

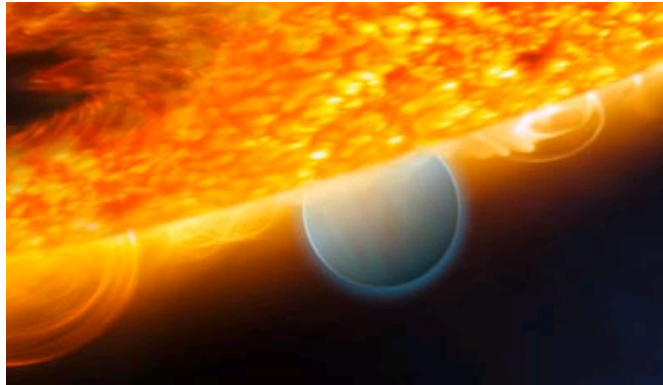
News archive

2010

- ▶ February 2010
- ▶ January 2010

- ▶ 2009
- ▶ 2008
- ▶ 2007
- ▶ 2006
- ▶ 2005
- ▶ 2004
- ▶ 2003
- ▶ 2002
- ▶ 2001
- ▶ 2000
- ▶ 1999
- ▶ 1998
- ▶ 1997

Exoplanet hunting brought down to Earth

Feb 5, 2010 [1 comment](#)

Well studied HD189733b is now observable from Earth

Researchers in the US have used a ground-based telescope to detect organic compounds in the atmosphere of an exoplanet – that is, a planet orbiting a star other than our Sun. The result, the researchers claim, will open up the hunt for Earth-like planets to anyone with access to a decent telescope. "We expect a massive explosion of exoplanet research because it is not limited anymore to the lucky few who have access to space telescopes," says Pieter Deroo at the California Institute of Technology.

Since astronomers made the first discovery of a planet orbiting another star in 1992 they have gone on to catalogue more than 400 of these exoplanets. The favoured hunting technique is known as the transit method whereby astronomers monitor the light from a star and look for dips in its intensity caused by a planet sweeping in front of its parent star cutting across the line of vision from Earth.

Honing in on exoplanets

The next stage in exoplanet research is to start looking a bit more closely at the nature of these planets with the ultimate goal of discovering a planet with habitable conditions like Earth's. The first step is to decipher the chemical composition of exoplanetary atmospheres as this could provide information about a planet's formation and evolution; it might also reveal the signatures of life.

To date, the most popular approach has been to adapt the transit detection method to study how starlight, observed from Earth, is affected during eclipses. The idea is a relatively simple one: compare the spectrographic data of a star's light when an exoplanet is first in front then behind its parent star in relation to our line of vision.

This exoplanetary eclipse technique is proving successful with the detection of water vapour, carbon dioxide and carbon monoxide in the atmospheres of the hot-Jupiter type exoplanets HD 189733b and HD 209458b. So far, however, these discoveries have only been possible using data from telescopes located beyond the Earth's swirling atmosphere, which tends to distort our view.

View from Hawaii

Sign up

To enjoy free access to all high-quality "In depth" content, including topical features, reviews and opinion [sign up](#)

Share this

- E-mail to a friend
- Connotea
- CiteUlike
- Delicious
- Digg
- Facebook
- Twitter
- BOOKMARK

Related stories

- [Recipes for planet formation \(in depth\)](#)
- [Exoplanet's atmosphere laid bare](#)
- [Kepler finds its first five exoplanets](#)
- [Is exoplanet a waterworld?](#)
- [Water confirmed on distant planet](#)
- [Massive planet spotted around Sun-like star](#)
- [Water found on different planet](#)

Related links

[Pieter Deroo](#)

Restricted links

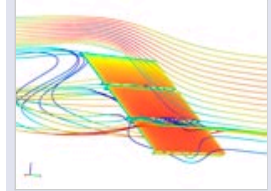
"A ground-based near-infrared emission spectrum of the exoplanet HD 189733b"

Related products

[Non Magnetic Low Profile, High Speed Piezomotor Rotary Stage @ Photonics West](#)

Physik Instrumente (PI) GmbH & Co. KG
Feb 17, 2010

Webinar series



Green Energy Simulations

[Free registration](#)

Key suppliers



Corporate partners



[Contact us for advertising information](#)

Now Deroo and his colleagues have brought the eclipse technique down to Earth. They used NASA's 3 m Infrared Telescope Facility (IRTF), located atop Mauna Kea in Hawaii, to study the light emitted by the well observed star system HD 189733. By looking for infrared light – the part of the spectrum not currently monitored by space-based planet hunters – the researchers used a new iterative technique for removing atmospheric distortions.

The resulting spectrum is in strong agreement with those acquired using space-based telescopes confirming the presence of water vapour, carbon dioxide and carbon monoxide. What is more, the researchers detect the presence of methane by observing a fluorescent emission, they suggest, by the planet's close proximity to its parent star – one-tenth of the distance between Mercury and the Sun.

Deroo says that the real beauty of his technique is that it is not limited to detecting large Jupiter-like planets such as this one. "The NASA space mission Kepler will find true Earth-analogues – the new technique will give us a great tool to characterize these planets."

This research is published in *Nature*.

About the author

James Dacey is a reporter for *physicsworld.com*

New Controller for
Optical Path Control,
Beam Steering & Image
Stabilization

Physik Instrumente (PI)
GmbH & Co. KG
Feb 17, 2010

Super Resolution
Microscopy Stage / PI
nano™ B45 Piezo
Stage & Controller

Physik Instrumente (PI)
GmbH & Co. KG
Feb 17, 2010

1 comment

[Add your comments on this article](#)

1

g-moore

Feb 12, 2010 11:24 AM

Exoplanets - radio detection?

Quote from above: "We expect a massive explosion of exoplanet research... ..with the ultimate goal of discovering a planet with habitable conditions like that of the Earth's."

Could there be another way to detect exoplanets using low frequency radio? By the accidental use of a two-degree wide beam aerial (F.Graham Smith 'Radio Astronomy' Penguin, 1974, p202) Jupiter was found to be radiating signals centred on 20MHz, far stronger than from possible thunderstorms, but a wider aerial beam would have failed to distinguish the planet from all the noise. (Does any of this 'noise' come from exoplanets?) The Earth emits 'auroral kilometric radiation' (AKR) on 150kHz in many directions of "billions of watts", see:

www.gi.alaska.edu...859.html

[en.wikipedia.org...Aurora_\(astronomy\)](http://en.wikipedia.org...Aurora_(astronomy))

Since AKR is generated by the interaction of solar emanations with the Earth's characteristically habitable atmosphere and magnetic field, perhaps our green planet emits habitable signature signals detectable from afar.

Habitable exoplanets might emit AKR according to their season and exo-sunspot cycle. We are screened on the ground by our ionosphere from receiving AKR - so how much is known about kilometric radiation in space? Have any maps been made? Dish aerials cannot be used for such big wavelengths, but perhaps a large triaxial Bellini-Tosi D/F satellite at a Lagrange point might pull the signals out of the angular spread of noise with enough resolution to spot exoplanets, and other phenomena like neutron star flares, and give more data on phenomena in our solar system.

[▶ Reply to this comment](#) [▶ Offensive? Unsuitable? Notify Editor](#)