

Perth Observatory discovers Earth's twin at heart of Milky Way

Marilyn Head.
ABC Science Online Thursday, 26 January 2006

The new planet may look like this, a rocky-icy world circling a red dwarf star. Astronomers have discovered the most Earth-like planet so far, close to the centre of our galaxy.

The international team says the planet's relatively small size and large orbit imply a rocky-icy composition with a thin atmosphere. The discovery, involving a global network of telescopes and reported in today's issue of the journal *Nature*, is good news for astronomers searching for planets outside our solar system that may support life.

"This discovery is a strong hint that these lower-mass objects are very common," says lead author Dr Jean-Philippe Beaulieu from the Institut d'Astrophysique de Paris. The discovery of OGLE-2005-BLG-390Lb also backs current theoretical models of planetary formation, the scientists say.

These models predict finding planets the size of Earth to Neptune orbiting red dwarf stars, small cool stars, between one and 10 times the distance from the Earth to our Sun.

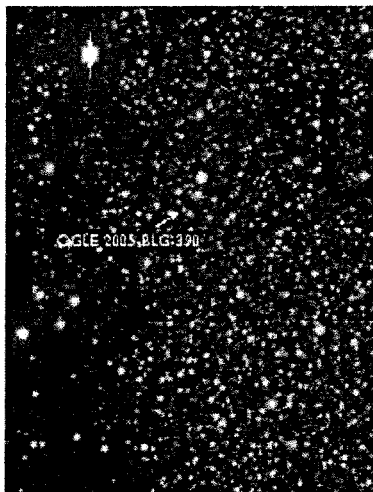
The new planet has mass more than five times that of Earth and orbits a red dwarf at more than two-and-a-half times the distance between the Earth and the Sun. This makes it the first relatively small extrasolar planet discovered not huddled close to its parent star.

The planet is about 28,000 light years away, near the centre of the Milky Way, and was discovered using a technique astronomers say is better at finding smaller planets. Hunting for extrasolar planets

Most extrasolar planets discovered have been 'hot Jupiters' or gas giant planets in small orbits, detected by the gravitational 'wobble' they induce in the parent star.

"That technique is sensitive to massive planets orbiting nearby stars. But the microlensing method ... can detect much smaller planets orbiting at larger distances around distant stars," says New Zealand's Dr Michael Albrow from the University of Canterbury.

This dense star field at the galactic centre is best seen from the southern hemisphere.



(Image: PLANET group) Albrow is a founding member of the PLANET collaboration, which found the planet, one of the three microlensing collaborations involved from 32 institutions in 12 countries.

Dr Andrew Williams from Australia's Perth Observatory explains how microlensing works. "The gravity of a dim intervening star acts as a giant natural telescope, magnifying a more distant star, which brightens temporarily. A small 'defect' in the brightening reveals the existence of a planet around the lens star."

Because the chances of exact alignment are very rare, astronomers continuously monitor dense star fields such as the galactic centre, which is best seen from the southern hemisphere.

The Japanese-New Zealand Microlensing Observations in Astrophysics group supplied extra data.

The group happened to be testing the world's largest dedicated microlensing telescope at the time, a 1.8 metre telescope at Mount John University Observatory in Tekapo, New Zealand.

http://abc.net.au/science/news/space/SpaceRepublish_1554907.htm

Congratulations to Andrew & Ralph

(and all of the PLANET, MOA, OGLE etc consortia) - official news of their discovery of an earth like planet has hit websites around the world. Naturally the story has been Slashdotted (where I came across it) and Dugg, which can be construed as a mark of high respect, none can be higher than being the lead article. Nature link should be <http://www.nature.com/news/index.html>. Enjoy basking in the glory guys! Cheers, Bevan.

And likewise from all the POVG. members (ed.)

