Space News Update

— October 31, 2017 —

Contents

In the News

Story 1:

'Monster' planet discovery challenges formation theory

Story 2:

Scientists penetrate mystery of raging black hole beams

Story 3:

Astronomers Find Comets Orbiting a Star 800 Light-Years Away

Departments

The Night Sky

ISS Sighting Opportunities

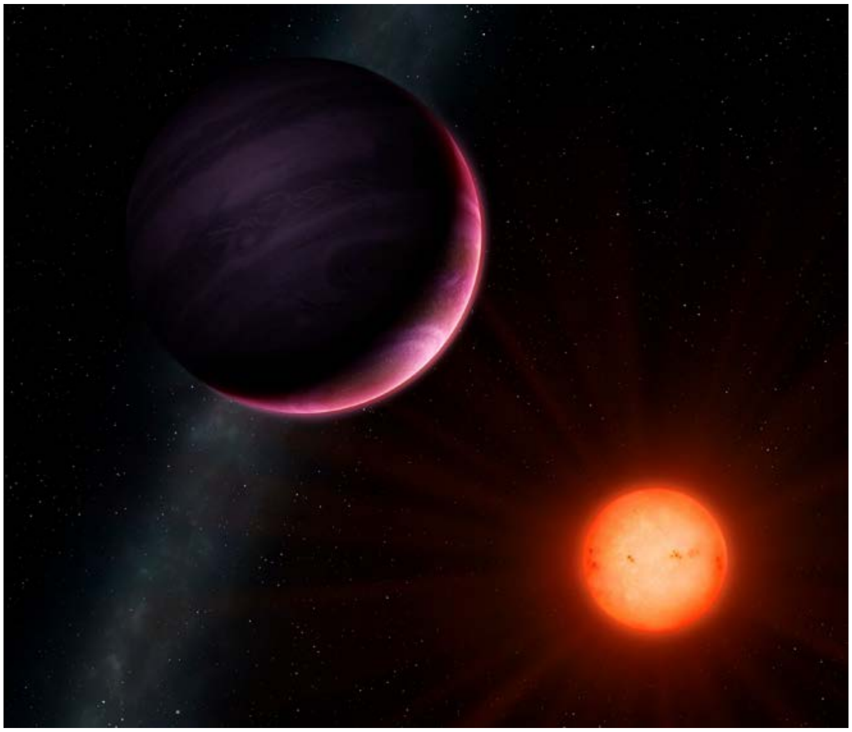
Space Calendar

NASA-TV Highlights

Food for Thought

Space Image of the Week

1. 'Monster' planet discovery challenges formation theory



A giant planet, which should not exist according to planet formation theory, has been discovered around a distant star. The new research is presented in a paper recently accepted for publication in the journal *Monthly Notices of the Royal Astronomical Society*.

The existence of the 'monster' planet, 'NGTS-1b', challenges theories of planet formation which state that a planet of this size could not be formed around such a small star. According to these theories, small stars can readily form rocky planets but do not gather enough material together to form Jupiter-sized planets.

'NGTS-1b' however, is a 'gas giant' - due to its size and temperature, the planet is known as a 'hot Jupiter', a class of planets that are at least as large as our solar system's very own Jupiter, but with around 20% less mass. Unlike Jupiter however, NGTS-1b is very close to its star - just 3% of the distance between Earth and the Sun, and completes an orbit every 2.6 days, meaning a year on NGTS-1b lasts two and a half Earth-days.

In contrast, the host star is small, with a radius and mass half that of our sun. Professor Peter Wheatley from the University of Warwick commented on the complications this introduced: "Despite being a monster of a planet, NGTS-1b was difficult to find because its parent star is so small and faint". He went on to explain the significance of the discovery given the challenging circumstances "small stars like this red M-dwarf are actually the most common in the Universe, so it is possible that there are many of these giant planets waiting to found."

NGTS-1b is the first planet to be spotted by The Next-Generation Transit Survey (or 'NGTS') which employs an array of 12 telescopes to scour the sky. The researchers made their discovery by continually monitoring patches of the night sky over many months, and detecting red light from the star with innovative red-sensitive cameras. They noticed dips in the light from the star every 2.6 days, implying that a planet was orbiting and periodically blocking the starlight.

Using these data, they then tracked the planet's orbit and calculated the size, position and mass of NGTS-1b by measuring the radial velocity of the star. In fact, this method, measuring how much the star 'wobbles' due to the gravitational tug from the planet, was the best way of measuring NGTS-1b's size.

