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1. November Supermoon a Spectacular Sight

The moon is a familiar sight in our sky, brightening dark nights and reminding us of space exploration, past and present. But the upcoming supermoon — on Monday, Nov. 14 — will be especially “super” because it’s the closest full moon to Earth since 1948. We won’t see another supermoon like this until 2034.

The moon’s orbit around Earth is slightly elliptical so sometimes it is closer and sometimes it’s farther away. When the moon is full as it makes its closest pass to Earth it is known as a supermoon. At perigee — the point at which the moon is closest to Earth — the moon can be as much as 14 percent closer to Earth than at apogee, when the moon is farthest from our planet. The full moon appears that much larger in diameter and because it is larger shines 30 percent more moonlight onto the Earth.

The biggest and brightest moon for observers in the United States will be on Monday morning just before dawn. On Monday, Nov. 14, the moon is at perigee at 6:22 a.m. EST and “opposite” the sun for the full moon at 8:52 a.m. EST (after moonset for most of the US).

If you’re not an early riser, no worries. “I’ve been telling people to go out at night on either Sunday or Monday night to see the supermoon,” said Noah Petro, deputy project scientist for NASA’s Lunar Reconnaissance Orbiter (LRO) mission. “The difference in distance from one night to the next will be very subtle, so if it’s cloudy on Sunday, go out on Monday. Any time after sunset should be fine. Since the moon is full, it’ll rise at nearly the same time as sunset, so I’d suggest that you head outside after sunset, or once it’s dark and the moon is a bit higher in the sky. You don’t have to stay up all night to see it, unless you really want to!”

This is actually the second of three supermoons in a row, so if the clouds don’t cooperate for you this weekend, you will have another chance next month to see the last supermoon of 2016 on Dec. 14.

NASA scientists have studied the moon for decades. A better understanding of our moon helps scientists infer what is happening on other planets and objects in the solar system. “The moon is the Rosetta Stone by which we understand the rest of the solar system,” Petro said.

LRO has been mapping the moon’s surface and capturing high resolution images for more than seven years. Extensive mapping of the moon aids scientists in understanding our planet’s history, as well as that of planetary objects beyond the Earth-moon system.

“Because we have the Apollo samples, we can tie what we see from orbit to those surface samples and make inferences about what has happened to the moon throughout its lifetime,” Petro said. “The samples tell us how old certain lunar surfaces are, and based on the number of impact craters on those surfaces, we can
estimate the ages of the rest of the moon. Furthermore, we can then apply those models to estimate the ages of surface on other planets in our solar system — all by studying the moon!“

Banner image: This image approximates the look of the Nov. 14, 2016, full moon with data from NASA's Lunar Reconnaissance Orbiter. Credit: NASA Goddard's Scientific Visualization Studio

Related Link

- Tips for photographing the supermoon
- NASA's LRO mission website

Source: NASA
2. Solved: One of the Mysteries of Globular Clusters

A study shows that the most massive stars in the last stages of their lives are those which contaminate the interstellar medium with new chemical elements, giving rise to successive generations of stars in these 'astronomical fossils'.

Globular clusters are swarms of about a million stars bound together by their gravitational field and distributed roughly spherically, which have formed from a single cloud of interstellar gas and dust. As their ages are close to that of the universe itself, they are considered veritable "astronomical fossils" because they retain information about the chemical composition and the evolution of galaxies from the epoch of their origin. In these cluster stars of different sizes are formed, and by observing the most massive stars which still survive we can work out the age of the cluster. However since some twenty years ago we know that there are different generations of stars in a single cluster. And the origin of these successive generations was unclear until now.

The professional journal The Astrophysical Journal Letters is publishing today a study by an international team, in which the Instituto de Astrofísica de Canarias (IAC) has participated, which solves this mystery about the formation and evolution of globular clusters in the early universe. According to this study the key is in the most massive, evolved AGB (asymptotic giant branch) stars. This is the first evidence that these stars play a fundamental role in the contamination of the interstellar medium, from which successive generations of stars have formed.

