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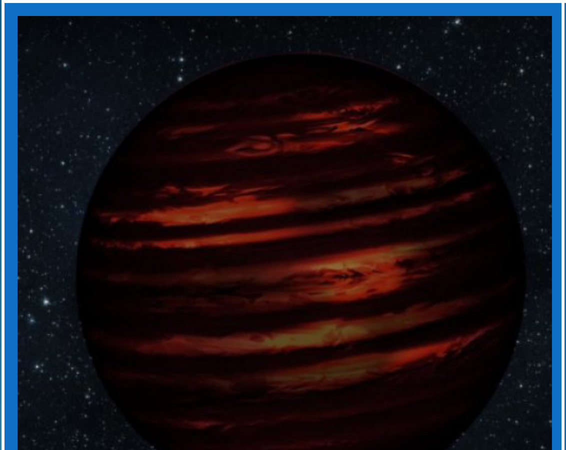
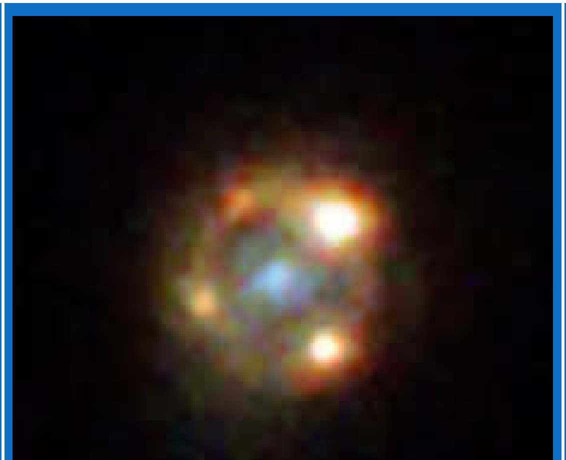
What's in the news this month?

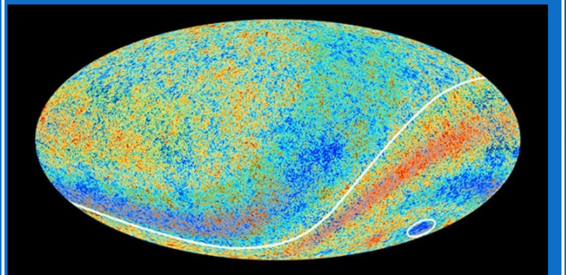
May - 2017



When a brown dwarf is actually a planetary mass object



The phenomenon of strong gravitational lensing

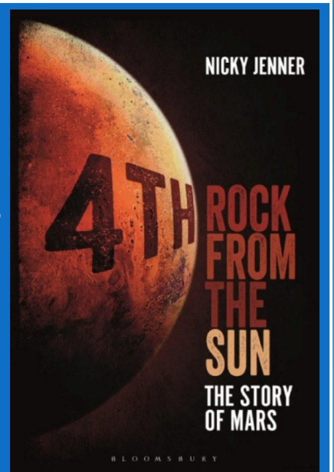


What is the mysterious cold spot in the Cosmic microwave background?

Cassini: The Grand Finale

What drives the accelerating expansion of the universe?

If you were to stand on the surface of Mars your feet would be tens of degrees warmer than your head.



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What's in the news this month?