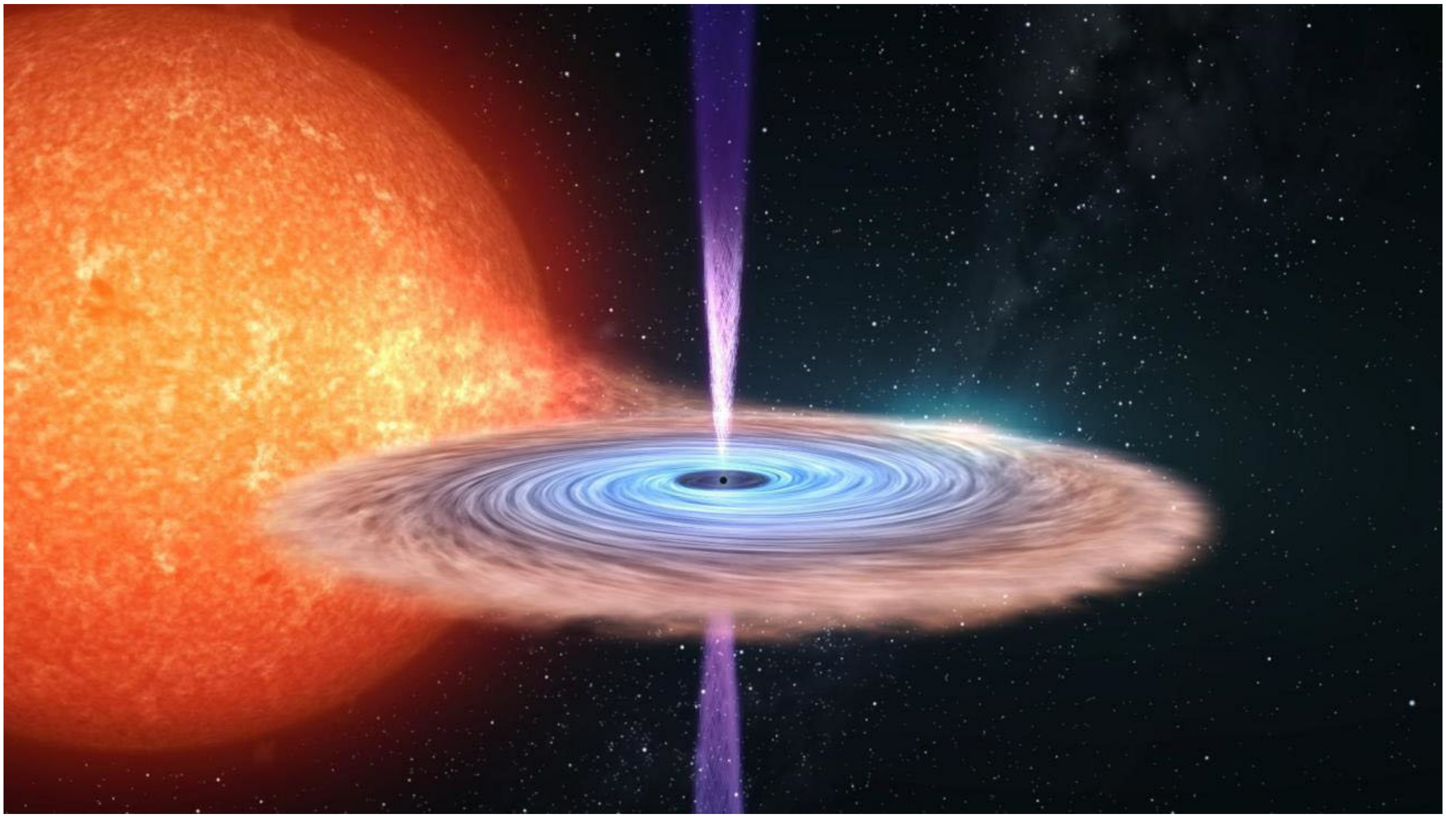
Dr Daniel Bayliss, lead author of the study, also from the University of Warwick, commented "The discovery of NGTS-1b was a complete surprise to us - such massive planets were not thought to exist around such small stars - importantly, our challenge now is to find out how common these types of planets are in the Galaxy, and with the new Next-Generation Transit Survey facility we are well-placed to do just that."

NGTS is situated at the European Southern Observatory's Paranal Observatory in the heart of the Atacama Desert, Chile, but is one of very few facilities to be run by external parties - UK Universities Warwick, Leicester, Cambridge, and Queen's University Belfast are involved, together with Observatoire de Genève, DLR Berlin and Universidad de Chile.

Professor Peter Wheatley leads NGTS, and was pleased to see these exciting results: "Having worked for almost a decade to develop the NGTS telescope array, it is thrilling to see it picking out new and unexpected types of planets. I'm looking forward to seeing what other kinds of exciting new planets we can turn up."

Source: EurekAlert Return to Contents

2. Scientists penetrate mystery of raging black hole beams



They are nature's very own Death Star beams - ultra-powerful jets of energy that shoot out from the vicinity of black holes like deadly rays from the Star Wars super-weapon.

Now a team of scientists led by the University of Southampton has moved a step closer to understanding these mysterious cosmic phenomena - known as relativistic jets - by measuring how quickly they 'switch on' and start shining brightly once they are launched.

How these jets form is still a puzzle. One theory suggests that they develop within the 'accretion disc' - the matter sucked into the orbit of a growing black hole. Extreme gravity within the disc twists and stretches magnetic fields, squeezing hot, magnetised disc material called plasma until it erupts in the form of oppositely directed magnetic pillars along the black hole's rotational axis.

Plasma travels along these focused jets and gains tremendous speed, shooting across vast stretches of space. At some point, the plasma begins to shine brightly, but how and where this occurs in the jet has been debated by scientists.

In a new study published today in *Nature Astronomy*, an international team of scientists led by Dr Poshak Gandhi show how they used precise multi-wavelength observations of a binary system called V404 Cygni - consisting of a star and a black hole closely orbiting each other, with the black hole feeding off matter from the star that falls through the disc - to throw light on this hotly debated phenomenon.

V404 Cygni is located about 7,800 light years away in the constellation of Cygnus, and weighs as much as about nine of our Suns put together. Dr Gandhi and his collaborators captured the data in June 2015, when V404 Cygni was observed radiating one of the brightest 'outbursts' of light from a black hole ever seen - bright enough to be visible to small telescopes used by amateur astronomers, and energetic enough to tear apart an Earth-like planet if properly focused.

Using telescopes on Earth and in space observing at exactly the same time, they captured a 0.1-second delay between X-ray flares emitted from near the black hole, where the jet forms, and the appearance of visible light flashes, marking the moment when accelerated jet plasma begins to shine.

This 'blink of an eye' delay was calculated to represent a maximum distance of 19,000 miles (30,000 km), impossible to resolve at the distance of V404 with any current telescope.

Dr Gandhi, of the University of Southampton, said: "Scientists have been observing jets for decades, but are far from understanding how nature creates these mind-bogglingly vast and energetic structures.

"Now, for the first time, we have captured the time delay between the appearance of X-rays and the appearance of optical light in a stellar-mass black hole at the moment jet plasma is activated. This lays to rest the controversy regarding the origin of the optical flashes, and also gives us a critical distance over which jet plasma must have been strongly accelerated to speeds approaching that of light."

In Star Wars terms, the key measurement of this study can roughly be likened to measuring the distance between the surface of the Death Star, where multiple rays of light shoot out, and the point where they converge into a single bright beam.

