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Astronomy & Physics Weekly News

Dept. of Applied Physics & Astronomy - University of Sharjah
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New research suggest Pluto should be reclassified as a planet

Should Pluto be reclassified a planet again? UCF scientist Philip Metzger says yes based on his research. Credit: NASA

The reason Pluto lost its planet status is not valid, according to new research from the University of Central Florida in Orlando.

In 2006, the International Astronomical Union, a global group of astronomy experts, established a definition of a planet that required it to "clear" its orbit, or in other words, be the largest gravitational force in its orbit.

Since Neptune's gravity influences its neighboring planet Pluto, and Pluto shares its orbit with frozen gases and objects in the Kuiper belt, that meant Pluto was out of planet status.However, in a new study published online Wednesday in the journal Icarus, UCF planetary scientist Philip Metzger, who is with the university's Florida Space Institute, reported that this standard for classifying planets is not supported in the research literature.

Metzger, who is lead author on the study, reviewed scientific literature from the past 200 years and found only one publication—from 1802—that used the clearing-orbit requirement to classify planets, and it was based on since-disproven reasoning.

He said moons such as Saturn's Titan and Jupiter's Europa have been routinely called planets by planetary scientists since the time of Galileo.

"The IAU definition would say that the fundamental object of planetary science, the planet, is supposed to be a defined on the basis of a concept that nobody uses in their research," Metzger said. "And it would leave out the second-most complex, interesting planet in our solar system.""We now have a list of well over 100 recent examples of planetary scientists using the word planet in a way that violates the IAU definition, but they are doing it because it's functionally useful," he said."It's a sloppy definition," Metzger said of the IAU's definition. "They didn't say what they meant by clearing their orbit. If you take that literally, then there are no planets, because no planet clears its orbit."

The planetary scientist said that the literature review showed that the real division between ...Read More...

Telescope Pierces into One of the Biggest Nebulae in the Milky Way to Reveal its Newly Forming (and Nearly Dying) Stars

Carina Nebula - ESO

Located about 7500 light-years from Earth, in the constellation of Carina, lies a star-forming region known as the Carina Nebula. This dynamic, evolving cloud of interstellar gas and dust measures about 300 light-years in diameter and is one of the Milky Way's largest star-forming regions. It is also an exercise in contrasts, consisting of bright regions of gas illuminated by intense stellar radiation and dark pillars of dust that obscure star formation.

While thousands of pictures have been taken of this scenic nebula, scientists have often wondered what is taking place within the darker regions of this stellar nursery. Thanks to the Visible and Infrared Survey Telescope for Astronomy (VISTA) at the Paranal Observatory in Chile, a team of astronomers was recently able to take detailed images of the nebula that pierced the dark veil of dust and showed what was taking place inside.

Thanks to its large mirror, wide field of view, and extremely sensitive detectors, VISTA is the world's largest infrared telescope and is allowing astronomers to study objects in our Universe that would not otherwise be visible. Using the VISTA telescope, astronomers at the European Southern Observatory (ESO) were able to learn things about the Carina Nebula that would not be possible using conventional (visible light) instruments.

This allowed the team to peer through the patches of hot, bright gas and obscuring dark dust that make up the nebula to see both newborn stars and those that were nearing the end of their life-cycle. Thanks to the images captured by VISTA, the team was also able to see a number of newly-formed stars that appeared to be locked in a battle with their obscuring dust clouds.

These dust clouds are the very stellar nurseries from which the new stars formed. Once formed, these new stars produce high-energy radiation and stellar winds that evaporate and disperse the dust clouds, making the nebula's new stars more visible. Eta Carinae, a massive binary system that is the most energetic star system ...Read More...

Water Molecules Detected Above Jupiter's Great Red Spot

Mark Garlick/Science Photo Library/Alamy Stock Photo NASA/JPL-Caltech/SwRI/MSSS/ Gerald Eichstädt /Seán Doran

Hydrogen and oxygen were found emitting from the gas giant's colossal storm, suggesting water-rich clouds exist deep in the atmosphere. Jupiter is without a doubt inhospitable, but it does have one thing going for it — increasing evidence that it's rich in water.