Paolo Ventura, astronomer from the Istituto Nazionale di Astrofisica (INAF) and first author of the article, mentioned the importance of the AGB stars during his recent stay at the IAC as a Severo Ochoa visiting researcher, during which time they were working on the study published today. "Until now", explains Aníbal García-Hernández, researcher at the IAC and the second author of the article, "various different types of stars had been prepared as candidates: supermassive stars, rapidly rotating massive stars, massive interacting binaries, and massive AGB stars. This research closes the debate about which stars cause this process, and resolves one of the outstanding unknowns in the formation and evolution of globular clusters", he concludes.
"The next step", explains Flavia Dell'Agli, who recently joined the IAC as a postdoctoral researcher, and who is the third author of the paper, "will be the systematic analysis of all the globular clusters in the northern hemisphere already observed in the APOGEE project, as well as the large numbers of these systems which will be observed, starting next spring, in the southern hemisphere in APOGEE-2".

The role of the AGB stars

Historically, globular clusters have been used as laboratories for studying stellar evolution, because it was thought that all the stars in a globular cluster formed at the same time and thus have the same age. However since a couple of decades ago it has been known that almost all the globular clusters contain several stellar populations. In the first generation the chemical abundances, for example those of elements such as aluminium and magnesium, show the composition of the original interstellar (or intra-cluster) medium. In the short time (astronomically) of only 500 million years the medium is contaminated and from this medium the second generation of stars is formed. Researchers think that some of the most massive stars in the first generation produce and destroy the heavy elements in their interiors ("nucleosynthesis") and by rapid mass loss contaminate the interstellar medium where the second generation of stars then forms with different chemical abundances. But which stars are responsible for this phenomenon?

Researchers suspected the most massive AGB (asymptotic giant branch) stars, which have between four and eight times the mass of the Sun, and now this study has corroborated the suspicion. To do so they used observations of the abundances of magnesium and aluminium observed by the international collaboration Sloan Digital Sky Survey (SDSS-III) and specific survey APOGEE (Apache Point Observatory Galactic Evolution Experiment) combined with theoretical models of nucleosynthesis in AGB stars. They were able to reproduce for the first time the anticorrelation (a relation in which when one quantity grows the other decreases) between the two elements in five globular clusters with very different metallicities (overall quantities of metals).

The production of aluminium and the destruction of magnesium in the interiors of stars is very sensitive to their temperature and overall metallicity, so they offer a good diagnostic to unveil the nature of the contaminating stars. The higher the temperature in the zone where these elements originate, the base of the convection zone inside the star, the more aluminium is produced and the more magnesium is destroyed. It is also known that the temperature in this zone rises when the total quantity of metals in the star falls. In massive AGB stars different types of these anticorrelations are expected: at very low metallicity we expect more aluminium and more destruction of magnesium, and at higher metallicity, exactly the opposite. These variations in the anticorrelations are exactly what is observed in the globular clusters, and agrees very well with the theoretical predictions for massive AGB stars, which produce these elements in their interiors, and then eject them during a phase of extremely rapid mass loss.

Source: Spaceref.com
In a first-of-its-kind collaboration, NASA's Spitzer and Swift space telescopes joined forces to observe a microlensing event, when a distant star brightens due to the gravitational field of at least one foreground cosmic object. This technique is useful for finding low-mass bodies orbiting stars, such as planets. In this case, the observations revealed a brown dwarf.

Brown dwarfs are thought to be the missing link between planets and stars, with masses up to 80 times that of Jupiter. But their centers are not hot or dense enough to generate energy through nuclear fusion the way stars do. Curiously, scientists have found that, for stars roughly the mass of our sun, less than 1 percent have a brown dwarf orbiting within 3 AU (1 AU is the distance between Earth and the sun). This phenomenon is called the "brown dwarf desert."

The newly discovered brown dwarf, which orbits a host star, may inhabit this desert. Spitzer and Swift observed the microlensing event after being tipped off by ground-based microlensing surveys, including the Optical Gravitational Lensing Experiment (OGLE). The discovery of this brown dwarf, with the unwieldy name OGLE-2015-BLG-1319, marks the first time two space telescopes have collaborated to observe a microlensing event.

"We want to understand how brown dwarfs form around stars, and why there is a gap in where they are found relative to their host stars," said Yossi Shvartzvald, a NASA postdoctoral fellow based at NASA's Jet Propulsion Laboratory, Pasadena, California, and lead author of a study published in the Astrophysical Journal. "It's possible that the 'desert' is not as dry as we think."