"But the physics of black hole jets has nothing to do with lasers or the fictional Kyber crystals that power the Death Star. Nature has found other ways to power jets," said Dr Gandhi. "Gravity and magnetic fields play the key roles here, and this is the mechanism we are trying to unravel."

The study also creates a link between V404 Cygni and supermassive black holes, which lie at the centre of massive galaxies and which weigh billions of times more than stellar-mass black holes. Similar jet physics may apply to all black holes.

Dr Gandhi said: "This is an exciting and important discovery which can be fed back into theory about relativistic jets, and contributes to our ever-growing understanding of black holes."

The X-ray emission, representing the accretion disc 'feeding' the jet at its base, was captured from Earth orbit by NASA's NuSTAR telescope, while the moment the jet became visible as optical light was caught by the ULTRACAM high-speed camera, mounted on the William Herschel Telescope on La Palma, in the Canary Islands.

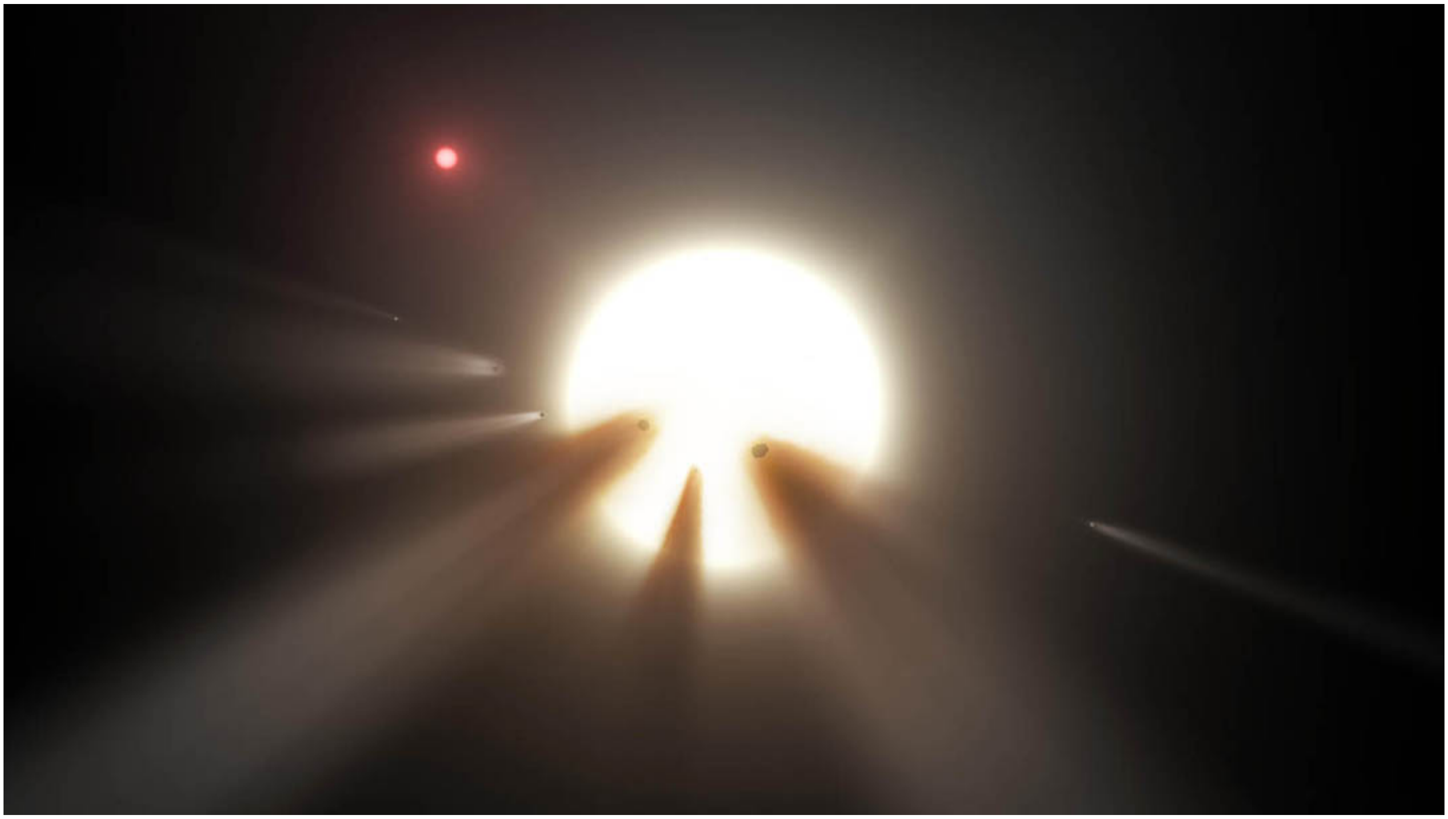
Professor Vik Dhillon, of the University of Sheffield, the principal investigator behind ULTRACAM, commented: "This discovery was made possible thanks to our camera gathering 28 frames per second. It demonstrates the untapped potential of studying astrophysical phenomena at high speeds."

At the same time, radio waves from the extended portions of the jet plasma were observed by a team of Professor Rob Fender, of the University of Oxford, using the AMI-LA radio telescope, in Cambridge, UK.

Professor Fender said: "These observations are another major step towards understanding exactly how relativistic jets are formed by black holes. Radio detections come from the outer jet and are the key unambiguous indicator of ongoing jet activity. The optical, X-rays and radio were also crucial for that discovery."

Source: Phys.org Return to Contents

3. Astronomers Find Comets Orbiting a Star 800 Light-Years Away



In the past thirty years, thousands of extra-solar planets have been discovered beyond our Solar System. For the most part, they have been detected by the *Kepler Space Telescope* using a technique called Transit Photometry. For this method, astronomers measure periodic dips in a star's brightness – which are the result of planets passing in front of them relative to an observer – to confirm the presence of planets.

Thanks to a new research effort conducted by a team of professional and amateur astronomers, something much smaller than planets were recently detected orbiting a distant star. According to a new study published by the research team, six exocomets were observed orbiting around KIC 3542116, a spectral type F2V star located 800 light years from Earth. These comets are the smallest objects to date detecting the Transit Photometry method.