1 - Surprise! When a brown dwarf is actually a planetary mass object

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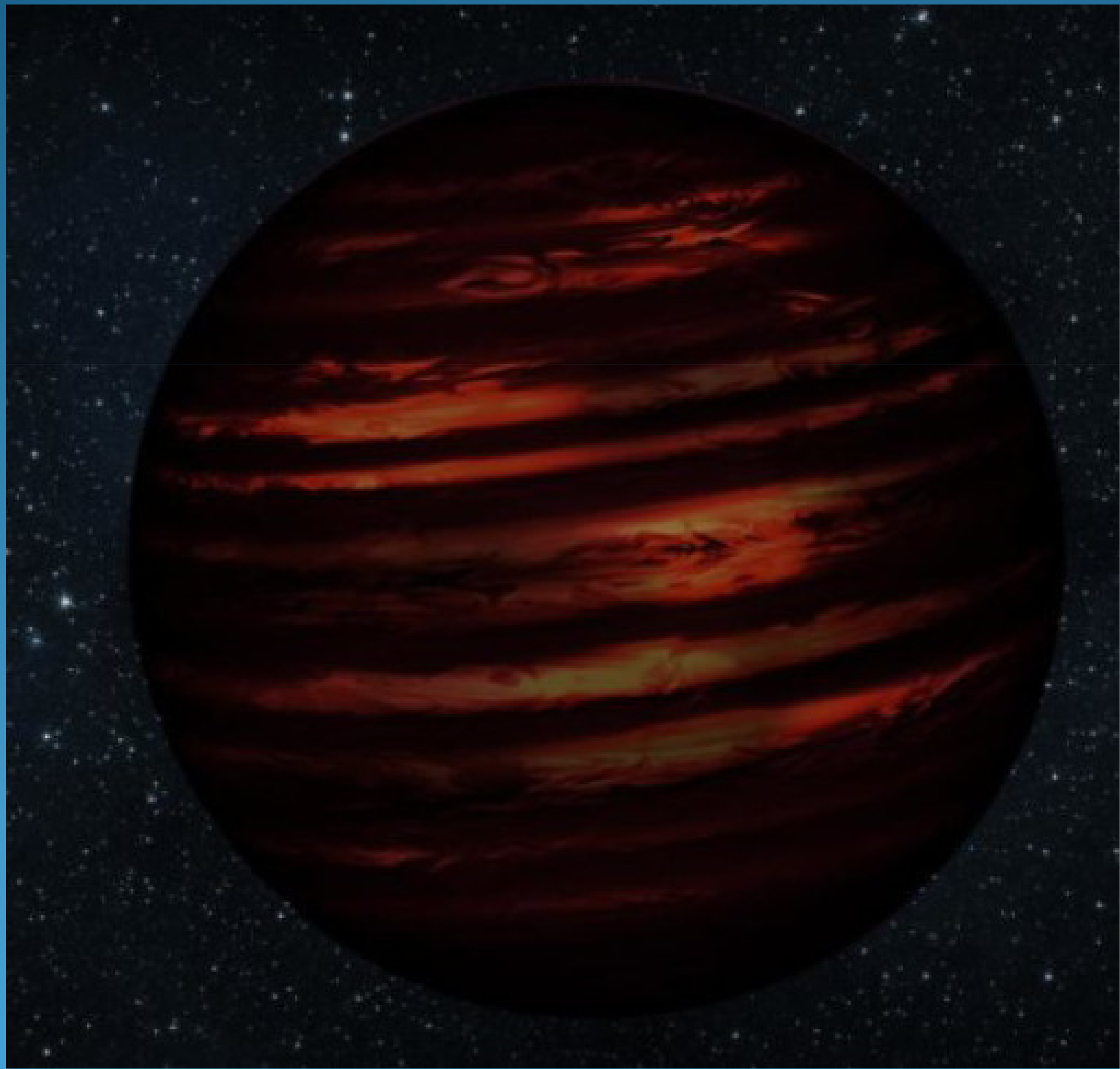

Credit:
Image is courtesy of NASA/JPL, slightly modified by Jonathan Gagné

What's in the news this month?

1 - Surprise! When a brown dwarf is actually a planetary mass object

May 9, 2017 Carnegie Institution for Science

Sometimes a brown dwarf is actually a planet or planet like anyway. A team discovered that what astronomers had previously thought was one of the closest brown dwarfs to our own Sun is in fact a planetary mass object.

The research team were able to demonstrate SIMP0136 (13x the mass of Jupiter) is right at the boundary that separates brown dwarf like properties, primarily the short lived burning of deuterium in the object's core, from planet like properties.

Free floating planetary mass objects are valuable because they are very similar to gas giant exoplanets that orbit around stars, but it is comparatively much easier to study their atmospheres. Observing the atmospheres of exoplanets found within distant star systems is challenging, because dim light emitted by those orbiting exoplanets is overwhelmed by the brightness of their host stars, which blinds the instruments that astronomers use to characterize an exoplanet's atmospheres.

What's in the news this month?

2 - The phenomenon of strong gravitational lensing

The video illustrating the strong gravitational lensing from "iPTF16geu" is at:-

http://www.spacetelescope.org/videos/heic1710a/

This effect caused the type 1a supernova (iPTF16geu) to appear 50 times brighter than under normal circumstances and to be visible on the sky four times.