**What is microlensing?**

In a microlensing event, a background source star serves as a flashlight for the observer. When a massive object passes in front of the background star along the line of sight, the background star brightens because
the foreground object deflects and focuses the light from the background source star. Depending on the mass and alignment of the intervening object, the background star can briefly appear thousands of times brighter.

One way to understand better the properties of the lensing system is to observe the microlensing event from more than one vantage point. By having multiple telescopes record the brightening of the background star, scientists can take advantage of "parallax," the apparent difference in position of an object as seen from two points in space. When you hold your thumb in front of your nose and close your left eye, then open it and close your right eye, your thumb seems to move in space -- but it stays put with two eyes open. In the context of microlensing, observing the same event from two or more widely separated locations will result in different magnification patterns.

"Anytime you have multiple observing locations, such as Earth and one, or in this case, two space telescopes, it's like having multiple eyes to see how far away something is," Shvartzvald said. "From models for how microlensing works, we can then use this to calculate the relationship between the mass of the object and its distance."

The new study

Spitzer observed the binary system containing the brown dwarf in July 2015, during the last two weeks of the space telescope's microlensing campaign for that year.

While Spitzer is over 1 AU away from Earth in an Earth-trailing orbit around the sun, Swift is in a low Earth orbit encircling our planet. Swift also saw the binary system in late June 2015 through microlensing, representing the first time this telescope had observed a microlensing event. But Swift is not far enough away from ground-based telescopes to get a significantly different view of this particular event, so no parallax was measured between the two. This gives scientists insights into the limits of the telescope's capabilities for certain types of objects and distances.

"Our simulations suggest that Swift could measure this parallax for nearby, less massive objects, including 'free-floating planets,' which do not orbit stars," Shvartzvald said.

By combining data from these space-based and ground-based telescopes, researchers determined that the newly discovered brown dwarf is between 30 and 65 Jupiter masses. They also found that the brown dwarf orbits a K dwarf, a type of star that tends to have about half the mass of the sun. Researchers found two possible distances between the brown dwarf and its host star, based on available data: 0.25 AU and 45 AU. The 0.25 AU distance would put this system in the brown dwarf desert.

"In the future, we hope to have more observations of microlensing events from multiple viewing perspectives, allowing us to probe further the characteristics of brown dwarfs and planetary systems," said Geoffrey Bryden, JPL scientist and co-author of the study.

JPL manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center at Caltech in Pasadena, California. Spacecraft operations are based at Lockheed Martin Space Systems Company, Littleton, Colorado. Data are archived at the Infrared Science Archive housed at the Infrared Processing and Analysis Center at Caltech. NASA's Swift satellite was launched in November 2004 and is managed by NASA's Goddard Space Flight Center in Greenbelt, Maryland.

Source: NASA
The Night Sky

Friday, November 11

• Saturn is falling ever farther away to the lower right of Venus at dusk. Far to Venus's upper left, Mars is drawing closer to it — very gradually.

• Orion is clearing the eastern horizon by about 8 p.m. now, depending on how far east or west you live in your time zone. High above Orion shines orange Aldebaran. Above Aldebaran is the little Pleiades cluster, the size of your fingertip at arm's length. Far left of the Pleiades is bright Capella.

Saturday, November 12

• The waxing gibbous Moon shines in the southeast this evening. Upper left of it by about 15° are the two or three leading stars of Aries. About the same distance lower left of the Moon is Menkar, Alpha Ceti, the only brightish star (magnitude 2.5) in Cetus's head.

Sunday, November 13

• Full Moon tonight and tomorrow. The Moon is exactly full at 8:52 a.m. Eastern Standard Time Monday morning, splitting the difference between Sunday and Monday evenings.

• And yes, this is a record-breaking full "supermoon," by just a little bit. Can you really detect its difference from an average Moon? For a way to do this, see “Supermoons”: A Unique Observing Challenge.

Monday, November 14

• Another night of full supermoon; see above. Look for Aldebaran to its lower left. And can you see the Pleiades to its upper right, through the supermoonlight?

Tuesday, November 15

• The Moon, just past full, has now stepped to the lower left of Aldebaran (as seen in the evening).