The study which details their findings, titled "Likely Transiting Exocomets Detected by Kepler", recently appeared in the *Monthly Notices of the Royal Astronomical Society*. Led by Saul Rappaport of MIT's Kavli Institute for Astrophysics and Space Research, the team also consisted of amateur astronomers, members of the Harvard-Smithsonian Center for Astrophysics (CfA), the University of Texas, Northeastern University, and NASA's Ames Research Center.

This is the first time that Transit Photometry has been used to detect object as small as comets. These comets were balls of ice and dust – comparable in size to Halley's Comet – that were found to be traveling at speeds of about 160,934 km/h (100,000 mph) before they vaporized. The researchers were able to detect them by picking out their tails, the clouds of dust and gas that form when comets get closer to their star and begin to sublimate.

This was no easy task, since the tails managed to obscure only about a tenth of 1% of the star's light. As Saul Rappaport, who is also the professor emeritus of physics at the Kavli Institute for Astrophysics and Space Research, explained in an MIT press release:

"It's amazing that something several orders of magnitude smaller than the Earth can be detected just by the fact that it's emitting a lot of debris. It's pretty impressive to be able to see something so small, so far away."

Credit for the original detection goes to Thomas Jacobs, an amateur astronomer who lives in Bellevue, Washington, and is a member of Planet Hunters. This citizen scientist project was first established by Yale University and consists of amateur astronomers who dedicated their time to the search for exoplanets. Members are given access to data from the *Kepler Space Telescope* in the hopes that they would notice things that computer algorithms might miss.

Back in January, Jacobs began scanning four years of data obtained during *Kepler*'s main mission. During this phase, which lasted from 2009 to 2013, *Kepler* scanned over 200,000 stars and conducted measurements of their light curves. After five months of sifting through the data (on March 18th), he noticed several curious light patterns amid background noise coming from KIC 3542116. As Jacobs said:

"Looking for objects of interest in the Kepler data requires patience, persistence, and perseverance. For me it is a form of treasure hunting, knowing that there is an interesting event waiting to be discovered. It is all about exploration and being on the hunt where few have traveled before."

Specifically, Jacobs was searching for signs of single transits, which are not like those that are caused by planets orbiting a star (i.e. periodic). While looking at KIC 3542116, he noticed three single transits, and then alerted Rappaport and Andrew Vanderburg, as astrophysicist at University of Texas and member of the CfA. Jacobs had worked with both men in the past, and wanted their opinion on these findings.

As Rapport recalled, the process of interpreting the data was challenging, but rewarding. Initially, they noted that the lightcurves did not resemble those caused by planetary transits, which are characterized by a sudden and sharp drop in light, followed by a sharp rise. In time, Rapport noted the asymmetry in the three lightcurves resembled those of disintegrated planets, which they had observed before.

"We sat on this for a month, because we didn't know what it was — planet transits don't look like this," said Rappaport. "Then it occurred to me that, 'Hey, these look like something we've seen before'… We thought, the only kind of body that could do the same thing and not repeat is one that probably gets destroyed in the end. The only thing that fits the bill, and has a small enough mass to get destroyed, is a comet."

Based on their calculations, which indicated that each comet blocked out about one-tenth of 1% of the star's light, the research team concluded that the comet likely disintegrated entirely, creating a dust trail that was sufficient to block out light for several months before it disappeared. After conducting additional observations, they also noted three more transits in the same time period that were similar to the ones noticed by Jacobs.

The fact that these six exocomets appear to have transited very close to their star in the past four years raises some interesting questions, and answering them could have drastic implications for extra-solar research. It could also advance our understanding of our own Solar System. As Vanderburg explained:

"Why are there so many comets in the inner parts of these solar systems? Is this an extreme bombardment era in these systems? That was a really important part of our own solar system formation and may have brought water to Earth. Maybe studying exocomets and figuring out why they are found around this type of star… could give us some insight into how bombardment happens in other solar systems."

Between 4.1 and 3.8 billion years ago, the Solar System also experienced a period of intense comet activity known as the Late Heavy Bombardment. During this time, asteroids and comets are believed to have impacted bodies in the inner Solar System on a regular basis. Interestingly, this period of heavy bombardment is believed to be what was responsible for the distribution of water to Earth and the other terrestrial planets.

As noted, KIC 3542116 belongs to the spectral type F2V, a yellow-white class of star that is typically 1 to 1.4 times as massive as our Sun and quite bright. Since it is comparable in size and mass to our Sun, it is possible that the bombardment period it is experiencing is similar to what the Solar System went through. Watching it unfold could therefore tell us much about how similar activity influenced the evolution of our Solar System billions of years ago.

In addition to the study's significance to the study of astrophysics and astronomy, it also demonstrates the important role citizen scientists play today. Were it not for the tireless work performed by Jacobs, who sifts through Kepler data between working his day job and on the weekends, this discovery would not have been possible.

"I could name 10 types of things these people have found in the Kepler data that algorithms could not find, because of the pattern-recognition capability in the human eye," said Rappaport. "You could now write a computer algorithm to find this kind of comet shape. But they were missed in earlier searches. They were deep enough but didn't have the right shape that was programmed into algorithms. I think it's fair to say this would never have been found by any algorithm."

In the future, the research team expects that the deployment Transiting Exoplanet Survey Satellite(TESS) – which will be led by MIT – will continue to conduct the type of research performed by Kepler.

Source: Universe Today Return to Contents

The Night Sky

Tuesday, October 31

• For this Halloween evening, a bright waxing gibbous Moon shines in the southeast to south. It's lower right of the Great Square of Pegasus at dusk, and directly below it later in the evening. The Great Square is about 15° on a side, somewhat larger than your fist at arm's length.

