



ASTRO

NEWSLETTER

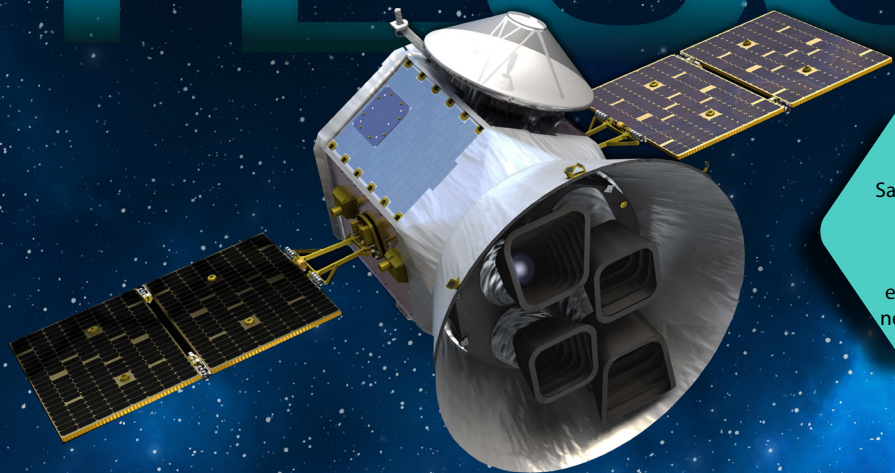
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TRANSITING EXOPLANET SURVEY SATELLITE TESS



NASA's Transiting Exoplanet Survey Satellite is an all-sky survey mission that will discover thousands of exoplanets around nearby bright stars.

NASA Planet Hunter on Its Way to Orbit

NASA's Transiting Exoplanet Survey Satellite (TESS) launched on the first-of-its-kind mission to find worlds beyond our solar system, including some that could support life.

TESS, which is expected to find thousands of new exoplanets orbiting nearby stars, lifted off at 6:51 p.m. EDT Wednesday on a SpaceX Falcon 9 rocket from Space Launch Complex 40 at Cape Canaveral Air Force Station in Florida. At 7:53 p.m., the twin solar arrays that will power the spacecraft successfully deployed.

The SpaceX Falcon 9 rocket with NASA's Transiting Exoplanet Survey Satellite (TESS) lifts off at 6:51 p.m. EDT. NASA's next planet-hunter, the Transiting Exoplanet Survey Satellite (TESS), successfully launched on a SpaceX Falcon 9 on April 18, 2018. TESS will search for new worlds outside our solar system for further study. Over the course of several weeks, TESS will use six thruster burns to travel in a series of progressively

elongated orbits to reach the Moon, which will provide a gravitational assist so that TESS can transfer into its 13.7-day final science orbit around Earth. After approximately 60 days of check-out and instrument testing, the spacecraft will begin its work.

TESS will be watching for phenomena called transits. A transit occurs when a planet passes in front of its star from the observer's perspective, causing a periodic and regular dip in the star's brightness. More than 78 percent of the approximately 3,700 confirmed exoplanets have been found using transits.

TESS's four wide-field cameras were developed by MIT's Lincoln Laboratory. Additional partners include Orbital ATK, NASA's Ames Research Center, the Harvard-Smithsonian Center for Astrophysics, and the Space Telescope Science Institute. More than a dozen universities, research institutes and observatories worldwide are participants in the mission.

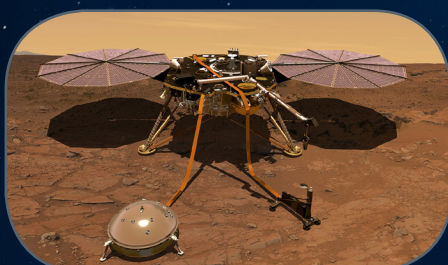
www.nasa.gov

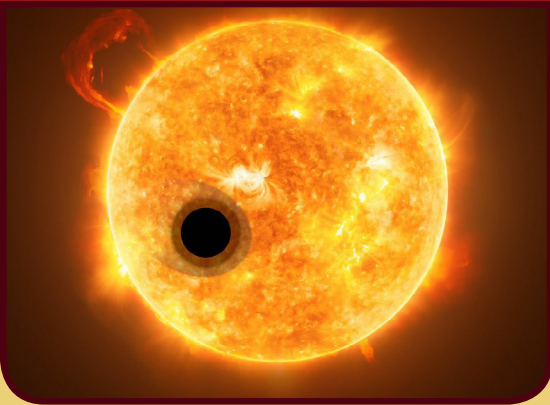
InSight Will Take the 'Vital Signs' of Mars