Source: Sky & Telescope
ISS Sighting Opportunities

For Denver:

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Sighting information for other cities can be found at NASA's [Satellite Sighting Information](https://www.nasa.gov/)

NASA-TV Highlights
(all times Eastern Daylight Time)

**Friday, November 11**

12 p.m., Video File of the ISS Expedition 50-51/Soyuz MS-03 Crew Activities at the Baikonur Cosmodrome in Kazakhstan (Novitskiy, Whitson, Pesquet) (all channels)

2 p.m., 4 p.m., 8 p.m., Replay of the Heroes and Legends Grand Opening Ceremony (all channels)

3 p.m., 7 p.m., Replay of the Video File of the ISS Expedition 50-51/Soyuz MS-03 Crew Activities at the Baikonur Cosmodrome in Kazakhstan (Novitskiy, Whitson, Pesquet) (all channels)

11 p.m., Replay of the Video File of the ISS Expedition 50-51/Soyuz MS-03 Crew Activities at the Baikonur Cosmodrome in Kazakhstan (Novitskiy, Whitson, Pesquet) (NTV-1 (Public))

**Saturday, November 12**

1 a.m., Replay of the Video File of the ISS Expedition 50-51/Soyuz MS-03 Crew's Pre-Launch Activities at the Baikonur Cosmodrome in Kazakhstan (Novitskiy, Whitson, Pesquet; recorded from Nov. 1-10) (NTV-1 (Public))

2 a.m., 7 a.m., Replay of the Video File of the ISS Expedition 50-51/Soyuz MS-03 Crew Activities at the Baikonur Cosmodrome in Kazakhstan (Novitskiy, Whitson, Pesquet) (NTV-1 (Public))

3 a.m., Replay of the Video File of the ISS Expedition 50-51/Soyuz MS-03 Crew's Pre-Launch Activities at the Baikonur Cosmodrome in Kazakhstan (Novitskiy, Whitson, Pesquet; recorded from Nov. 1-10) (NTV-3 (Media))

9 a.m., Replay of the Heroes and Legends Grand Opening Ceremony (all channels)

10 a.m., 6 p.m., Replay of the NASA Science Media Briefing on Cyclone Global Navigation Satellite System (CYGNSS) Mission (all channels)

11 a.m., 3 p.m., 4 p.m., Replay of the Video File of the ISS Expedition 50-51/Soyuz MS-03 Crew's Pre-Launch Activities at the Baikonur Cosmodrome in Kazakhstan (Novitskiy, Whitson, Pesquet; recorded from Nov. 1-10) (all channels)

Watch NASA TV on the Net by going to the [NASA website](https://www.nasa.gov/).
Space Calendar