Wednesday, November 1

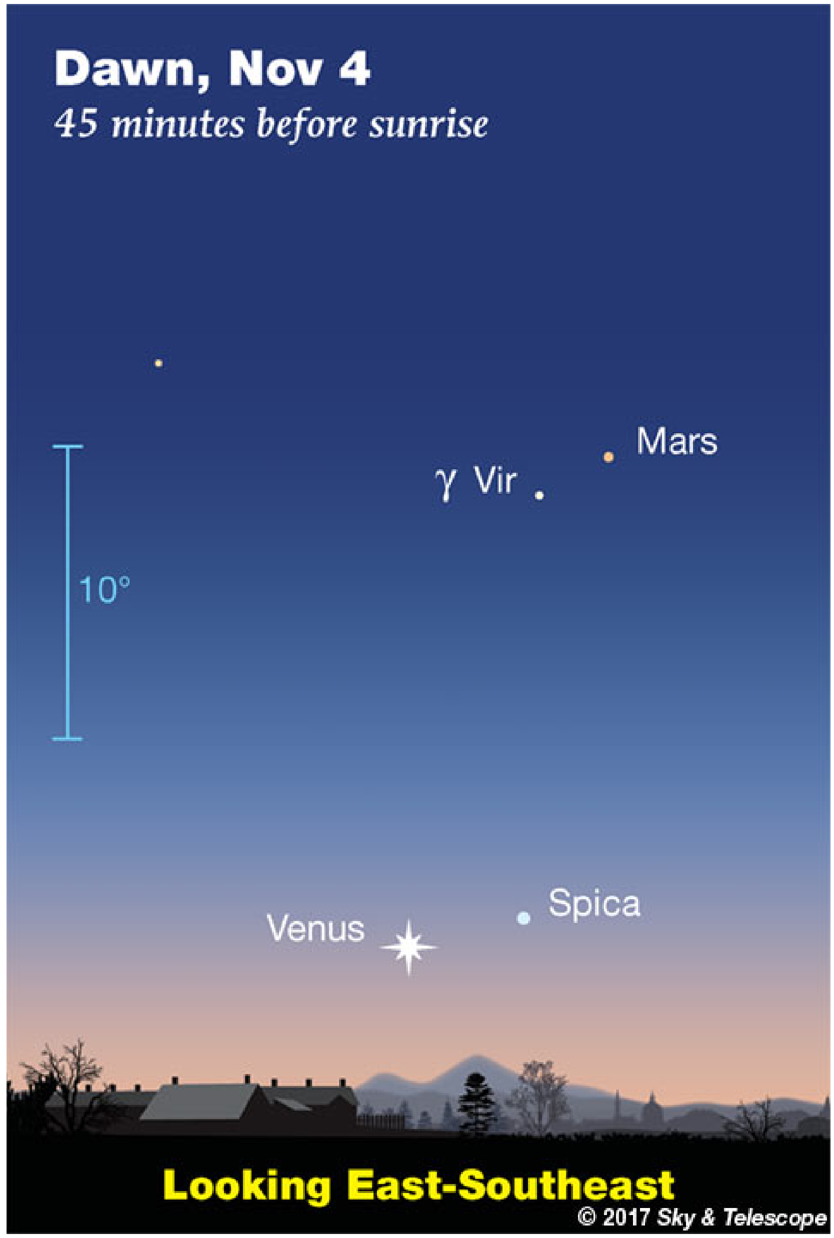
• The bright Moon is below the Great Square of Pegasus. Look to the Moon's left by about three fists at arm's length for the two or three brightest stars of Aries, lined up roughly horizontal.

Thursday, November 2

• Vega is the brightest star in the west on November evenings. Its little constellation Lyra extends to its left, pointing in the direction of Altair, the brightest star in the southwest.

Three of Lyra's leading stars, after Vega, are interesting doubles. Barely above Vega is 4th-magnitude Epsilon Lyrae, the Double-Double. Epsilon forms one corner of a roughly equilateral triangle with Vega and Zeta Lyrae. The triangle is less than 2° on a side, hardly the width of your thumb at arm's length. It easily fits in a binocular's field of view.

Binoculars easily resolve Epsilon. And a 4-inch telescope at 100× or more should resolve each of Epsilon's wide components into a tight pair.



All week, bright Venus and faint Mars shine in the east during early dawn. (The blue 10° scale is about a fist-width at arm's length, always a handy measure.)

Zeta Lyrae is also a double star for binoculars; much tougher, but plainly resolved in any telescope.

Delta Lyrae, upper left of Zeta, is a much wider and easier pair.

Friday, November 3

• Full Moon tonight (exactly full at 1:23 a.m.). The full Moon of November always rides very high in the middle of the night, almost as high as the full Moon of December.

Source: Sky & Telescope

Return to Contents

ISS Sighting Opportunities

For Denver:

Date	Visible	Max Height	Appears	Disappears
Tue Oct 31, 5:46 AM	2 min	40°	32° above S	24° above E
Wed Nov 1, 6:29 AM	5 min	39°	21° above W	11° above NE
Thu Nov 2, 5:39 AM	2 min	45°	45° above NE	10° above NE
Fri Nov 3, 6:22 AM	3 min	21°	20° above NW	10° above NNE

Sighting information for other cities can be found at NASA's Satellite Sighting Information

NASA-TV Highlights

(all times Eastern Daylight Time)

10 a.m., Wednesday, November 1 - Live coverage of Senate Commerce Committee hearing on the nomination of Rep. James Bridenstine to be NASA Administrator (NTV-1 (Public))

12:30 p.m., Thursday, November 2 - NASA to Launch Joint Polar Satellite System (JPSS), NOAA's Newest Weather Satellite (all channels)

6:30 a.m., Friday, November 3 - ISS Expedition 53 In-Flight Interviews with KARE-TV, Minneapolis and "Fox and Friends" and Commander Randy Bresnik and Flight Engineers Joe Acaba and Mark Vande Hei of NASA (Starts at 6:25 a.m.) (all channels)

11:30 a.m., Friday, November 3 - The Smithsonian National Air and Space Museum Presents – "What's New in Aerospace?" Astronaut Presentation with Jack "2fish" Fischer (NTV-1 (Public))

Watch NASA TV on the Net by going to the NASA website.