Astrophysicist Gordon L. Bjoraker of NASA's Goddard Space Flight Center recently published a paper in the Astronomical Journal, outlining how he and his team of researchers detected signatures of water emitting from Jupiter's Great Red Spot. By studying the giant storm with ground-based telescopes, they were able to observe molecular hydrogen and oxygen at infrared wavelengths, backing up theories that Jupiter could actually be abundant in water.

Jupiter's Great Red Spot

Water probably isn't the first thing that comes to mind when you think of the enormous gas giant, but it isn't all that unfathomable if you think about it. Back in 1973, the Pioneer spacecraft swung by Jupiter and detected a magnetic field with features similar to Earth's, leading researchers to wonder if the gaseous planet had a core, and if so, what was it made out of?

Follow-up spacecraft have since detected chemical elements that indicate Jupiter's core could be 10 times the mass of Earth, and made up of rocky material and water ice. We've also witnessed strong thunder and lightning coming from Jovian clouds, which, as far as we know, only occurs in the presence of moisture.

"The moons that orbit Jupiter are mostly water ice, so the whole neighborhood has plenty of water," said Bjoraker in a press release. "Why wouldn't the planet - which is this huge gravity well, where everything falls into it - be water rich, too?"

Researchers believe that the Great Red Spot, which stretches about 10,000 miles (16,000 kilometers) in diameter and extends 200 miles (300 kilometers) into Jupiter's atmosphere, is composed of three layers of clouds. It has a

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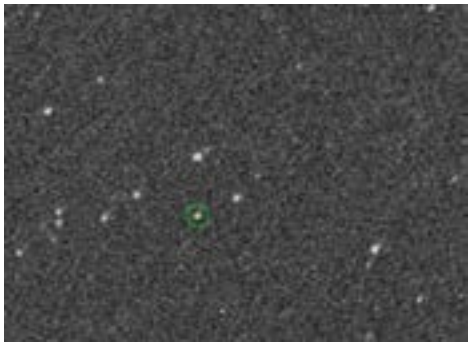
OSIRIS-REx snaps its first picture of asteroid Bennu



NASA/Goddard/University of Arizona

After almost two years of space travel, NASA's spacecraft finally has a clear view of its destination.

If you think your commute is bad, try traveling over a billion miles to get to work.

After almost two years of space travel, NASA's Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer (OSIRIS-REx) spacecraft finally has a clear view of its jobsite — a near-Earth, carbon-rich asteroid named Bennu.

The craft's PolyCam camera captured its first image of Bennu on August 17 from a distance just 1.4 million miles (2.25 million kilometers), and will now begin its final approach. Once it arrives, NASA's first asteroid-bound mission will start mapping and studying its 1,640-foot-long (500 meters) surface, and ultimately bring samples back to Earth.

These samples will not only give us a first-hand look at an asteroid in its original state, but will allow us to glimpse into our celestial past. Previous studies have shown that Bennu is rich in carbon, which is thought to be a prominent element in the solar system's oldest asteroids. It's believed that these ancient objects haven't changed much since the formation of the solar system, and that they still contain organic molecules, amino acids and volatiles — a.k.a. the building blocks of life. By bringing these primitive samples back to Earth, we can get a better idea of how our solar system formed and how life spread throughout it.

Too Close For Comfort

Unfortunately, we also selected Bennu for more ominous reasons. It's on NASA's list of potentially hazardous asteroids, coming within just 186,000 miles (300,000 km) of Earth every six years. Researchers think that Bennu could possibly impact Earth in the late 22nd century, and even though it's not nearly large enough wipe out humans or destroy the planet, we should still know what we'd be up against.

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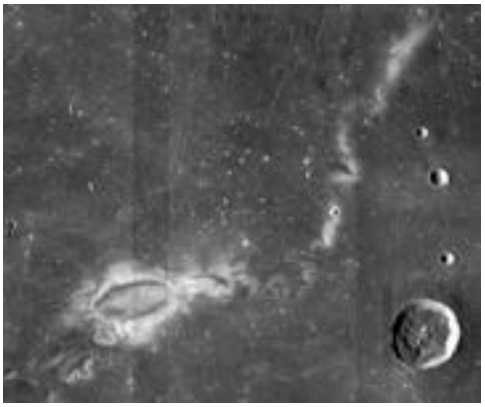
Mysterious 'lunar swirls' point to moon's volcanic, magnetic past



This is an image of the Reiner Gamma lunar swirl from NASA's Lunar Reconnaissance Orbiter.