PERTH OBSERVATORY VOLUNTEERS' GROUP

Perth Observatory Staff

Dr Jamie Biggs Director and Govt Astronomer
 Ralph Martin Astronomer
 Dr Andrew Williams Astronomer
 Rick Tonello Astronomer Assistant
 Greg Lowe Astronomer Assistant
 Janet Bell Administration Officer
 Di Johns Clerical Officer
 Arie Vermeer Technical manager
 John Pearce Mechanical technician
 Marc Appelhof Maintenance Person/Cleaner

POVG Volunteers

Mike Freeman Chairperson
 Elaine Walker Chairperson
 John Morris Secretary
 Bevan Harris Treasurer and newsgroup moderator
 (contact: ngc2070@gmail.com)
 Jeff Alcroft Newsletter Editor
 (contact: callides@iinet.net.au)

Volunteer List

Jeff Alcroft
 Dick Alderson
 Ireneusz Baran
 Trevor Beardsmore
 Lyall Bell
 Frank Bilki
 Tony Beston
 Ric Boelen
 Giuseppe Coletti
 David Emrich
 Mark Emmons
 Keith Ford
 Mike Freeman
 Lynda Frewer
 Bevan Harris
 Mark Haslam
 Karen Kotze
 Rob Loney
 Andrew MacNaughtan
 Len Martin
 Jacque Milner
 John Morris
 Tim Roberts
 Lloyd Robinson
 Elaine Walker
 Matthew Zengerer
 Probationary
 Asher Abraham
 Val Semmler
 Noreen Townsend



POVG

Perth Observatory Volunteers Group

PERTH OBSERVATORY
 537 Walnut Road, Dickley WA 6076
<http://www.wa.gov.au/perthobs>

PHASES of the MOON for 2006

New Moon	First Quarter	Full Moon	Last Quarter
Jan 29 22:14	Jan 7 02:56	Jan 14 17:48	Jan 22 23:14
Fed 28 08:31	Fed 5 14:29	Fed 13 12:44	Fed 21 15:17
Mar 29 18:15	Mar 7 04:16	Mar 15 07:35	Mar 23 03:10
Apt 28 03:44	Apt 5 20:01	Apt 14 00:40	Apt 21 11:28
May 27 13:25	May 5 13:13	May 13 14:51	May 20 17:20
Jun 26 00:05	Jun 4 07:06	Jun 12 02:03	Jun 18 22:08
July 25 12:31	July 4 00:36	July 11 11:02	July 18 03:12
Aug 24 03:10	Auk 2 16:46	Auk 9 18:54	Auk 16 09:51
Sept 22 19:45	Sept 1 06:56	Sept 8 02:42	Sept 14 19:15
Oct 22 13:14	Sept 30 19:04	Oct 7 11:13	Oct 14 08:25
Nov 21 06:18	Oct 30 05:25	Nov 5 20:58	Nov 13 01:45
Dec 20 22:01	Nov 28 14:29	Dec 5 08:25	Dec 12 22:32
	Dec 27 22:48		

JOIN THE POVG NEWS GROUP

If you've got any news, information or pics post them on the news group. To join simply send your email address to Bevan Harris at:
ngc2070@gmail.com

To unsubscribe send an email to:
perthobsvollies-unsubscribe@yahoogroups.com.au

To modify your subscription, visit
 the group website at:
<http://au.groups.yahoo.com/mygroups>



Below are listed the training nights scheduled for 2006.

The vollies decided at a recent meeting that they would like to rationalise the training/meeting night schedule. They decided that scheduling a meeting on the third Monday of the month would be more convenient. We have checked for clashes with Observatory events and so far none have been identified. (Naturally, flexibility needs to be maintained and the meeting date will be changed from the strict schedule as the need arises.)

Training is important for our volunteers, they enjoy it, and we need to support these staff members in return for the assistance they render.

All staff are directed NOT to ROSTER ANY ACTIVITY THAT WILL INTERFERE WITH TRAINING night attendees access to the lecture theatre and the VOF (and associated telescopes).

Also, could you please bring the details of this message to the attention of all staff under your direct supervision.

Your co-operation is appreciated.
 Jamie Biggs.

20th February (Changed from 27th Fed)
 20th March (Changed from 27th March)
 18th April (Note: Tuesday)
 15th May (Changed from 15th May)
 19th June
 17th July
 21st August
 18th September
 16th October
 20th November
 18th December (Maybe we'll cancel this one - it's very close to Xmas)

Free Public Lecture: The discovery of planet "OGLE", the first Earth-like planet beyond our solar system

Dr Andrew Williams of Perth Astronomical Observatory

Two astronomers at Perth Observatory have played a crucial part in the discovery of a new planet around a distant star, significantly more Earth-like than any other planet discovered so far.

