

Water, water everywhere -- on an extrasolar planet (Forwarded)

Source: <http://sci.tech-archive.net/Archive/sci.astro/2007-07/msg00174.html>

- *From:* Andrew Yee <ayee@xxxxxxxxxxxxxxxxxxxxxxxxxxxx>
 - *Date:* Thu, 12 Jul 2007 02:26:32 GMT
-

ESA News
<http://www.esa.int>

11 July 2007

Water, water everywhere -- on an extrasolar planet

Scientists report the first conclusive discovery of the presence of water vapour in the atmosphere of a planet beyond our Solar System.

The discovery was made by analysing the transit of the gas giant HD 189733b across its star, in the Infrared.

Giovanna Tinetti, ESA fellow at the Institute d'Astrophysique de Paris, and colleagues from around the world, used data from NASA's Spitzer Space Telescope. They targeted planet HD 189733b, 63 light-years away, in the constellation Vulpecula.

The planet was discovered in 2005 as it dimmed the light of its parent star by some three percent when transiting in front of it. Using Spitzer, Tinetti and the team observed the star, which is slightly fainter than the Sun. They watched its starlight dim at two infrared bands (3.6 and 5.8 micrometres).

Had the planet been a rocky body devoid of atmosphere, both these bands and a third one (8 micrometres), recently measured by a team at Harvard, would have shown the same behaviour.

Instead, as the planet's tenuous outer atmosphere slipped across the face of the star, the starlight absorbed showed a different, distinctive pattern. The atmosphere absorbed less infrared radiation at 3.6 micrometres than at the other two wavelengths.

"Water is the only molecule that can explain that behaviour," says Tinetti.

The presence of water vapour does not necessarily make it a good candidate in the search for planets that harbour life. "This is a far from habitable

Water, water everywhere -- on an extrasolar planet (Forwarded)

world," she adds.

Instead of a rocky world like Earth, HD 189733b is large, about 1.15 times the mass of Jupiter. Located just 4.5 million km from its star, it orbits it in 2.2 days. In comparison, Earth is 150 million km from the Sun; even Mercury, the innermost planet, is 70 million km away.

Astronomers classify such worlds as 'hot jupiters'. These planets tend to have extensive atmospheres because heat from the nearby star gives them energy to expand. HD 189733b is no exception; its diameter is 1.25 times that of Jupiter.

HD 189733b's atmospheric temperature is about 1000 Kelvin (a little more than 700 C) or higher, implying that the significant amounts of water vapour in the atmosphere cannot condense to fall as rain or form clouds. The temperature would have to be about five times lower to form clouds of water vapour or rain.