The mystery behind lunar swirls, one of the solar system's most beautiful optical anomalies, may finally be solved thanks to a joint Rutgers University and University of California Berkeley study.

The solution hints at the dynamism of the moon's ancient past as a place with volcanic activity and an internally generated magnetic field. It also challenges our picture of the moon's existing geology.

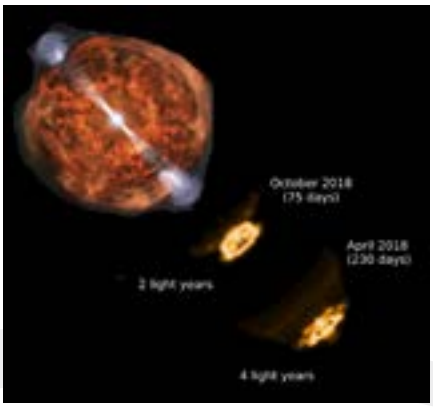
Lunar swirls resemble bright, snaky clouds painted on the moon's dark surface. The most famous, called Reiner Gamma, is about 40 miles long and popular with backyard astronomers. Most lunar swirls share their locations with powerful, localized magnetic fields. The bright-and-dark patterns may result when those magnetic fields deflect particles from the solar wind and cause some parts of the lunar surface to weather more slowly.

"But the cause of those magnetic fields, and thus of the swirls themselves, had long been a mystery," said Sonia Tikoo, coauthor of the study recently published in the Journal of Geophysical Research - Planets and an assistant professor in Rutgers University-New Brunswick's Department of Earth and Planetary Sciences. "To solve it, we had to find out what kind of geological feature could produce these magnetic fields - and why their magnetism is so powerful."

Working with what is known about the intricate geometry of lunar swirls, and the strengths of the magnetic fields associated with them, the researchers developed mathematical models for the geological "magnets." They found that each swirl must stand above a magnetic object that is narrow and buried close to the moon's surface.

The picture is consistent with lava tubes, long, narrow structures formed by flowing lava during volcanic eruptions; or with lava dikes, vertical sheets of magma injected into the lunar crust. But this raised another question: How could lava tubes and dikes be so strongly magnetic? The answer lies in a reaction that may be unique ...Read More...

Faster Than Light? Neutron star Merger Shot Out a Jet with Seemingly Impossible Speed



The simulated radio images in this not-to-scale artist's illustration show superfast jets blasting from the black hole created by the merger of two neutron stars, a dramatic event observed in August 2017. In the 155 days between two observations, the jet appeared to move 2 light-years, a distance that would require it to travel four times faster than light. This "superluminal motion" is an illusion created as the jet is pointed nearly toward the Earth; it is actually moving at about 97 percent light speed.
Credit: D. Berry, O. Gottlieb, K. Mooley, G. Hallinan, NRAO/AUI/NSF

The dramatic neutron-star merger that astronomers spotted last year generated a jet of material that seemed to move at four times the speed of light, a new study reports.

"Seemed" is the operative word here, of course; the laws of physics tell us that nothing can travel faster through space than light. So, the superluminal motion was an illusion, which was caused by the jet's (still very fast) speed and the fact that it blasted almost directly at us, researchers said.

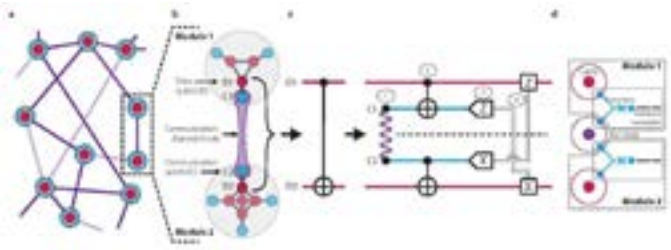
"Based on our analysis, this jet most likely is very narrow, at most 5 degrees wide, and was pointed only 20 degrees away from the Earth's direction," study co-author Adam Deller, of the Swinburne University of Technology in Australia, said in a statement from the National Radio Astronomy Observatory (NRAO), a facility of the U.S. National Science Foundation (NSF).

