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**WEEKLY** January 22 - 28, 2022


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**A NEW KIND OF QUANTUM COMPUTING**

HINTS OF A HUGE EXOMOON

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Space

# Astronomers may have found a huge moon around a Jupiter-like exoplanet

Leah Crane

THERE are signs of a possible exomoon orbiting a planet more than 5000 light years away. If it is real, this could be the first exomoon we have found.

There have been unconfirmed candidates before, most notably one around a planet called Kepler-1625b, spotted by David Kipping at Columbia University in New York and his team. Out of a sample of about 300 planets, all observed by the Kepler space telescope, Kepler-1625b was most similar to Jupiter. "That's kind of unusual, because Kepler has a strong bias toward looking at planets closer to the star, and Jupiter-sized planets are quite rare," says Kipping.

So, in their next search through Kepler data, the researchers looked for moons orbiting Jupiter-like exoplanets – those at least half as big as Jupiter with relatively long orbital periods. They found 70 such worlds and sorted through them for signs of exomoons.

Kepler searches for planets by observing the light of stars. When a planet passes in front of its star, the light from the star dips, and this should happen at regular intervals as the planet orbits. If there is a moon, it will cause an extra dip in starlight.

Of the 70 worlds, Kipping and his colleagues found three where the starlight appeared to match a model containing both a planet and a moon. They eventually attributed one of the signals to effects of the telescope's movement and another to activity on the star's surface, but the third stubbornly defied explanation by anything other than a moon.

**Hints of a very large exomoon were found in flickering starlight**

"In the first two cases, we're pretty sure they're bogus, but for the last one we couldn't kill this moon," says Kipping. The third planet is called Kepler-1708b.

The researchers calculated that there is about a 1 per cent chance the detection is a false positive caused by noise in the signal. If the exomoon is real, it is about 2.6 times the size of Earth, far bigger than any moon seen in our own solar system and only slightly smaller than the unconfirmed exomoon orbiting Kepler-1625b (*Nature Astronomy*, doi.org/hc2j).

HELENA VALENZUELA WIDERSTRÖM

That may seem strange, but it doesn't mean these huge moons are likely to be common. If it were any smaller, the signal wouldn't be strong enough for Kepler to spot it. "Any survey for moons with Kepler is, by definition, a supermoon survey," says Kipping.

Even with such a large potential moon, the observations aren't conclusive – usually astronomers prefer to have at least three dips in a star's light, and we only have two for Kepler-1708b. The star is also relatively dim, so the signal isn't very strong, says René Heller at the Max Planck Institute for Solar System Research in Germany.

"Looking at the numbers, I would say it's interesting, but it's not a killing argument in favour of an exomoon," says Heller.

Kipping and his colleagues are now working to figure out what we could learn about this system with additional observations, but it is possible that the star is so faint that we will never be able to know for sure – a similar fate to the last possible exomoon we spotted. ▮

Technology

# Extreme memory test helps select random numbers

**COMPUTERS struggle to create randomness, but a new method may at last allow them to create a ready source of truly random numbers.**

**Such numbers are a vital ingredient for cryptographic algorithms and scientific simulations, but computers can't easily be made unpredictable. True random number generators produce numbers by sampling a physical source of randomness, such as radioactive decay.**

**In a similar vein, it is possible to use a quirk of one component in computers, DRAM memory chips, as a source of random noise. This can be done by deliberately asking more of these chips than manufacturers designed them for, and then monitoring the rate of errors produced. But generating random numbers in this way can slow down the rest of the computer.**

**Nisa Bostanci at TOBB University of Economics and Technology in Ankara, Turkey, and her colleagues have developed a solution. They created a system that reduces the interference between memory being used to generate random numbers and memory being used to run the computer as normal.**

**It predicts when memory will be sitting idle and creates a stockpile of random numbers in these periods. Once the supply is empty, it places requests for new random numbers in a queue with other software tasks and assigns them priorities.**

**During 186 experimental scenarios, the system improved performance of normal computer operation by 17.9 per cent and random number generation by 25.1 per cent compared with previous DRAM random number-generating models (arxiv.org/abs/2201.01385).**

**"A source of randomness is an important part of keeping online communication private"**

**"Computers are entirely predictable and thus poor at creating random numbers, so a source of randomness is an important part of keeping online communication private," says John Graham-Cumming at Cloudflare, an internet security firm.** ▮

Matthew Sparkes