Credit:*ESA/Hubble, L. Calçada*

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iPTF16geu

First Observed by the intermediate Palomar Transient Factory (iPTF)
a wide-field sky survey based at Palomar Observatory.

High spatial resolution images from the Hubble Space Telescope and the Keck Observatory used to resolve the positions of the SN images, the partial Einstein ring of the host galaxy and the intervening lensing galaxy.

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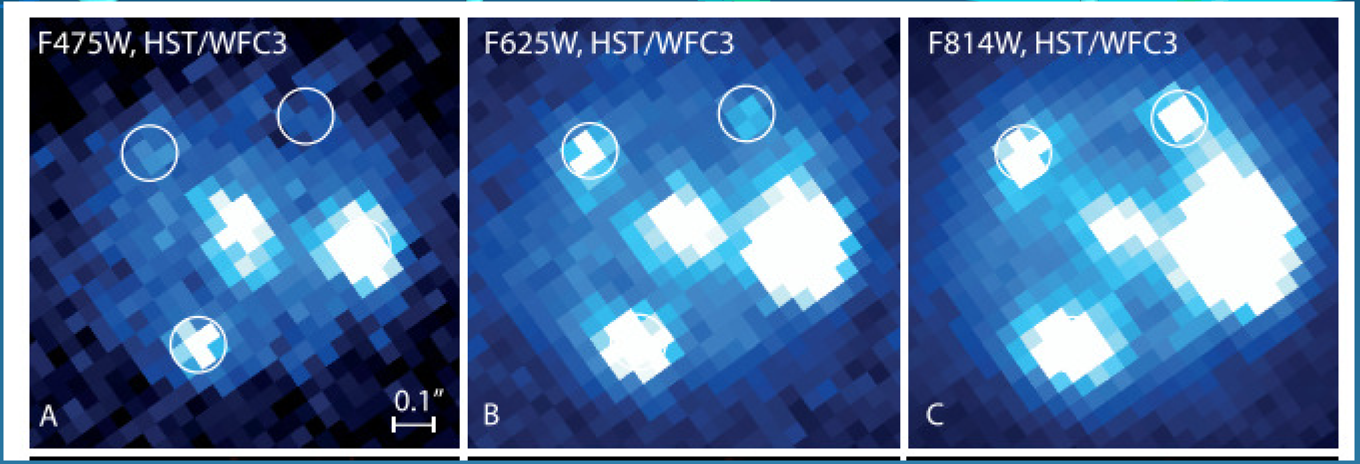
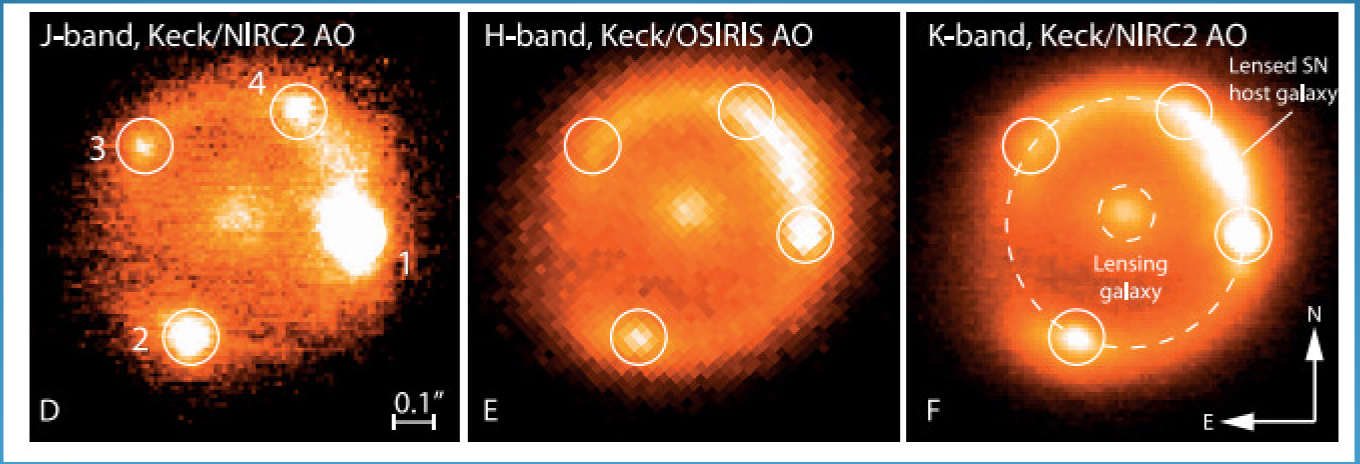


HST/WFC3 observations obtained in Oct 2016 in the F475W, F625W and F814W bands. The images reveal four point sources, except for F475W where SN images 3 and 4 are too faint.



