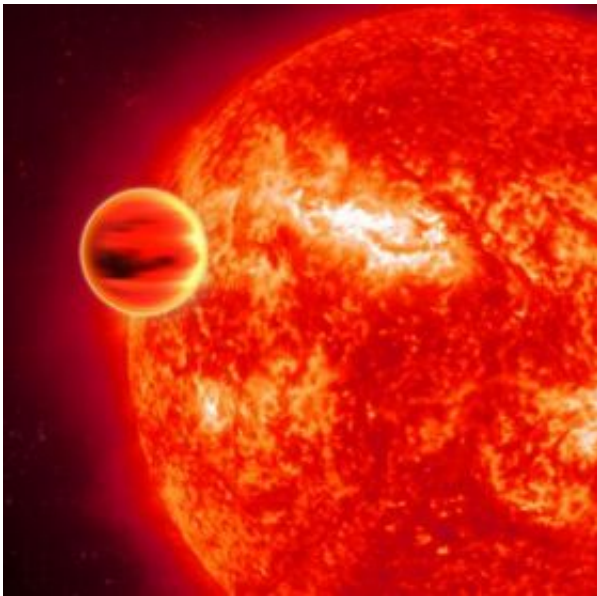


Search for the water of life -- Astronomers find water on extra-solar planet

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An artist's impression of HD 189733b and its star as though viewed using infrared. Credit: ESA - C. Carreau

Researchers at UCL (University College London) are part of an international team which has discovered water on an extra-solar planet for the first time. Findings will be published in this week's *Nature*.

'Extra-solar' planets are those outside our Solar System and more than 200 have been discovered orbiting stars close to our own Sun. The planet with water in its atmosphere is known as HD 189733b, and orbits a star in the constellation of Vulpecula the Fox, which is 64 light years from

the Sun. HD 189733b is known as a “transiting planet” because it passes directly in front of its star, as viewed from the Earth.

The researchers, led by Dr Giovanna Tinetti of the European Space Agency and UCL’s Department of Physics & Astronomy, found that as HD 189733b passes in front of its ‘sun’, it absorbs starlight in a way that can only be explained by the presence of water vapour in its atmosphere. This is the first time that astronomers have been able to confirm that water is present on an extra-solar planet.

Dr Tinetti, who has recently taken up a prestigious Aurora Fellowship at UCL, said: “Although HD 189733b is far from being habitable, and actually provides a rather hostile environment, our discovery shows that water might be more common out there than previously thought, and our method can be used in the future to study more ‘life-friendly’ environments.”

The discovery was made using NASA’s Spitzer Earth-orbiting telescope, taking measurements at a number of key wavelengths in the infrared region of the spectrum that pick out the crucial signature of water. The water detection relied not only on Dr Tinetti’s painstaking analysis, but also on the calculation of highly accurate water absorption parameters by Dr Bob Barber and Professor Jonathan Tennyson, both of UCL’s Department of Physics & Astronomy.

Dr Barber said: “The absorption parameters were calculated from our Barber-Tennyson list of water vapour spectral lines. This includes over 500 million individual absorption features, each like fingerprints, giving us vital clues to the amount of water present and the temperature of the atmosphere.”

Professor Tennyson, who heads UCL’s Physics & Astronomy Department, explained: “Parts of the atmosphere of HD 189733b are

very hot – around 2,000 degrees. You need the millions of lines we calculated to simulate this, putting in absorption accurately where it should be and – just as accurately – giving gaps for the light to get through the atmosphere, where it can.”

HD 189733 is a star very much like our own Sun, although a little cooler. Its planet is not like Earth, however. HD 189733b is a gas giant planet, about 15 per cent bigger than Jupiter. However, while Jupiter is over five times as far away from the Sun as our Earth is, HD 189733b is more than 30 times closer to its star than the Earth is to the Sun – explaining why it’s so hot.

Dr Tinetti added: “The ‘holy grail’ for today’s planet hunters is to find an Earth-like planet that also has water in its atmosphere. When it happens, that discovery will provide real evidence that planets outside our Solar System might harbour life. Finding the existence of water on an extra-solar gas giant is a vital milestone along that road of discovery.”

Source: University College London

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