InSight (Interior Exploration using Seismic Investigations, Geodesy, and Heat Transport), the first mission to explore Mars' deep interior, is scheduled to launch at 7:05 a.m. EDT on May 5, 2018, from Vandenberg Air Force Base on a ULA Atlas V rocket. But InSight is more than a Mars mission - it is a terrestrial planet explorer that will address one of the most fundamental issues of planetary and solar system science - understanding the processes that shaped the rocky planets of the inner solar system (including Earth) more than four billion years ago.

By using sophisticated geophysical instruments, InSight will delve deep beneath the surface of Mars, detecting the fingerprints of the processes of terrestrial planet formation, as well as measuring the planet's "vital signs": Its "pulse" (seismology), "temperature" (heat flow probe), and "reflexes" (precision tracking).

www.nasa.gov





Helium detected in exoplanet atmosphere for the first time

An international team of researchers, led by Jessica Spake from the University of Exeter, discovered evidence of the inert gas on 'super-Neptune' exoplanet WASP-107b, found 200 light years from Earth and in the constellation of Virgo.

The pivotal breakthrough, made from observations of the exoplanet using the Hubble Space Telescope, revealed an abundance of helium in the upper atmosphere of the exoplanet, which was only discovered in 2017.

The strength of the helium signal detected was so large that scientists believe the planet's upper atmosphere extends tens of thousands of kilometres into space.

Helium is the second most common element in the universe and it has long-since been predicted to be one of the most readily-detectable gases on giant exoplanets. However, this pioneering new research is the first time that the gas has been successfully found.

Now, the research team believe that the ground-breaking study could pave the way for scientists to discover more atmospheres around Earth-sized exoplanets across the galaxy.

The research is published in the leading scientific journal, Nature, on May 3, 2018.

WASP-107b is a very low-density planet similar in size to Jupiter, but with only 12 per cent of its mass. Orbiting its host star every six days, it has one of the coolest atmospheres of any of the exoplanets discovered, although at 500 C is still radically hotter than Earth.

Helium was first detected as an unknown yellow spectral line signature in sunlight in 1868. Devon-based astronomer Norman Lockyer was the first to propose this line was due to a new element, and named it after the Greek Titan of the Sun, Helios.

[phys.org](#)



Microbes living in a toxic volcanic lake could hold clues to life on Mars

Researchers at the University of Colorado Boulder have discovered microbes living in a toxic volcanic lake that may rank as one of the harshest environments on Earth. Their findings, published recently online, could guide scientists looking for signs of ancient life on Mars.

The team, led by CU Boulder Associate Professor Brian Hynek, braved second-degree burns, sulfuric acid fumes and the threat of eruptions to collect samples of water from the aptly-named Laguna Caliente. Nestled in Costa Rica's Poas Volcano, this body of water is 10 million times more acidic than tap water and can reach near boiling temperatures. It also resembles the ancient hot springs that dotted the surface of early Mars, Hynek said.