"But to match our observations, the material in the jet also has to be blasting outwards at over 97 percent of the speed of light," he added.

Deller and his colleagues — led by Kunal Mooley, of the NRAO and the California Institute of Technology in Pasadena — used a variety of radio telescopes to study the aftermath of the neutron-star collision, a historic event known as GW170817.

GW170817 was the first documented collision of two neutron stars, the superdense remnants of massive stars that have died in supernova explosions. GW170817, which occurred about 130 million light-years from Earth, also opened the era of "multimessenger ..Read More...

Researchers 'teleport' a quantum gate



Network overview of the modular quantum architecture demonstrated in the new study. Credit: Yale University

Yale University researchers have demonstrated one of the key steps in building the architecture for modular quantum computers: the "teleportation" of a quantum gate between two qubits, on demand.

The findings appeared online Sept. 5 in the journal Nature.

The key principle behind this new work is quantum teleportation, a unique feature of quantum mechanics that has previously been used to transmit unknown quantum states between two parties without physically sending the state itself. Using a theoretical protocol developed in the 1990s, Yale researchers experimentally demonstrated a quantum operation, or "gate," without relying on any direct interaction. Such gates are necessary for quantum computation that relies on networks of separate quantum systems—an architecture that many researchers say can offset the errors that are inherent in quantum computing processors.

Through the Yale Quantum Institute, a Yale research team led by principal investigator Robert Schoelkopf and former graduate student Kevin Chou is investigating a modular approach to quantum computing. Modularity, which is found in everything from the organization of a biological cell to the network of engines in the latest SpaceX rocket, has proved to be a powerful strategy for building large, complex systems, the researchers say. A quantum modular architecture consists of a collection of modules that function as small quantum processors connected into a larger network.

Modules in this architecture have a natural isolation from each other, which reduces unwanted interactions through the larger system. Yet this isolation also makes performing operations between modules a distinct challenge, according to the researchers. Teleported gates are a way to implement inter-module operations.

"Our work is the first time that this protocol has been demonstrated where the classical communication occurs in real-time, allowing us to implement a ..Read More...

Surprising hidden order unites prime numbers and crystal-like materials

Princeton University researchers have uncovered patterns in prime numbers that are similar to those found in the positions of atoms inside certain crystal-like materials. Credit: Kyle McKernan, Office of Communications

The seemingly random digits known as prime numbers are not nearly as scattershot as previously thought. A new analysis by Princeton University researchers has uncovered patterns in primes that are similar to those found in the positions of atoms inside certain crystal-like materials.

The researchers found a surprising similarity between the sequence of primes over long stretches of the number line and the pattern that results from shining X-rays on a material to reveal the inner arrangement of its atoms. The analysis could lead to predicting primes with high accuracy, said the researchers. The study was published Sept. 5 in the Journal of Statistical Mechanics: Theory and Experiment.

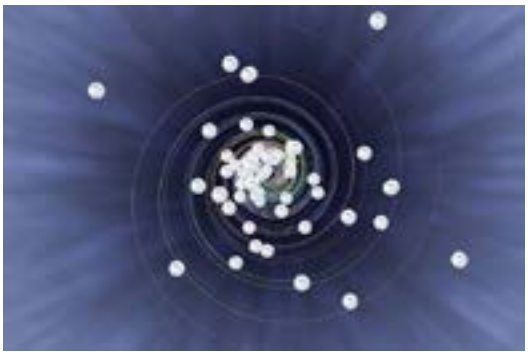
"There is much more order in prime numbers than ever previously discovered," said Salvatore Torquato, Princeton's Lewis Bernard Professor of Natural Sciences, professor of chemistry and the Princeton Institute for the Science and Technology of Materials. "We showed that the primes behave almost like a crystal or, more precisely, similar to a crystal-like material called a 'quasicrystal.'"

Primes are numbers that can only be divided by 1 and themselves. Very large primes are the building blocks of many cryptography systems. Primes appear to be sprinkled randomly along the number line, although mathematicians have discerned some order. The first few primes are 2, 3, 5, 7 and 11, becoming more sporadic higher in the number line.

Torquato and his colleagues have found that that, when considered over large swaths of the number line, prime numbers are more ordered than previously believed, falling within the class of patterns known as "hyperuniformity."