The planet, which is about 5.5 times as massive as the Earth, orbits its parent star every 10 years, with an orbital radius of about 3 times the Earth-Sun distance in our solar system. The star it orbits is much like our Sun, except it is only 1/5th as massive, a red M-dwarf (the most common type of star in the Milky Way), about 22,000 light years away, toward the Galactic center. It was discovered using a technique known as gravitational microlensing, and was reported in Nature on the 26th January 2006.

More than 170 planets outside the solar system (known as extra-solar planets or exo-

planets) have been discovered to date. Almost all were found using the 'Radial Velocity' technique, which detects planets by measuring the tiny back-and-forth movements of the parent star as the planet orbits. This technique is biased towards finding large planets, close to their parent star. If a distant star had a set of planets with masses and orbits identical to the ones in our solar system, they would be largely undetectable using the radial velocity technique, with current technology.

Gravitational microlensing uses the chance alignment of two stars at different distances. The closer star (the 'lens') amplifies the light from the more distant star (the 'source'), like a giant natural telescope, for a few weeks as the stars move past one another. In this case, the extra mass of a planet around the lens star caused a short additional brightening that allowed us to calculate the mass ratio and separation.

This new planet, dubbed "OGLE-2005-BLG-390Lb" is probably the smallest detected so far. Only one other known extra-solar planet comes close: Gliese 876d, at 7.3 ± 1 Earth

masses, is within the statistical errors on mass but in a very different orbit - orbiting its sun every 2 days, at 1/50th of the Earth-Sun distance.

CV
Andrew Williams graduated from UWA with a PhD in Physics in 1997, having built the first astronomical CCD camera in Western Australia, and established an automated search for supernovae using a 61cm telescope at Perth Observatory. After a brief time in New Zealand automating a similar telescope there, he has worked full time for Perth Observatory since 1996. He was a founding member of the PLANET microlensing group in 1995, which runs a worldwide (currently 8 telescopes) observing season every southern-hemisphere winter, when the galactic bulge is visible.
SCHOOL OF PHYSICS,
4:00pm Thursday 23rd February 2006
Lecture Room 2.15, Physics Building,
University of WA

[Clipping thank to John Morris]

Free public lectures - All welcome

The Gamma-Ray Burst Supernova Connection.
Gemma Anderson

4:00pm Thursday 9th February 2006

Hunting Planets with the Anglo-Australian Planet Search.
Dr Chris Tinney
Anglo Australian Observatory

1:00pm Tues 21st February 2006

SCHOOL OF PHYSICS
Lecture Room 2.15, Physics Building,
University of WA



Perth Observatory astronomer and founding members of PLANET Andrew Williams, with a light curve graph associated with it

Hills played starring role in new discovery

The discovery of a new planet with the help of the Perth Observatory is being hailed as a planet being found in the field of astronomy.

Two local astronomers, Dr Andrew Williams and Ralph Morris, are part of the Perth, Leaning and American Network (PLANET), one of three international observing campaigns that work collaboratively to make the discovery.

Sixteen other collaborators affiliated with 32 institutions across 12 countries - France, United Kingdom, Poland, Denmark, Germany, Austria, Chile, Australia, New Zealand, the United States of America, South Africa and Japan - were involved with the three campaigns.

But the importance of the Hills facility in the collaboration did not end there.

Dr Williams said the observatory's position on the globe had also played a crucial role in the discovery.

"Detecting short-lived signals like the ones from this planet requires observations every hour or so, 24 hours a day, so obser-

vations from Perth off the large time zone gave us the southern hemisphere between Chile and South Africa," he said.

"The planetary anomaly lasted about a day, with the Perth Observatory taking about two thirds of all the images during the event.

Without the data from Perth, the mass, orbit and even the existence of the planet would be in doubt.

The planet's discovery was made using the technique of gravitational microlensing.

While astronomers cannot see the planet or the star it is orbiting, its presence is known by the visible effect of the gravity.

Dr Williams said gravitational microlensing had used the gravity of a dim Sun-like star to act as a giant natural telescope, magnifying a more distant, brighter star.

He said the existence of the planet around the nearby star was revealed through a small "defect" in this gravitational lens.

From the brightness of the parent star and the orbital distance, astronomers have calculated the planet has a surface temperature of about 50 Kelvin or -200 C below zero.

But despite this low temperature, Dr Morris said the new planet was more Earth-like than any other

planet that had been discovered so far.