- Nov 11 - [Nov 04] 50th Anniversary (1966), Gemini 12 Launch (Jim Lovell and Buzz Aldrin)
- Nov 11 - [Nov 10] WorldView 4 (GeoEye 2)/ RAVAN/ U2U/ Aerocube 8C & 8D/ Prometheus 2.1 & 2.2/ CELTEE 1 Atlas 5 Launch
- Nov 11 - [Nov 11] XPNAV 1/ Xiaoxiang 1 CZ-11 Launch
- Nov 11 - Cassini, Distant Flyby of Tethys
- Nov 11 - Comet 73P-BF/Schwassmann-Wachmann Perihelion (0.993 AU)
- Nov 11 - [Nov 06] Apollo Asteroid 2016 VQ Near-Earth Flyby (0.007 AU)
- Nov 11 - [Nov 07] Apollo Asteroid 2016 VA1 Near-Earth Flyby (0.029 AU)
- Nov 11 - Asteroid 301 Bavaria Closest Approach To Earth (1.883 AU)
- Nov 11 - Vladimir Solovyov's 70th Birthday (1946)
- Nov 11 - 180th Birthday (1836), Macau Meteorite Fall (Hit Cattle in Brazil?)
- Nov 12 - Comet 73P-V/Schwassmann-Wachmann Closest Approach To Earth (1.723 AU)
- Nov 12 - Comet P/1999 XN120 (Catalina) At Opposition (2.435 AU)
- Nov 12 - [Nov 08] Apollo Asteroid 2016 VY1 Near-Earth Flyby (0.007 AU)
- Nov 12 - [Nov 07] Apollo Asteroid 2016 VZ Near-Earth Flyby (0.008 AU)
- Nov 12 - [Nov 06] Apollo Asteroid 2016 VR Near-Earth Flyby (0.016 AU)
- Nov 12 - [Nov 10] Apollo Asteroid 2016 VN3 Near-Earth Flyby (0.016 AU)
- Nov 12 - Apollo Asteroid 2016 UN5 Near-Earth Flyby (0.048 AU)
- Nov 12 - Amor Asteroid 2016 UX40 Near-Earth Flyby (0.059 AU)
- Nov 12 - Apollo Asteroid 2016 UZ56 Near-Earth Flyby (0.099 AU)
- Nov 12 - Asteroid 8889 Mockturtle Closest Approach To Earth (1.701 AU)
- Nov 12 - 35th Anniversary (1981), STS-2 Launch (Space Shuttle Columbia)
- Nov 12 - Seth Nicholson's 125th Birthday (1891)
- Nov 13 - [Nov 08] Apollo Asteroid 2016 VX1 Near-Earth Flyby (0.013 AU)
- Nov 13 - [Nov 07] Amor Asteroid 2016 VZ3 Near-Earth Flyby (0.097 AU)
- Nov 13 - Asteroid 12542 Laver Closest Approach To Earth (2.119 AU)
- Nov 13 - Asteroid 19148 Alaska Closest Approach To Earth (2.470 AU)
- Nov 14 - [Nov 07] Cassini, Titan Flyby
- Nov 14 - Comet 226P/Pigott-LINEAR-Kowalski Closest Approach To Earth (0.991 AU)
- Nov 14 - Comet P/2006 F4 At Opposition (3.640 AU)
- Nov 14 - [Nov 05] Apollo Asteroid 2016 UB107 Near-Earth Flyby (0.022 AU)
- Nov 14 - [Nov 10] Amor Asteroid 2016 VP2 Near-Earth Flyby (0.065 AU)
- Nov 14 - Atira Asteroid 2013 JX28 Closest Approach To Earth (0.722 AU)
- Nov 14 - Apollo Asteroid 2212 Hephaistos Closest Approach To Earth (1.129 AU)
- Nov 14 - Asteroid 4738 Jimihendrix Closest Approach To Earth (1.702 AU)
- Nov 14 - Asteroid 2636 Lassell Closest Approach To Earth (2.244 AU)
- Nov 14 - Neptune Trojan 2007 VL305 At Opposition (27.221 AU)
- Nov 14 - Kuiper Belt Object 2012 VP113 At Opposition (82.501 AU)
- Nov 14 - 45th Anniversary (1971), Mariner 9, Mars Orbit Insertion
- Nov 14 - Ken Bowersox's 60th Birthday (1956)

Source: JPL Space Calendar
Food for Thought

Beagle 2 'was so close to Mars success'

Beagle 2, the failed British mission to Mars in 2003, came "excruciatingly close" to succeeding, a study shows. A new analysis of pictures of the Beagle 2 spacecraft shows that it did not crash-land on the Martian surface. Instead, it indicates that the landing went to plan and at least three of its four solar panels opened successfully.

The analysis also suggests that the probe may even have worked for several months, but was unable to send its data back to Earth. Prof Mark Sims of Leicester University, who commissioned the study, told BBC News that there is an extremely small possibility that Beagle 2 might still be working on the Martian surface. "It may have worked for hundreds of days depending on how much dust was deposited on the solar panels and whether any dust devils were cleaning the panels - as happened with Nasa's Mars Exploration Rovers," he said. "One possibility is that it could still be working today - but it is extremely unlikely and I doubt that it is."

Dr Manish Patel, of the Open University, was among the hundreds of UK scientists who worked on the Beagle 2 mission. He agrees that the new evidence suggests that Beagle 2 took lots of scientific data but was unable to send it back. "If Beagle 2 went into surface operations mode, it could have continued for some time performing the initial pre-programmed operations, happily taking data and waiting for a response from the orbiters. It turned out to be a very lonely time for the lander at the surface," he said.

Those views are backed by Prof Jan-Peter Muller of the Mullard Space Science Laboratory, which is part of University College London - who has no ties with the Beagle-2 mission. "Given that (Nasa's) exploration rover Opportunity is going strong since January 2004 when it was due to last only until March 2004 and that Mars Express is going strong 13 years after orbit insertion when it was due to last only 3 years, the possibility that Beagle 2 could still be collecting data after 13 years is remotely possible."
Charismatic

The British built Beagle 2 Spacecraft was due to land on the Martian surface on Christmas Day in 2003. The mission was charismatically led by the late Prof Colin Pillinger. The spacecraft was capable of collecting soil samples and analysing them for signs of organic molecules associated with life in a miniaturised on-board laboratory.