Return to Contents

Space Calendar

- Oct 31 - [Oct 28] SkySat 8-13/ COPPER 2/ CPOD A & B/ MinXSS 2/ RANGE A & B Minotaur-C-XL-3210 Launch
- Oct 31 - Comet P/2016 G1 (PANSTARRS) Closest Approach To Earth (1.492 AU)
- Oct 31 - Comet 73P-BG/Schwassmann-Wachmann Closest Approach To Earth (2.638 AU)
- Oct 31 - Comet 123P/West-Hartley At Opposition (2.739 AU)
- Oct 31 - [Oct 31] Apollo Asteroid 2017 UO43 Near-Earth Flyby (0.017 AU)
- Oct 31 - Apollo Asteroid 2017 UO2 Near-Earth Flyby (0.028 AU)
- Oct 31 - Apollo Asteroid 2003 UV11 Near-Earth Flyby (0.038 AU)
- Oct 31 - [Oct 29] Aten Asteroid 2017 UP6 Near-Earth Flyby (0.039 AU)
- Oct 31 - Apollo Asteroid 2017 TZ4 Near-Earth Flyby (0.049 AU)
- Oct 31 - Amor Asteroid 2017 UO1 Near-Earth Flyby (0.066 AU)
- Oct 31 - Asteroid 3783 Morris Closest Approach To Earth (1.176 AU)
- Oct 31 - Asteroid 10958 Mont Blanc Closest Approach To Earth (1.316 AU)
- Oct 31 - Asteroid 32605 Lucy Closest Approach To Earth (2.450 AU)
- Nov 01 - Comet 73P-BQ/Schwassmann-Wachmann Closest Approach To Earth (1.868 AU)

- Nov 01 - Comet 73P-N/Schwassmann-Wachmann At Opposition (1.881 AU)
- Nov 01 - Comet 219P/LINEAR Closest Approach To Earth (1.883 AU)
- Nov 01 - Asteroid 9719 Yakage Occults HIP 36393 (5.1 Magnitude Star)
- Nov 01 - [Oct 31] Apollo Asteroid 2017 UD43 Near-Earth Flyby (0.012 AU)
- Nov 01 - Asteroid 316020 Linshuhow Closest Approach To Earth (1.531 AU)
- Nov 01 - Asteroid 1677 Tycho Brahe Closest Approach To Earth (1.643 AU)
- Nov 01 - Plutino 47171 (1999 TC36) At Opposition (29.598 AU)
- Nov 02 - [Oct 27] 100th Anniversary (1917), Mount Wilson 100-inch Telescope First Light
- Nov 02 - Comet 355P/LINEAR-NEAT At Opposition (0.736 AU)
- Nov 02 - Comet 73P-AX/Schwassmann-Wachmann At Opposition (1.908 AU)
- Nov 02 - Comet 73P-V/Schwassmann-Wachmann Closest Approach To Earth (2.665 AU)
- Nov 02 - Comet 73P-BB/Schwassmann-Wachmann Closest Approach To Earth (2.743 AU)
- Nov 02 - Apollo Asteroid 496816 (1989 UP) Near-Earth Flyby (0.055 AU)
- Nov 02 - Asteroid 85197 Ginkgo Closest Approach To Earth (0.871 AU)
- Nov 02 - Asteroid 46610 Besixdouz Closest Approach To Earth (0.882 AU)
- Nov 02 - Asteroid 8003 Kelvin Closest Approach To Earth (1.018 AU)
- Nov 02 - Asteroid 2597 Arthur Closest Approach To Earth (1.543 AU)
- Nov 02 - Asteroid 3767 DiMaggio Closest Approach To Earth (1.979 AU)
- Nov 02 - Kuiper Belt Object 472271 (2014 UM33) At Opposition (42.855 AU)
- Nov 02 - 15th Anniversary (2002), Stardust, Asteroid 5535 Annefrank Flyby
- Nov 02 - 70th Anniversary (1947), Howard Hughes Flies the Spruce Goose
- Nov 03 - [Oct 30] 60th Anniversary (1957), Sputnik 2 Launch (Laika Dog)
- Nov 03 - Taurids Meteor Shower Peak
- Nov 03 - Comet 73P-BO/Schwassmann-Wachmann At Opposition (1.954 AU)
- Nov 03 - Comet 73P-BN/Schwassmann-Wachmann At Opposition (1.961 AU)
- Nov 03 - Comet 73P-BK/Schwassmann-Wachmann At Opposition (1.979 AU)
- Nov 03 - Comet 73P-J/Schwassmann-Wachmann At Opposition (1.990 AU)
- Nov 03 - Aten Asteroid 2009 UZ87 Near-Earth Flyby (0.070 AU)
- Nov 03 - Apollo Asteroid 2015 WA2 Near-Earth Flyby (0.093 AU)
- Nov 03 - Asteroid 1655 Comas Sola Closest Approach To Earth (1.248 AU)
- Nov 03 - Asteroid 31664 Randiiwessen Closest Approach To Earth (1.713 AU)
- Nov 03 - Asteroid 3524 Schulz Closest Approach To Earth (1.723 AU)