Hyperuniform materials have special order at large distances and include crystals, quasicrystals and special disordered systems. Hyperuniformity is found in the arrangement of cone cells in bird eyes, in certain ...Read More...

Fish-eye lens may entangle pairs of atoms



James Maxwell was the first to realize that light is able to travel in perfect circles within the fish-eye lens because the density of the lens changes, with material being thickest at the middle and gradually thinning out toward the edges. Credit: Massachusetts Institute of Technology

Nearly 150 years ago, the physicist James Maxwell proposed that a circular lens that is thickest at its center, and that gradually thins out at its edges, should exhibit some fascinating optical behavior. Namely, when light is shone through such a lens, it should travel around in perfect circles, creating highly unusual, curved paths of light.

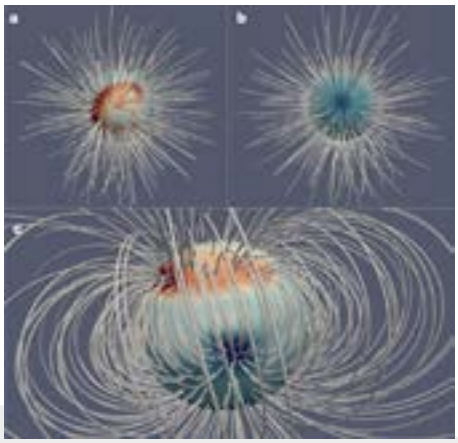
He also noted that such a lens, at least broadly speaking, resembles the eye of a fish. The lens configuration he devised has since been known in physics as Maxwell's fish-eye lens—a theoretical construct that is only slightly similar to commercially available fish-eye lenses for cameras and telescopes.

Now scientists at MIT and Harvard University have for the first time studied this unique, theoretical lens from a quantum mechanical perspective, to see how individual atoms and photons may behave within the lens. In a study published Wednesday in Physical Review A, they report that the unique configuration of the fish-eye lens enables it to guide single photons through the lens, in such a way as to entangle pairs of atoms, even over relatively long distances.

Entanglement is a quantum phenomenon in which the properties of one particle are linked, or correlated, with those of another particle, even over vast distances. The team's findings suggest that fish-eye lenses may be a promising vehicle for entangling atoms and other quantum bits, which are the necessary building blocks for designing quantum computers.

"We found that the fish-eye lens has something that no other two-dimensional device has, which is maintaining this entangling ability over large distances, not just for two atoms, but for multiple pairs of distant atoms," says first author Janos Perczel, a graduate student in MIT's Department of Physics. "Entanglement and connecting these various quantum bits can be really the name of the game in making a push forward and trying to find applications of quantum mechanics." ...Read More...

Juno shows Jupiter's magnetic field is very different from Earth's



Magnetic field lines. a, North polar view; b, south polar view; c, equatorial view. The non-dipolar nature of the magnetic field in the northern hemisphere and the dipolar nature in the southern hemisphere is apparent. The equatorial view is centred near the Great Blue Spot and shows the linkage of magnetic field lines that enter through the Great Blue Spot. The contoured surface on which the field lines shown start and end is at r = 0.85RJ, where the density of field lines is proportional to the radial magnetic field strength and is depicted by the colour scale (red outward flux, blue inward flux). Credit: Nature (2018). DOI: 10.1038/s41586-018-0468-5

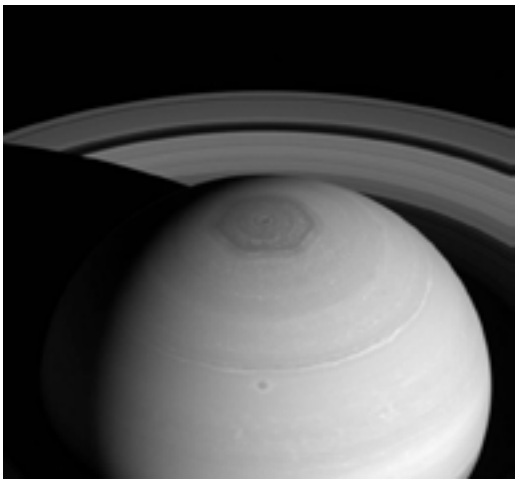
A team of researchers affiliated with several institutions in the U.S., including NASA and a pair from Denmark has found that Jupiter's magnetic field is quite different from Earth's. In their paper published in the journal Nature, the group describes their study of the planet using data from the Juno spacecraft, and what they found. Chris Jones, with the University of Leeds, offers a News and Views piece on the work done by the team in the same journal issue.