The NIR images obtained using Adaptive Optics aided Keck observations in the J, H and K bands. All four SN images are clearly seen in J-band. For the H and Ks images, both the lensing galaxy at the center of the system and the lensed partial Einstein ring of the host galaxy are visible.

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What's in the news this month?

3 - What is the mysterious cold spot in the Cosmic microwave background? Competing claims over cause

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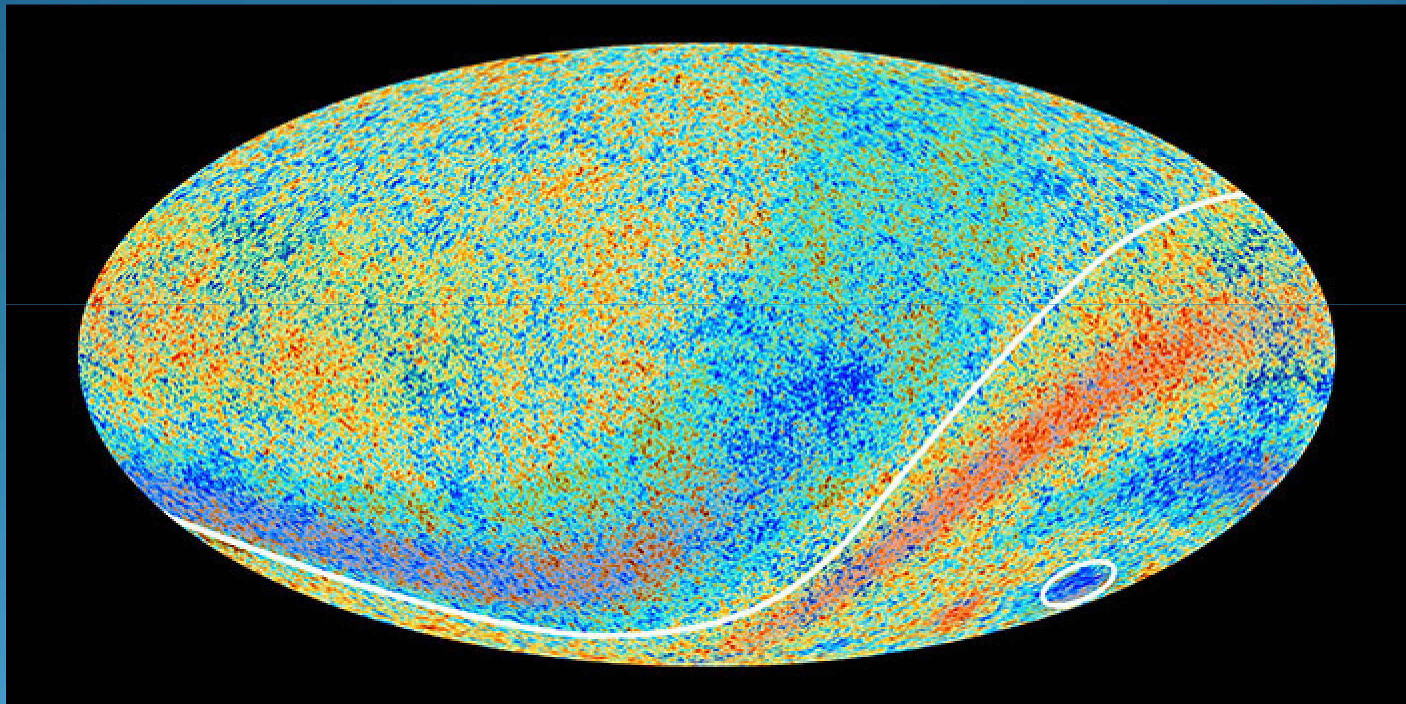

A survey of more than 7000 galaxies has concluded that a mysterious cold spot in the CMB (circled) is not caused by a giant void in space, potentially opening the door for more exotic explanations.

http://physicsworld.com/cws/article/news/2017/apr/26/competingclaimsovercauseofcosmiccoldspot

What's in the news this month?