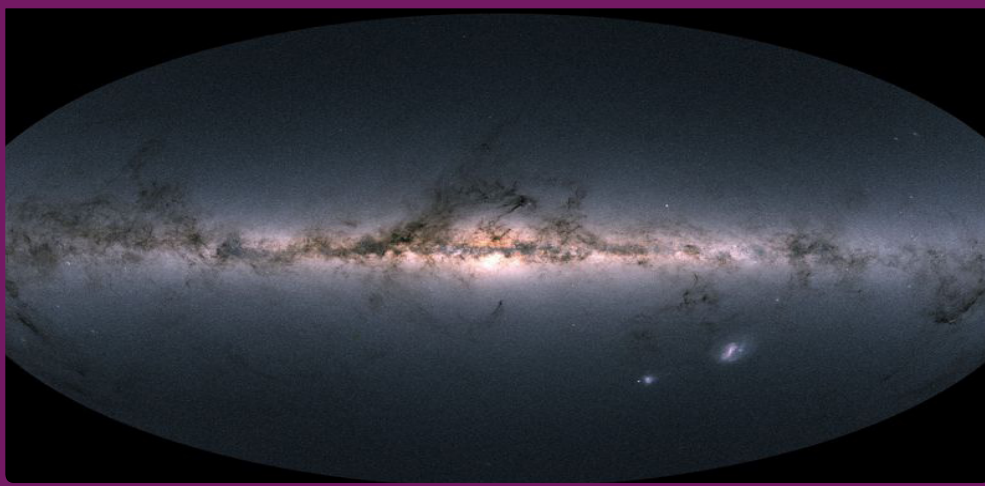
The Costa Rican lake can support life - but only barely. Hynek and his colleagues found microbes belonging to just a single species of bacteria in the lake water, a rock-bottom level of diversity. "Even in an extremely harsh environment, there can still be life," said Hynek of the Laboratory for Atmospheric and Space Physics and the Department of Geological Sciences. "But then there's very little life. Mars was just as extreme in its early history, so we should probably not expect to find evidence of large-scale biodiversity there." Laguna Caliente is chaotic, with water temperatures that can swing wildly in the span of hours and magma channels running under the lake that kick off frequent, geyser-like eruptions.

"We're at the limits of what life on Earth can tolerate," Hynek said. "It's not somewhere you want to spend a lot of time because you'd probably get covered in boiling mud and sulfur from the eruptions."

To search for living organisms in this "fringe" environment, the researchers scanned samples of lake water for DNA. In research published this month in *Astrobiology*, they found the signature of one species of bacteria belonging to the genus *Acidiphilium* - a group of microbes that scientists have previously seen in toxic drainage from coal mines and other harsh locations. "It's not uncommon to find an environment with no life, say in a volcano that's self-sterilizing," Hynek said. "But to find a single type of organism and not a whole community of organisms is very, very rare in nature." If life did evolve on Mars, Hynek said, it would likely have survived in ways similar to the lake's bacterium - by processing the energy from iron- or sulfur-bearing minerals. Hynek has spent much of his career searching for places on Earth today that look like Mars did nearly four billion years ago, when liquid water was plentiful on the surface.

It's a hard task: Rampant volcanism during that period created volatile and mineral-rich pools of water, giving rise to "Yellowstones all over Mars," Hynek said. In 2020, NASA is planning to send the Mars 2020 Rover to the Red Planet to hunt for fossil evidence of life. Hynek said that they should look first at these "Yellowstones."

www.marsdaily.com



New Star Map Could Change Everything We Know About the Milky Way

According to the ESA, the catalog, now available to professionals and amateur astronomers, includes data on the positions and brightness for 1.7 billion stars, the parallax (an effect in which an object appears in different positions depending the viewer's position) and motion of 1.3 billion stars, surface temperature for over 100 million stars and the effect of interstellar dust on 87 million stars.

The data also covers other objects as well, including the positions of 14,000 asteroids in our solar system and the positions of half a million quasars outside the Milky Way. According to the ESA, researchers were also able to plot the orbits of 75 globular clusters—or groups of stars held together by gravity—within our galaxy and 12 dwarf galaxies orbiting the Milky Way.

"Gaia is an unprecedented map of the Milky Way galaxy, fundamental astrophysics at its finest, laying the groundwork for decades of research on everything from the solar system to the origin and evolution of the universe," astronomer Emily Rice of CUNY College of Staten Island and the American Museum of Natural History tells Mandelbaum. "It is at once foundational and transformative, which is rare in modern astronomy."

The charts were not just automatically generated. It took years for some 450 human scientists and software engineers to analyze the raw satellite data and

produce the 3-D star charts, asteroid orbits and other images, the Associated Press reports.

And the data has already led to some breakthroughs. Antonella Vallenari, one of the lead scientists on the project, tells the AP that the results seems to support a hypothesis that the Milky Way was once hit with material from another galaxy, creating ripples evidenced by stars that move in ways different than expected.