Disappointingly, no signal was received on Christmas Day. The search for a response from Beagle 2 continued for several months but the spacecraft was never heard from again.

In 2014, Nasa's Mars Reconnaissance Orbiter (MRO) found Beagle 2 on the Martian surface. The spacecraft took pictures which seemed to indicate that the spacecraft landed as planned and some of its solar panels had opened.

In the new detailed analysis, Nick Higgett and his team at De Montfort University not only confirmed this but also indicated that Beagle 2 had deployed at least three of its solar panels - with the fourth and final panel possibly beginning to open. The technique is based on simulating possible configurations of the lander on the surface and comparing the amount of sunlight that reflects off the simulated lander with real pictures taken from Nasa's Mars Reconnaissance Orbiter.

The researchers then identified which landing configuration of one, two, three or four solar panels opened was the best fit. "Hopefully these results help to solve a long held mystery and will benefit any future missions to Mars," said Mr Higgett.

So close

"We got so close," says Prof Sims, adding: "We succeeded in so many elements. It is a great pity the communications didn't work and we didn't get the science back."

Prof Sims, who worked on Beagle 2, says that he and others who worked on the mission take satisfaction from the fact that the system did seem to work so well. "It shows that the Beagle 2 team did an amazing job. It shows that the design was sound. It got there. It landed on Mars at the first attempt."

The analysis suggests that Beagle 2 fell at the very final hurdle. It was unable to send back data or receive instructions from Earth. This may have been because the fourth solar panel may have partially opened and shielded the radio antenna. Alternatively, the receiver might have malfunctioned. Another possibility is that internal electrical systems were damaged by a heavy landing.

After studying the analysis, Dr Patel says he feels "incredibly frustrated" but also "incredibly proud" that the Beagle 2 team came so close. "Previously, I assumed it was in pieces. But now I feel very proud to know that it's there, intact, and was (likely) ready to do some great science," he explained. "This kind of tantalising result on a long held mystery is the kind of thing that keeps us going, that really inspires me to persist in the challenge of exploring Mars. "I like to think that in every failure there is a success hidden somewhere that teaches us and motivates us. This is a perfect example."

The new results will be discussed by Mark Sims and Geraint Morgan at the Colin Pillinger Memorial Talk at Bristol University next Wednesday 16 November.

Source: BBC
**Space Image of the Week**

**Anything But Black**

**Explanation:** ESO’s various observatory sites in Chile — [Paranal](https://www.eso.org/public/observatories-and-sites/western-observatories/paranal/), [La Silla](https://www.eso.org/public/observatories-and-sites/western-observatories/lasilla/), [Chajnantor](https://www.eso.org/public/observatories-and-sites/western-observatories/chajnantor/) — boast enviably low levels of light pollution. However, the skies overhead are rarely pitch-black!

As shown in this image of [Paranal Observatory](https://www.eso.org/public/observatories-and-sites/western-observatories/paranal/), the skies regularly display a myriad of colours and astronomical sights, from the plane of the Milky Way shining brightly overhead to the orange-hued speck of Mars (left), the starry constellations of [Scorpius](https://www.eso.org/public/constellations/scorpius/) and [Orion](https://www.eso.org/public/constellations/orion/), and the magenta splash of the [Carina Nebula](https://www.eso.org/public/constellations/carina-nebula/) (upper middle). Despite the remote location there are also occasional signs of human activity, for example the sequence of lamps seen in the centre of the frame. These faint lights illuminate the route from the Very Large Telescope (VLT) to the Visible and Infrared Survey Telescope for Astronomy (VISTA) where this image was taken.

Due to the highly sensitive camera this photograph also showcases a mysterious phenomenon called **airglow**. The night sky is ablaze with deep red and eerie green hues, caused by the faint glow of Earth’s atmosphere. Because of airglow, no observatory site on Earth could ever be absolutely, completely dark — although ESO’s do come pretty close.

This image was taken by talented astronomer and photographer Yuri Beletsky, a member of the 2016 ESO Fulldome Expedition team. This team visited Chile to gather spectacular images for use in the ESO Supernova Planetarium & Visitor Centre.

**Credit:** Yuri Beletsky (LCO)/ESO

Source: [ESO](https://www.eso.org/public)