a slightly less clumpy Universe (left) than that predicted by Planck (right). The pictures show the slight but noticeable difference as expected from large computer simulations. Credit: Hyper Suprime-Cam Survey

Today, an international group of researchers, including Carnegie Mellon University's Rachel Mandelbaum, released the deepest wide field map of the three-dimensional distribution of matter in the universe ever made and increased the precision of constraints for dark energy with the Hyper Suprime-Cam survey (HSC).

The present-day universe is a pretty lumpy place. As the universe has expanded over the last 14 billion years or so, galaxies and dark matter have been increasingly drawn together by gravity, creating a clumpy landscape with large aggregates of matter separated by voids where there is little or no matter.

The gravity that pulls matter together also impacts how we observe astronomical objects. As light travels from distant galaxies towards Earth, the gravitational pull of the other matter in its path, including dark matter, bends the light. As a result, the images of galaxies that telescopes see are slightly distorted, a phenomenon called weak gravitation lensing. Within those distortions is a great amount of information that researchers can mine to better understand the distribution of matter in the universe, and it provides clues to the nature of dark energy.

The HSC map, created from data gathered by Japan's Subaru telescope located in Hawaii, allowed researchers to measure the gravitational distortion in images of about 10 million galaxies.

The Subaru telescope allowed them to see the galaxies further back in time than in other similar surveys. For example, the Dark Energy Survey analyzes a much larger area of the sky at a similar level of precision as HSC, but only surveys the nearby universe. HSC takes a narrower, but deeper view, which allowed researchers to see fainter galaxies and make a sharper map of dark matter distribution.

The research team compared their map with the fluctuations predicted by the European Space ...Read More...

One black hole or two? Dust clouds can explain puzzling features of active galactic nuclei

An artist's impression of what an active galactic nucleus might look like at close quarters. The accretion disk produces the brilliant light in the centre. The broad-line region is just above the accretion disk and lost in the glare. Dust clouds are being driven upwards by the intense radiation. Credit: Peter Z. Harrington

Researchers at the University of California, Santa Cruz (UCSC), believe clouds of dust, rather than twin black holes, can explain the features found in active galactic nuclei (AGNs). The team publish their results today (14 June) in a paper in Monthly Notices of the Royal Astronomical Society.

Many large galaxies have an AGN, a small bright central region powered by matter spiralling into a supermassive black hole. When these black holes are vigorously swallowing matter, they are surrounded by hot, rapidly-moving gas known as the "broad-line region" (so-called because the spectral lines from this region are broadened by the rapid motion of the gas).

The emission from this gas is one of the best sources of information about the mass of the central black hole and how it is growing. The nature of this gas is however poorly understood; in particular there is less emission than expected from gas moving at certain velocities. The breakdown of simple models has led some astrophysicists to think that many AGNs might have not one but two black holes in them.

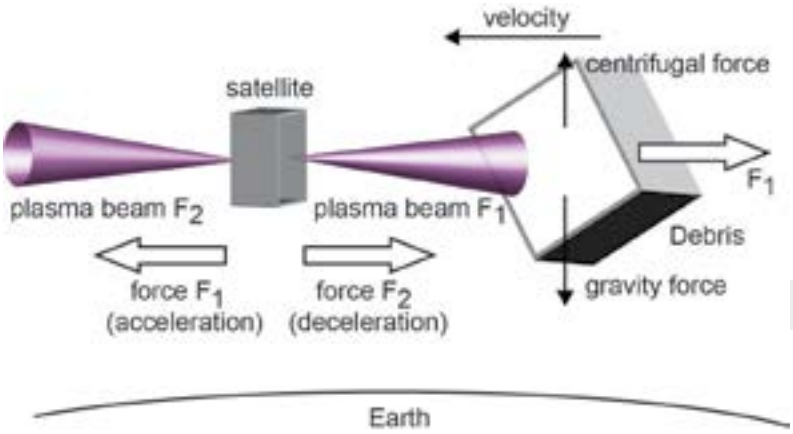
The new analysis is led by Martin Gaskell, a research associate in astronomy and astrophysics at UCSC. Rather than invoking two black holes, it explains much of the apparent complexity and variability of the emissions from the broad-line region as the results of small clouds of dust that can partially obscure the innermost regions of AGNs.

Gaskell comments: "We've shown that a lot of mysterious properties of active galactic nuclei can be explained by these small dusty clouds causing changes in what we see."

Co-author Peter Harrington, a UCSC graduate student who began work on the project as an undergraduate, explained that gas spiralling towards a galaxy's central black hole forms a flat "accretion disk" ...Read More...

Special Read:

Plasma thruster: New space debris removal technology



A concept for space debris removal by bi-directional momentum ejection from a satellite. Credit: Kazunori Takahashi.

The Earth is currently surrounded by debris launched into space over several decades. This space junk can collide with satellites, causing damage and creating more debris. To preserve a secure space environment, the active removal or de-orbiting of space debris is an emergent technological challenge. If remedial action is not taken in the near future, it will be difficult to sustain human space activities.

To overcome this issue, several methods for the removal and de-orbiting of debris have been proposed so far. These are classified as either contact methods (e.g., robotic arm, tether net, electrodynamic tether) or contactless methods (e.g., laser, ion beam shepherd), with the contactless methods proving to be more secure.