A close look at 4 million stars has also refined something known as the Hertzsprung-Russell diagram, which uses the color and magnitude of stars to determine their evolutionary stage. The diagram has already helped researchers learn to distinguish white dwarfs dominated by hydrogen and white dwarfs dominated by helium. It also suggests that the stars in the disc and halo of the Milky Way are different ages, suggesting there were two galactic formation events.

As Nola Taylor Redd at Scientific American reports, the data should also help astronomers study the mysterious brown dwarfs, perplexing failed stars that are not quite planets and not quite stars. Studying brown dwarfs can teach researchers a lot about both star and planet formation. "It's like being handed everything you ever wanted to know about brown dwarfs," Jackie Faherty, a brown dwarf researcher at the American Museum of Natural History, told Redd prior to the release of the data.

www.smithsonianmag.com



Mineral Found in Lunar Meteorite Hints at Hidden Moon Water

A mineral that requires the presence of water to form has been discovered in a lunar meteorite, a new study reports.

The find suggests that hidden caches of water ice potentially useful for human exploration might be hidden under the surface of the moon, study team members said.

A team of Japanese scientists led by Masahiro Kayama from the Department of Earth and Planetary Materials Science at Tohoku University found the mineral, called moganite, in a lunar meteorite discovered in a desert in northwest Africa.

Kayama and his team believe the mineral formed on the surface of the moon in the area called Procellarum Terrane, as water originally present in lunar dirt evaporated due to exposure to strong sunlight. According to Kayama, there is a good reason to believe that, deeper under the lunar surface, crystals of water ice could be abundant, protected from the harsh solar rays.

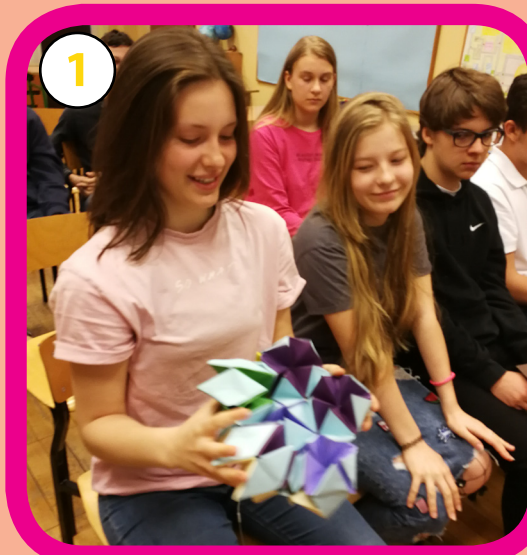
"For the first time, we can prove that there is water ice in the lunar material," Kayama told Space.com. "In a moganite, there is less water, because moganite forms from the evaporation of water. That's the case on the surface of the moon. But in the subsurface, much water remains as ice, because it's protected from the sunlight."

Scientists already knew that there's water on the moon. For example, NASA's Lunar Crater Observation and Sensing Satellite detected the stuff in a shadowed crater near the moon's south pole. And India's probe Chandrayaan-1 recorded evidence of water in the thin atmosphere above the moon's surface. But, according to Kayama, there has been no evidence so far of the presence of water in the subsurface at mid and lower latitudes.

www.space.com

Schools in Action

Last two weeks a lot of schools were in Spring Holiday! Despite of this some schools were stayed at school for finishing and presenting their project. We would like to say thank you for your hard work! Great job guys!



1-2 ProFuturo School - Poland, 3-4 SEV Middle School - Izmir

Astronomy Picture of the Day

Magellanic Mountain

Flanked by satellite galaxies of the Milky Way a volcanic peak rises from this rugged horizon. The southern night skyscape looks toward the south over Laguna Lejia and the altiplano of the Antofagasta Region of northern Chile. Extending the view across extragalactic space, the Large (right) and Small Magellanic Clouds are so named for the 16th century Portuguese explorer Ferdinand Magellan, leader of planet Earth's first circumnavigation. The larger cloud lies some 180,000 light-years, and the smaller 210,000 light-years beyond the mountaintop. Left of the Small Cloud of Magellan and also reflected in the foreground watery shallows on that starry night, 47 Tucanae shines like a bright star. A globular star cluster that roams the halo of the Milky Way, 47 Tucanae is about 13,000 light-years away.

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