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Sky at Night

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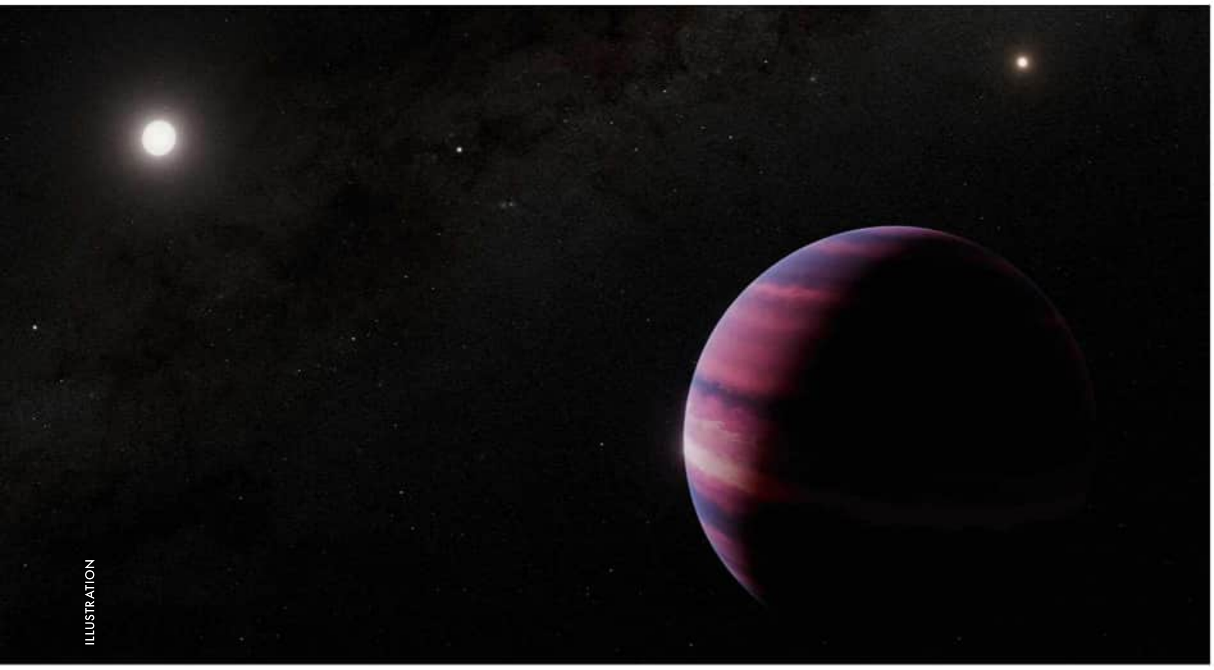
BULLETIN



▲ JWST has provided strong evidence of a gas giant orbiting a Sun-like star just four lightyears away

Possible planet found at Alpha Centauri A

If true, it would be the closest exoplanet ever found in a habitable zone

The number of planets discovered orbiting other stars stands at over 6,000 and counting, but that's just the confirmed ones. Many more candidate exoplanets are awaiting verification, some of which are so promising that they warrant further investigation.

One of these tantalising prospects is located in our nearest star system, Alpha Centauri, and – if confirmed – will be the closest exoplanet to Earth to also fall within its star's habitable zone. At just four lightyears away from us, the planetary candidate is thought to be orbiting Alpha Centauri A, a star which is around the same size and age as our Sun.

Before we get too excited, while it's located in an orbit that could potentially support life – that is, one where liquid water could exist – the planet is thought to be a gas giant like Saturn. This means it is unlikely to host life as we know it. However, it may well have moons that are more habitable.

If it is there, this planet has been playing hide and seek with the astronomers trying to observe it. With an initial detection back in August 2024, subsequent observations in February and April this year did not reveal any similar objects. "We are faced with the case of a disappearing planet!", says PhD student Aniket Sanghi of Caltech, co-author of research papers about the candidate planet. "To investigate this mystery, we used computer models to simulate millions of potential orbits, incorporating the knowledge gained when we saw the planet, as well as when we did not. We found that in half of the possible orbits simulated, the planet moved too close to the star and wouldn't have been visible to JWST in both February and April 2025."

If confirmed by further observations, it could transform the future of exoplanet science. Future studies will use spectral imaging to try to ascertain the planet's composition and how habitable any orbiting moons could be.

"With this system being so close to us, any exoplanets found would offer our best opportunity to collect data on planetary systems other than our own," says co-author Charles Beichman, senior scientist at NASA's Jet Propulsion Laboratory. "Yet, these are incredibly challenging observations to make, even with the world's most powerful space telescope, because these stars are so bright, close, and move across the sky quickly."

www.webbtelescope.org

Comment

by Chris Lintott

The discovery of a planet around one of our nearest stars is tantalising. We immediately want to study them in detail. Will we eventually visit this newfound world?

Interstellar travel seems as far off as ever, but scientists are working on audacious new missions to let us see these worlds. The plan is to put a space telescope in the outer reaches of our Solar System. Using the Sun as a gravitational lens, it could obtain images showing features as small as a few tens of kilometres across.

The effect would be as dramatic as the first exploration of the Solar System by robotic probes, turning what today is – charitably – at most an exciting blob into an actual world. What a sight that would be!

Chris Lintott co-presents *The Sky at Night*

NASA, ESA, CSA, STSCI, R. HURT (CALTECH, IPAC) | STEVEN HOBBS, STOCKTREK IMAGES, GETTY | IMPERIAL COLLEGE LONDON