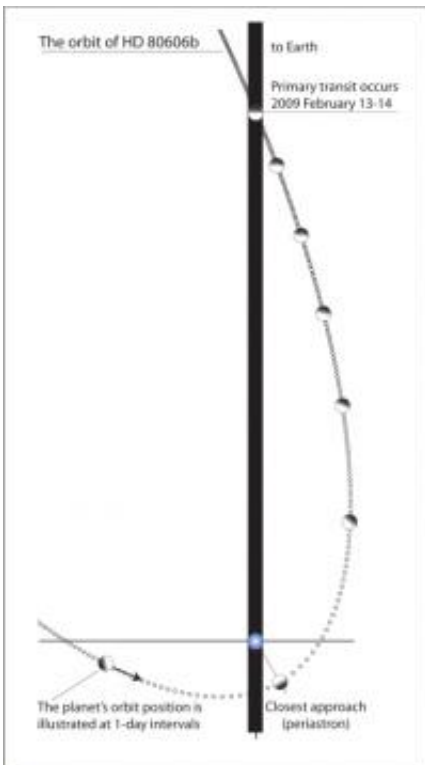


London students find Jupiter-sized oddball planet

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Plan view of the orbit of HD 80606b. The position of the planet is shown at 1-day intervals, close to the moment of close approach (periastron), where the high eccentricity of the orbit brings the planet 10 times closer to its parent star than Mercury's close approach to our own Sun. The primary transit occurs when the planet moves into the line of sight to the star, as viewed from Earth, and was observed by UCL astronomers and students on the night of Feb. 13/14, 2009. Credit: S. Fossey (UCL)/G. Laughlin (Univ. California at Santa Cruz)

(PhysOrg.com) -- A team of astronomers from University College London (UCL), including undergraduate students, have discovered that an exotic world passes directly in front of the Sun-like star it orbits, revealing for the first time that it is about the same size as Jupiter. And rather than travelling to one of the major observatories in Hawaii or Chile, the students made the discovery with a telescope at UCL's University of London Observatory (ULO) in the capital's northern suburb of Mill Hill.

The work was partly funded by a grant from the Royal Astronomical Society (RAS) and will be presented on Tuesday 21st April at the European Week of Astronomy and Space Science conference by ULO astronomer Dr. Steve Fossey; Ingo Waldmann, a final-year undergraduate and David Kipping, a PhD student working in the field of exoplanet science.

The team were alerted by the exoplanet science website www.oklo.org, run by Greg Laughlin of the University of California Santa Cruz. Using infrared space observations, Greg predicted that a planet (HD 80606b) would pass in front of its parent star (HD 80606) in a so-called transit event.

On the evening of 13th February, prompted by his alert, Dr Fossey and five UCL undergraduate observers started monitoring the brightness of HD 80606, and some 10 hours later at just after 4 am they discovered they had found the planet's transit.

Transit events such as this one are very important because they allow astronomers to pin down a planet's radius, density, and atmospheric composition, and to explore the possibility that their parent stars may harbour other as-yet-undetected planets.

The results have provided astronomers with some of the most precise

data yet on the planet's size and density, and the tilt and eccentricity of its orbit: and all with a relatively small telescope operated by UCL undergraduate students from a London suburb. The transit shows that the planet has a radius about the same as Jupiter, despite being about 4 times more massive.

The planet, called HD80606b, is unusual in that it travels in a highly elliptical orbit about its parent star. At its furthest point, it is almost as far from its star as the Earth is from the Sun. But every 111 days it is briefly a scorching 10 times closer to its star than Mercury is to the Sun. A hypothetical observer above the cloud tops of the planet would see its parent star swell to 30 times the apparent size of the Sun in our own sky.

HD80606b now holds the record for both the longest orbital period and most eccentric orbit of all transiting [planets](#) and with such extreme variations in heating it presents a fascinating object for further study.

Astronomers world-wide are now planning to follow up future transits of this intriguing world using space- and ground-based telescopes to take a closer look at the planet's characteristics, to try to understand its unusual orbit, and to explore the effect on its atmosphere of its looping, searing encounter with its parent star.

Greg Laughlin was quick to acknowledge the result on his website, "It's certainly been a long time since an observational astronomical discovery of this magnitude has been made from within the London City Limits."

Team leader Dr Steve Fossey is delighted. "Around the same time we submitted our paper, two other professional teams announced their own observations of the same transit. We are very encouraged that our results compare so favourably with those obtained from bigger European facilities, and that our results constrain tightly the nature of HD 80606b and its unusual orbit."

"For example, spectroscopic observations reported by a French-Swiss team, when combined with our precise measurement of the orbital tilt, indicate that the planet's unusual orbit might be explained by the [parent star](#) being a member of a binary system - where the companion star tugs on the planet's orbit over millions of years to leave it in the strange configuration we see today."

In the International Year of Astronomy (IYA2009), it seems appropriate that undergraduate students are making world class discoveries using a relatively small university observatory in an urban setting. Cherry Ng, one of the students who work at Mill Hill, comments, "The project gave me a taste of frontier astronomical research. It has definitely strengthened my resolve to pursue a career in astronomy."

More information: The results appear in a paper accepted publication in MNRAS Letters

www3.interscience.wiley.com/journal/118500770/home

S Fossey, I Waldmann & D Kipping, 'Detection of a transit by the planetary companion of HD 80606'. A preprint of the paper is available at arxiv.org/abs/0902.4616

Provided by Royal Astronomical Society ([news](#) : [web](#))

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