NASA launched Juno into space back in 2011, and it entered a close orbit around Jupiter in 2016—just 4,000 kilometers above its surface. Over the past two years, it has been monitoring the planet's magnetic field. In this new effort, the researchers reveal what the data shows.

When mapping a planet's magnetic field, it is common to use colored lines to show magnetic flux—doing so depicts the Earth's magnetic field as lines emanating outward from the north pole then circling back at the south pole. The result resembles a giant bar magnet. But the researchers report that things are different with Jupiter. While it does have flux lines emanating from its north pole, it also has two return points, rather than just one—one is located near its south pole, the other close to its equator. Also, on Earth, parts of the magnetic field do not favor either pole, and are instead spread between the two. With Jupiter, the same kinds of magnetic fields are almost all in the northern hemisphere.

There is also the matter of how the magnetic fields are generated. Earth's magnetic field is believed to be generated by its internal dynamo—the churning of electrically conductive fluids in the core. But Jupiter is thought to be made of helium and hydrogen, which are not very conductive. This has led to theories that suggest the ...Read More...

Saturn's famous hexagon towers above cloudtops



The Cassini spacecraft used its wide-angle camera to capture this image of the ringed planet Saturn on April 2, 2014. You can see Saturn's hexagon – an odd six-sided feature – surrounding its circular north polar vortex. Image via NASA.

As wide as 2 Earths – like nothing seen on any other world – Saturn's hexagon was thought to be a feature of the lower atmosphere, where Saturn's weather happens. Now there's evidence it extends high above the cloudtops.

Space scientists have been fascinated by the hexagonal feature at Saturn's north pole since the Voyager mission first discovered it in 1981. The hexagon – a jet stream in Saturn's atmosphere, moving at some 200 mph (320 km/h) — was believed to be a feature of Saturn's lower atmosphere, or troposphere, only. Now, however, as the seasons have passed on Saturn, this bizarre hexagon – which is wider than two Earths – appears to have changed. Writing in the peer-reviewed journal Nature Communications on September 3, 2018, scientists said they now have evidence that the hexagon extends to about 180 miles (300 km) above Saturn's cloudtops, up into this world's stratosphere, at least during Saturn's northern spring and summer.

The new work is a long-term study, using data from the Cassini spacecraft, which arrived at Saturn in 2004 and began observing the hexagon in 2006. Cassini's mission to Saturn ended in 2017, but scientists are still mining the mission's data (and will be for years to come). Leigh Fletcher of the University of Leicester, U.K., lead author of the new study, said:

The edges of this newly-found vortex appear to be hexagonal, precisely matching a famous and bizarre hexagonal cloud pattern we see deeper down in Saturn's atmosphere.

While we did expect to see a vortex of some kind at Saturn's north pole as it grew warmer, its shape is really surprising. Either a hexagon has spawned spontaneously and identically at two different altitudes, one lower in the clouds and one high in the stratosphere, or the hexagon is in fact a towering structure spanning a vertical range of several hundred kilometers. ..Read More...

Relationship established between brightness and diet of black holes

Credit: CC0 Public Domain

A group of researchers led by Paula Sánchez-Sáez, a doctoral student in the Department of Astronomy of the Universidad de Chile, managed to determine that the rate of variability in the light emitted by material being swallowed by supermassive black holes in nuclei of active galaxies is determined by the accretion rate, that is, how much matter they are "eating."