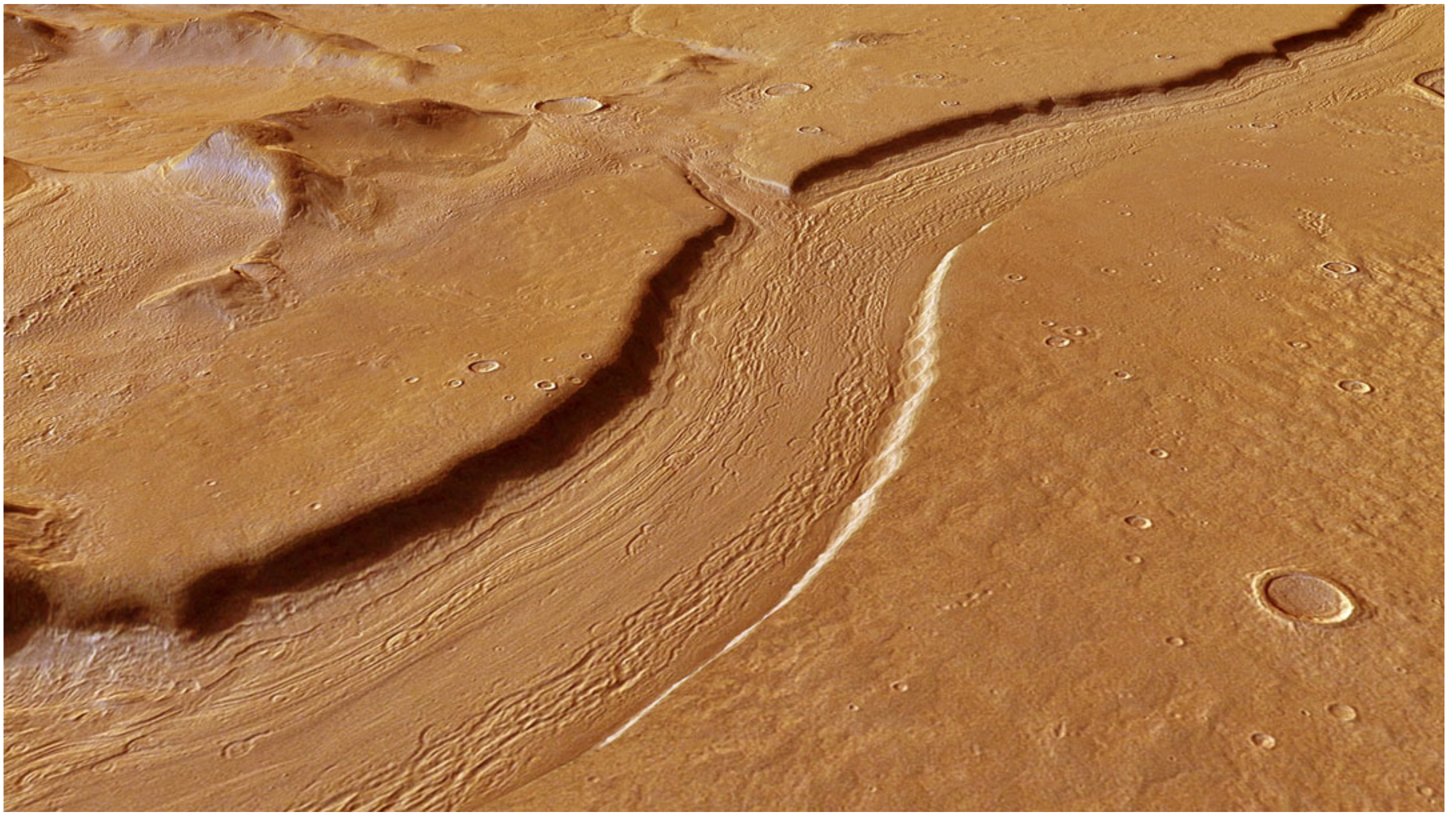
- Nov 03 - Apollo Asteroid 4486 Mithra Closest Approach To Earth (2.285 AU)
- Nov 03 - Asteroid 5515 Naderi Closest Approach To Earth (2.289 AU)
- Nov 03 - Kuiper Belt Object 120348 (2004 TY364) At Opposition (38.116 AU)

Source: JPL Space Calendar

Return to Contents

Food for Thought

New Research says "Levitating" Sands Explain How Mars Got its Landscape



Mars modern landscape is something of a paradox. It's many surface features are very similar to those on Earth that are caused by water-borne erosion. But for the life of them, scientists cannot imagine how water could have flown on Mars' cold and desiccated surface for most of Mars' history. Whereas Mars was once a warmer, wetter place, it has had a very thin atmosphere for billions of years now, which makes water flow and erosion highly unlikely.

In fact, while the surface of Mars periodically becomes warm enough to allow for ice to thaw, liquid water would boil once exposed to the thin atmosphere. However, in a new study led by an international team of researchers from the UK, France and Switzerland, it has been determined that a different kind of transport process involving the sublimation of water ice could have led to the Martian landscape becoming what it is today.

The study, which was led Dr. Jan Raack – a Marie Sklodowska-Curie Research Fellow at The Open University – was recently published in the scientific journal *Nature Communications.* Titled "Water Induced Sediment Levitation Enhances Downslope Transport on Mars", this research study consisted of experiments that tested how processes on Mars' surface could allow water transport without it being in liquid form.

To conduct their experiments, the team used the Mars Simulation Chamber, an instrument at The Open University that is capable of simulating the atmospheric conditions on Mars. This involved lowering the atmospheric pressure inside the chamber to what is normal for Mars – about 7 mbar, compared to 1000 mbar (1 bar or 100 kilopascals) here on Earth – while also adjusting temperatures.

On Mars, temperatures range from a low of -143 °C (-255 °F) during winter at the poles to a high of 35 °C (95 °F) at the equator during midday in the summer. Having recreated these conditions, the team found that when water ice exposed to the simulated Martian atmosphere, it would not simply melt. Instead, it would become unstable and begin violently boiling off.

However, the team also found that this process would be capable of moving large amounts of sand and sediment, which would effectively “levitate” on the boiling water. This means that, compared to Earth, relatively small amounts of liquid water are capable of moving sediment across the surface of Mars. These levitating pockets of sand and debris would be capable of forming tje large dunes, gullies, recurring slope lineae, and other features observed on Mars.

In the past, scientists have indicated how these features were the result of sediment transportation down slopes, but were unclear as to the mechanisms behind them. As Dr. Jan Raack explained in a OUNews press release:

“Our research has discovered that this levitation effect caused by boiling water under low pressure enables the rapid transport of sand and sediment across the surface. This is a new geological phenomenon, which doesn’t happen on Earth, and could be vital to understanding similar processes on other planetary surfaces.”

Through these experiments, Dr. Raack and his colleagues were able to shed light on how conditions on Mars could allow for features that we tend to associate with flowing water here on Earth. In addition to helping to resolve a somewhat contentious debate concerning Mars’ geological history and evolution, this study is also significant when it comes to future exploration missions.