The ion beam shepherd contactless method uses a plasma beam ejected from the satellite to impart a force to the debris, thereby decelerating it so that it falls to a lower altitude, re-entering the Earth's atmosphere and burning up naturally. However, ejecting the plasma beam toward the debris accelerates the satellite in the opposite direction, which makes it difficult to maintain a consistent distance between debris and the satellite.

To safely and effectively remove debris, two propulsion systems have to be mounted on the satellite to eject bi-directional plasma beams (Figure 1). This interferes with a satellite system integration requiring the reduction of a satellite's weight and size.

"If the debris removal can be performed by a single high-power propulsion system, it will be of significant use for future space activity," said Associate Professor Kazunori Takahashi from Tohoku University in Japan, who is leading research on new technology to remove space debris in collaboration with colleagues at the Australian National University.

The Japanese and Australian research group has demonstrated that a helicon plasma thruster can yield the space debris removal operation using a single propulsion system. In the laboratory experiment, the bi-directional ejection of plasma plumes from the single plasma thruster was precisely controlled with a magnetic field and gas injection; then the decelerating force imparted to an object simulating debris was measured whilst maintaining the zero-net force to the thruster (and satellite). The system, having the single plasma thruster, can be operational in three operational modes: acceleration of the satellite; deceleration of the satellite; and debris removal.

"The helicon plasma thruster is an electrodeless system, which allows it to undertake long operations performed at a high-power level." says Takahashi, "This discovery is considerably different to existing solutions and will make a substantial contribution to future sustainable human activity in space." ...Read More...

Third UAEMMN Tower is Up and Working

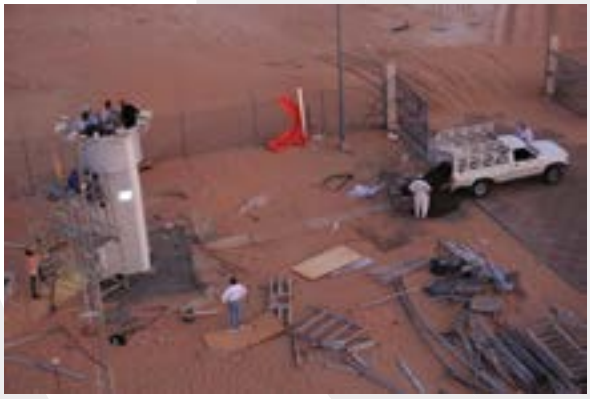
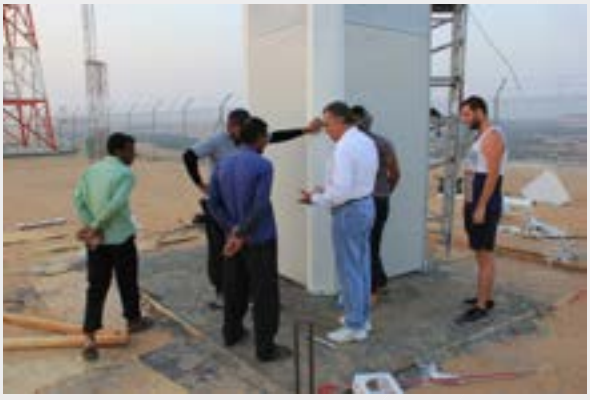
A team of research assistants from the Sharjah Center for Astronomy and Space Sciences has just finished installing the 3rd UAE Meteor Monitoring Network tower in the Liwa region some 250 km from Abu-Dhabi City. The team started work on Sunday, Sep. 23, 2018. The final touch was done on Thursday, Sep. 27, 2018. All 17 cameras of the tower are working properly and ready for the first pictures of meteors or any other space debris.

The team was composed of Mr. Issam Abu-Jami (Technical General Project Manager), Mr. Mohamed Talafha (Science Project Manager), Mr. Ridwan Fernini (Research Assistant), Mr. Mert Topaloglu (IASTE student, Turkey), Mr. Asamti Badji (IASTE student, Belgium), and Ms. Nicole Baar (IASTE student, Germany). On Sep. 26, a team of students from the University of Sharjah came to do some drone experiments as part of using drones to recognize meteorites once the UAEMMN towers locate the possible impacts. The students are Mr. Shahab Mohammad Zarafshan (UoS), Ms. Masa Basel (UoS), Ms. Takwa Mohamed Dawdi (UoS), Mr. Anas Omar Adwan (UoS), Ms. Cvija Perišić (IASTE student, Serbia), Ms. Liina Jukko (IASTE student, Finland), and Ms. Jareen Khan (IASTE student, Bangladesh).

The UAEMMN project is funded by the UAE Space Agency.





From left to right: Anas Omar Adwan (UoS), Mert Topaloglu (IASTE student, Turkey), Ridwan Fernini (SCASS), Asamti Badji (IASTE student, Belgium), Nicole Baar (IASTE student, Germany), Mohamed Talafha (SCASS), Issam Abu-Jami (SCASS), and Ilias Fernini (UoS/SCASS). (Sep. 26, 2018 - Liwa/UAE)

This Week's Sky at a Glance - Sep. 29 - Oct. 05, 2018

Sep 30	Su	11:06	Moon-Aldebaran: 1.4° S
Oct 02	Tu	13:45	Last Quarter
		17:03	Moon North Dec.: 21° N
Oct 04	Th	07:10	Moon Ascending Node
		13:51	Moon-Beehive: 1.3° N

A beautiful sunrise over the desertic Liwa region (Abu-Dhabi - UAE - Sep. 27, 2018)