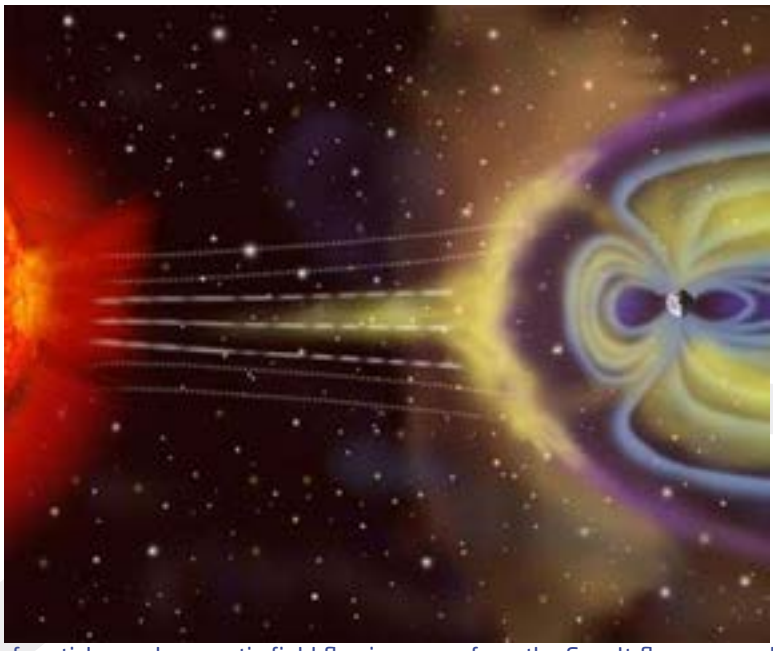
"The light emitted by the material that is falling (its brightness) changes a lot over time, without a stable pattern, so we say that they show variability. We know that it varies, but we still do not know clearly why. If one observes other objects, such as stars or galaxies without active nuclei, their brightness is constant over time, but if we look at galaxies with active nuclei their brightness rises and falls, and is completely unpredictable. We studied how the amplitude of this variation in the emitted light (or in simple words, the amplitude of the variability) is related, with the average luminosity emitted by the AGN, the mass of the super massive black hole, and the AGN accretion rate (which corresponds to how much material the black hole consumes in a year). The results of our analysis show that, contrary to what was believed, the only important physical property to explain the amplitude of the variability is the AGN accretion rate," explains the young researcher.

The study determined that there is only one physical property that could predict the variability of these objects: the accretion rate. "This is nothing but how much material is falling into this supermassive black hole. So if it is on a diet, or if it is swallowing a lot or if it does not fit anymore in his mouth... that will determine if they vary much or little. And what we detect is that the less they swallow, the more they vary," explains Paulina Lira, an academic from the Department of Astronomy of the Universidad de Chile, and a researcher at the CATA Center for Excellence in Astrophysics.

For Paula Sánchez-Sáez, first author of the study, the importance of this discovery is to try to elucidate what is the physical mechanism behind this variability, one of the most inherent characteristics of the ...Read More...

Special Read:

Satellites more at risk from fast solar wind than a major space storm



The solar wind is a stream of particles and magnetic field flowing away from the Sun. It flows around the Earth's magnetic field and excites so-called 'chorus' plasma waves near geostationary orbit. Chorus waves accelerate electrons and form the Van Allen radiation belts. The chorus waves also travel along the geomagnetic field to the Polar Regions where they are detected on the ground at Halley Research Station, Antarctica.

Satellites are more likely to be at risk from high-speed solar wind than a major geomagnetic storm according to a new UK-US study published this week in the Journal Space Weather. Researchers investigating the space weather risks to orbiting satellites calculated electron radiation levels within the Van Allen radiation belts. This ring-doughnut-shaped zone wraps around the Earth, trapping charged particles. Geostationary orbit lies inside the Van Allen radiation belts

The study, which analysed years of satellite data, found that electron radiation levels at geostationary orbit could remain exceptionally high for 5 days or more, even after the solar wind speed had died down. As a result, electronic components on satellites could charge up to dangerously high levels and become damaged.

Professor Richard Horne, lead author of the study, said: "Until now we thought that the biggest risk to orbiting satellites was geomagnetic storms. Our study constructed a realistic worst-case event by looking at space weather events caused by high-speed solar wind flowing away from the Sun and striking the Earth. We were surprised to discover just how high electron radiation levels can go."

This new research is particularly interesting to the satellite industry. Professor Horne continues:

"Fast solar wind is more dangerous to satellites because the geomagnetic field extends beyond geostationary orbit and electron radiation levels are increased all the way round the orbit - in a major geomagnetic storm the field is distorted and radiation levels peak closer to the Earth.