Dr. Raack acknowledges the need for more research to confirm their study’s conclusions, and indicated that the ESA’s *ExoMars 2020 Rover* will be well-situated to conduct it once it is deployed :

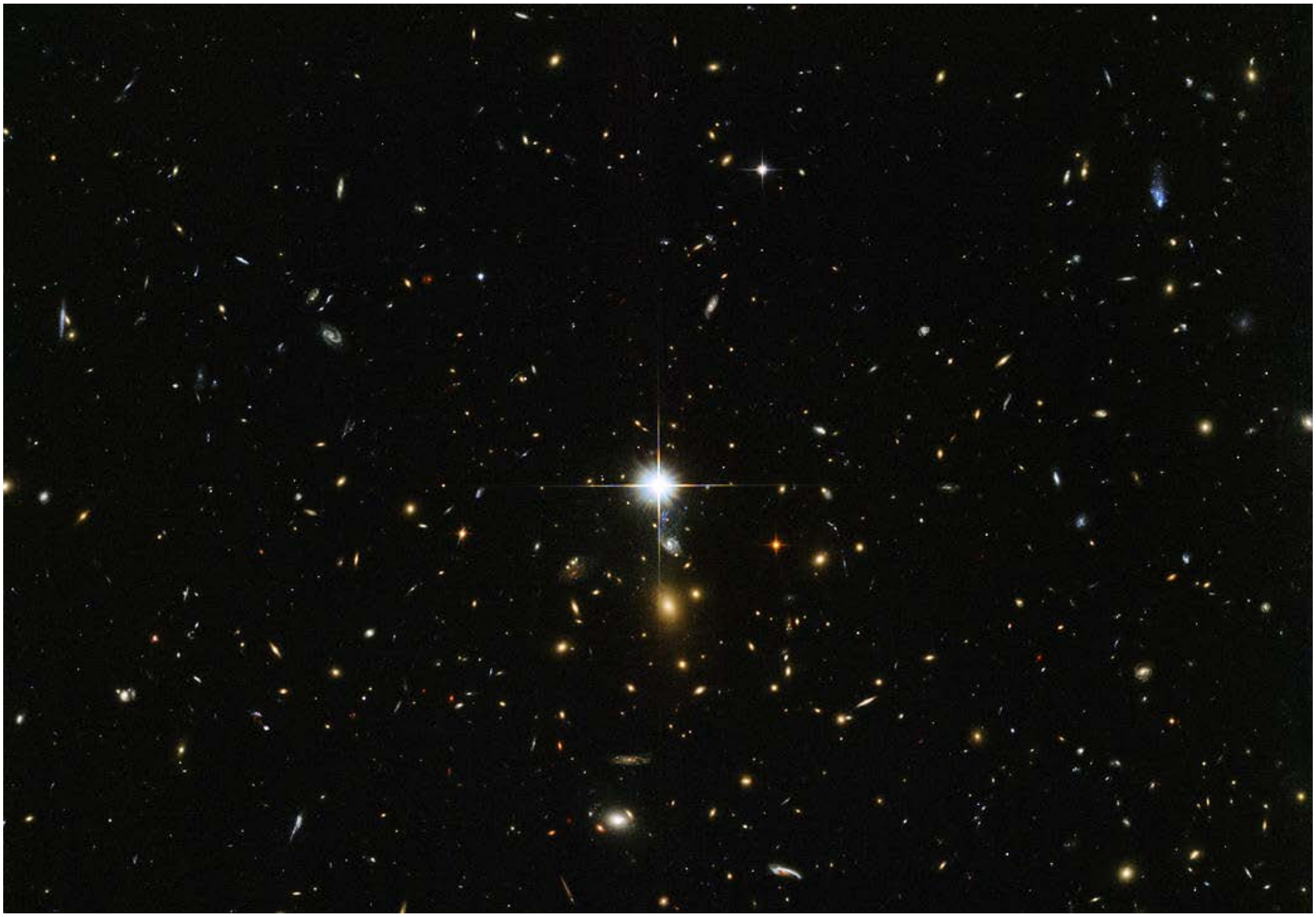
“This is a controlled laboratory experiment, however, the research shows that the effects of relatively small amounts of water on Mars in forming features on the surface may have been widely underestimated. We need to carry out more research into how water levitates on Mars, and missions such as the ESA ExoMars 2020 Rover will provide vital insight to help us better understand our closest neighbour.”

The study was co-authored by scientists from the STFC Rutherford Appleton Laboratory, the University of Bern, and the University of Nantes. The initial concept was developed by Susan J. Conway of the University of Nantes, and was funded by a grant from the Europlanet 2020 Research Infrastructure, which is part the European Union’s Horizon 2020 Research and Innovation Program.

Source: Universe Today

Return to Contents

Space Image of the Week



Hubble Digs into Cosmic Archaeology

This NASA/ESA Hubble Space Telescope image is chock-full of galaxies. Each glowing speck is a different galaxy, except the bright flash in the middle of the image which is actually a star lying within our own galaxy that just happened to be in the way. At the center of the image lies something especially interesting, the center of the massive galaxy cluster called WHL J24.3324-8.477, including the brightest galaxy of the cluster.

The Universe contains structures on various scales — planets collect around stars, stars collect into galaxies, galaxies collect into groups, and galaxy groups collect into clusters. Galaxy clusters contain hundreds to thousands of galaxies bound together by gravity. Dark matter and dark energy play key roles in the formation and evolution of these clusters, so studying massive galaxy clusters can help scientists to unravel the mysteries of these elusive phenomena.

This infrared image was taken by Hubble's Advanced Camera for Surveys and Wide-Field Camera 3 as part of an observing program called RELICS (Reionization Lensing Cluster Survey). RELICS imaged 41 massive galaxy clusters with the aim of finding the brightest distant galaxies for the forthcoming NASA/ESA/CSA James Webb Space Telescope to study. Such research will tell us more about our cosmic origins.

Source: NASA

Return to Contents