"It is about five times as massive as the Earth with an orbital radius only three times the Earth-Sun distance in our solar system, and orbits its parent star every 10 years," he said.

"Due to its low mass and low temperature, it may be solid, an icy or rocky planet similar to Pluto in our solar system, rather than gaseous like Jupiter, Saturn, Uranus and Neptune."

The planet is the first discovered by the PLANET group and is the smallest to ever be found around a normal star.

The discovery is the result of about 10 years of searching by PLANET astronomers.

Minutes of the POVG

Perth Observatory Volunteer Group Inc
Minutes of Meeting January 16th 2006

Present

E.Walker. L.Martin. J.Biggs. J.Morris. D.Emrich. A.Williams.
R.Tonello. J.Milner. T.Beardsmore. M.Freeman. F.Bilki. B.Harris.
G.Lowe. R.Boelin. D.Alderson.T.Roberts

Apologies

J. Alcroft. G. Coletti. T. Beston. I. Barak. L. Robinson. N. Townsend.

Confirmation of Minutes.

The Minutes were confirmed as a true and correct record. Moved
B.Harris, seconded E. Walker

Business Arising from the Minutes. Nil.

Treasurer's Report

B. Harris stated that there had been no financial transactions since
the last meeting so the bank statement remained at \$420,63

Chairman's Report.

M. Freeman reported that we were experiencing difficulties in get-
ting the Yearly Financial Report audited, one quote had been
received at a cost of \$700.00 , this was unacceptable, and he asked
members for their assistance in obtaining the services of an auditor
at reasonable or nil cost .

L. Martin said that he might be able to assist in this matter and
would report at the next meeting.

GENERAL BUSINESS.

Corporate Viewing Night

J.Biggs stated that despite inclement weather the Corporate Viewing
Night had been successful and would be repeated later in the season.

Heritage Board Grant

The Chairman of the Heritage Board had said that he was applying
to the Government for a substantial Grant for the upkeep of Heritage
listed buildings , which could apply to the Observatory.

National Trust's Letter of thanks received

A letter of thanks had been received from the member on the Board
of the National Trust ,who could prove to be a useful future contact.

Weekly Night Sky Column for Midland Echo

The owner and Editor of the Midland Echo had offered his help and
J.Biggs had suggested a weekly Night Sky Column would be a help-
ful promotional item for us. He hoped that Midland Echo might
wish to Sponsor the Annual Summer Lecture.

Vote of thanks to Noreen Townsend

It was unanimously agreed that much of the credit for the night was
due to Noreen Townsend, both for the idea and the successful out-
come.

D. Emrich moved, seconded J. Morris that a vote of thanks be
recorded to Noreen for her efforts.

Internet Telescope Launch by Minister

During January the Internet Telescope had been officially launched
by Minister Judy Edwards, the event went well with all the partici-
pants able to take advantage of a clear night to do some star view-
ing.

Ten accounts had been opened to enable various Universities and
others to view the Southern skies .

Volunteer Group to establish a Tax Free Trust Fund

J.Biggs also stated that it would be advantageous if the Volunteer
Group was to establish a Tax Free Trust Fund for the lodgement of
short term funds.

There being no further General Business the meeting closed at 7.35
pm.

The next meeting will be on the 20TH FEBRUARY

On the blog

At Jacquie's request I've just made the PDF
version of the Shoemaker Impact Structure
Field Guide available on my FTP site.

There are two versions of the field guide:
Full Resolution and Downloadable. The
major difference between them is the qual-
ity of the embedded images. The linework in
the downloadable version isn't good enough
for print quality, but should be sufficient for
online browsing. Just be aware, the full res

version is biggish so don't tackle it on
dialup.

Field Guide (Revised 20/09/2004, full reso-
lution) (14.9 MB)

Field Guide (Revised 20/09/2004, down-
loadable) (4.51 MB)

SIS Satellite Image (A4 300 dpi) (2.72 MB)

Frank Bilki

Hi, everyone - I've just been in touch (by
email) with Lynda Frewer. She still keeps the

database of vllie contact details for us. Has
done for years. That's her particular way of
volunteering. Staff members and long-time
vllies know Lynda. She's a bit shy, and says
she's not game to chime in when there's
astro-chat happening on
perthobsvllies.com, but she's out
there listening. So here's a cheerio from
Lynda to all of you, especially the old
stagers.

- Greg