"Electronic components on satellites are usually protected from electrostatic charges by encasing them in metal shielding. You would have to use about 2.5 mm of aluminium to reduce charging to safe levels - much more than is used at present. There are well over 450 satellites in geostationary orbit and so in a realistic worst case we would expect many satellites to report malfunctions and a strong likelihood of service outage and total satellite loss".

Dr Nigel Meredith, a co-author on the study, said: "A few years ago, we calculated electron radiation levels for a 1 in 150 year space weather event using statistical methods. This study uses a totally different approach but gets a very similar result and confirms that the risk of damage is real." The solar wind is a stream of particles and magnetic field flowing away from the Sun. It flows around the Earth's magnetic field and excites so-called 'chorus' plasma waves near geostationary orbit. Chorus waves accelerate electrons and form the Van Allen radiation belts. The chorus waves also travel along the geomagnetic field to the Polar Regions where they are detected on the ground at Halley Research Station, Antarctica. . ..Read More...

Crescent of Muharram 1440 AH

Basic Astronomical Information about the observations of the crescent of Muharram 1440 AH:

	Sep. 09, 2018	Sep. 10, 2018
New Moon	22:01	--
Sunset (Azimuth)	18:29 (276º)	18:28 (276º)
Moonset (Azimuth)	18:29 (280º)	19:13(274º)
Moon's Altitude	0.0º	9.10º
Lag Time ((Minutes)	--	45
Age (Hrs, Min)	--	21h

Summary:

A difficult setting for the crescent to be observed on Sep. 09 since new Moon happens after sunset. We should expect the first day of Muharram 1440 AH to be on Tuesday, Sep. 11, 2018.

This Week's Sky at a Glance - Sep. 08-14, 2018

Sep 08	**Sa**	05:21	Moon Perigee: 361400 km
Sep 09	**Su**	22:01	New Moon
Sep 14	**Fr**	06:21	Moon-Jupiter: 4.6° S

SCASS Summer Students Research Team 2018

The picture exposes all the summer students research team that spent nearly three months (June-August 2018) helping the Sharjah Center for Astronomy and Space Sciences accomplishing its commitment to excel in space sciences research. Among the many research areas that the students tackled, we can mention "Machine learning", "UFO Observations", "Drone Observations", "Decametric Radio Observations", "Sunspot Analysis", "Space Debris Observations", "Building an Artificial Martian Atmosphere", and "GNSS Analysis." The students were all from the University of Sharjah, mainly from the College of Sciences and the College of Engineering. One-third of the students were sponsored by SCASS as approved by Prof. Hamid Al-Naimiy, Chancellor of the University of Sharjah, and SCASS General Director, while the remaining students by the UAE Space Agency (Space Debris and Radio Astronomy) and the Mohamed Bin Rashed Space Center (Martian Atmosphere). It is important to mention that the UAE Space Agency and the Mohamed Bin Rashed Space Center Space Sciences funds were awarded in 2016 and 2017 to Dr. Ilias Fernini as the main principal investigator, and are worth more than 2.5 million Dhs.

A special seminar showcasing this summer research will be organized in early October 2018 where each research team will highlight its main accomplishments. So, stay tuned for the event.

SCASS Summer Research Team:

Mohamed Bassem Abdelmonem Abdelsalam; Yusra Mohamed Elkalyoubi; Takwa Mohamed Dawdi ; Anas Omar Mohamad Adwan; Aisha Abdulla Alowais; Mariam Abdisalam Ahmed; Douae Nouichi; Safa Naseem; Khawla Alaa Ibrahim Kadry Hassan; Akhmad Hassan Ahmad Mohammad Ahmad; Sameera Ahmed; Shahab Mohammad Zarafshan; Masa Basel Moh*f*??d Alnaser; Maryam Essa A Sharif; Mohammed Fadil Talafha; Mohammad Baker Rihan; Ruhi Ahmed Moazzam Misbahulhaque; Maitha Ahmed Abdulla Saif Alshamsi; Maryam Muntasir Khaled Saqr Alqasemi; Sara Abdulmoein Chaar; Ridwan Mohammed Fernini; Noora Mohamad Alameri; Tarifa Mohammed Al Kaabi; Salma Subhi; Issam S.S. Abujami; Thuraya Hassan Al-Ban; Muhammad Mubasshir Shaikh; Ilias Fernini.