3 - What is the mysterious cold spot in the Cosmic microwave background? Competing claims over cause

If Shanks and Mackenzie, Durham University, are correct then an alternative explanation for the cold spot must now be found.

Simulations have shown that a random, non-Gaussian quantum fluctuation in the CMB has a 1 in 50 chance of creating the cold spot, but other, more exotic possibilities may also come into play.

Among them is the idea that the cold spot is where our universe is bumping into another universe created by eternal inflation.

This would produce an identifiable polarization signal in the cold spot. Data from the ESA's Planck spacecraft that might prove or disprove this have yet to be fully analysed.

If the polarization signal is there, however, then a collision with another universe would "become the most plausible explanation, believe it or not", according to Shanks.

What's in the news this month?

4 - Cassini: The Grand Finale

After almost 20 years in space, NASA's Cassini spacecraft begins the final chapter of its remarkable story of exploration: its Grand Finale.

Between April and September 2017, Cassini will undertake a daring set of orbits.
Following a final close flyby of Saturn's moon Titan, Cassini will leap over the planet's icy rings and begin a series of 22 weekly dives *between* the planet and the rings.

As Cassini plunges past Saturn, the spacecraft will collect some valuable information that was too risky to obtain earlier in the mission:
- The spacecraft will make detailed maps of Saturn's gravity and magnetic fields, revealing how the planet is arranged internally.
- The final dives will improve our knowledge of how much material is in the rings, bringing us closer to understanding their origins.
- Cassini's particle detectors will sample icy ring particles being funnelled into the atmosphere by Saturn's magnetic field.
- Its cameras will take ultra-close images of Saturn's rings and clouds.

What's in the news this month?

5 - What drives the accelerating expansion of the universe?

Solving one of nature's great puzzles.
May 15, 2017 University of British Columbia

PhD student Qingdi Wang has tackled this question in a new study that tries to resolve a major incompatibility issue between two of the most successful theories that explain how our universe works:

1) quantum mechanics and
2) Einstein's theory of general relativity.

- The most natural candidate for dark energy is vacuum energy.

- When physicists apply the theory of quantum mechanics to vacuum energy, it predicts that there would be an incredibly large density of vacuum energy, far more than the total energy of all the particles in the universe. If true Einstein's theory of GR suggests that the energy would have a strong gravitational effect and most physicists think this would cause the universe to explode.

-Their calculations provide a completely different physical picture of the universe.

- The study suggests that if we zoomed in on the universe, we would realize it's made up of constantly fluctuating space and time.

- At each point, it oscillates between expansion and contraction. As it swings back and forth, the two almost cancel each other but a very small net effect drives the universe to expand slowly at an accelerating rate.

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What's in the news this month?

6 - Cold head – Warm feet! "4th Rock from the Sun"

Nicky Jenner BSc MSc, is a freelance science writer and editor. She writes and edits for the ESA, European Southern Observatory and was The European Press Officer for the Hubble Space Telescope. From chapter 1, Mars Fever.

Coupled with its greater distance from the Sun, Mars's thin atmosphere means that its surface is far colder than Earth's. The planet receives less light (and therefore heat) from the Sun in the first place, but has a harder time keeping hold of it due to its comparably puny atmosphere. Mars has an average temperature of just over -60ºC (-76ºF), and regularly hits temperatures as low as -90ºC (-130ºF). When and where things get particularly nippy, this can fall as low as -153ºC (-243ºF)! Additionally, Mars's thin atmosphere gives it very poor control over its climate, so temperatures fluctuate wildly depending on location, time of day and distance from the surface – at the equator in the summer, for example, they can soar to a pretty temperate 20ºC or even 30ºC (68–86ºF). If you were to stand on the surface of Mars your feet would be noticeably warmer, maybe even tens of degrees warmer, than your head. This isn't impossible for humans to endure, but certainly isn't comfortable.

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