

Team finds smallest transiting extrasolar planet ever

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The CoRoT satellite has discovered a planet only twice as large as the Earth orbiting a star slightly smaller than the Sun. It is the smallest extrasolar planet (planet outside our solar system) whose radius has ever been measured. The planet's composition is not yet certain, but it is probably made predominantly of rock and water. It orbits its host star in 20 hours, which is the shortest orbital period of all exoplanets found so far. Astronomers infer its temperature must be so high (over 1000 degrees C) that it should be covered in lava or superheated water vapour.

Most of the 330 or so exoplanets discovered so far are giant planets, primarily composed of gas, like Jupiter and Neptune. This new object, named CoRoT-Exo-7b, is very different. "Finding such a small planet

wasn't a complete surprise", says Dr Daniel Rouan, from LESIA in Paris, who announced the discovery today at a conference in Paris. Dr Alain Leger from the Institut d'Astrophysique de Marseille, leader of the discovery paper, explains: "It could be an example of a so-called ocean planet, whose existence was predicted some years ago: a Neptune-like planet, made of ice around a rocky core, drifts so close to its star, the ice the melting to form a fluid envelope."

Such a small planets such as this one is extremely difficult to detect. CoRoT-Exo-7b was found because it passes in front of its host star, causing the star to dim very slightly once per orbit - a so-called transit, which in this case is only 0.03% deep. "We were able to see it with CoRoT because it is in space, with no atmosphere to disturb the measurements or daylight to interrupt them." explains Dr Roi Alonso, from the Laboratoire d'Astrophysique de Marseille.

The team then had to make sure they were not seeing one of many other kinds of objects that can mimic planetary transits, using complementary observations from the ground. This is particularly challenging in the case of such a small planet, as Dr Aigrain from the University of Exeter explains "We ruled out every mimic except for a very improbable, almost perfect chance alignment of three stars. All our data so far is consistent with the transits being caused by a planet of a few Earth masses, though more data are needed for a precise mass estimate."

The discovery of CoRoT-Exo-7b is being announced today at the CoRoT Symposium 2009 in Paris and will be the published in a forthcoming special issue of the journal *Astronomy and Astrophysics* dedicated to results from CoRoT.

CoRoT - which stands for Convection, Rotation and planetary Transits - was developed by the French Space Agency CNES, with important contributions from Austria, Belgium, Brazil, the European Space

Agency, Germany, and Spain. It was designed to detect tiny variations in the luminosity of stars, with two scientific goals: searching for planets orbiting stars other than the Sun, and studying the internal structure of seismology.

This discovery is based on data from the CoRoT satellite and complementary observations made from the European Southern Observatory at Paranal and La Silla (Chile), the 80-cm telescope at the Canary Islands Astrophysics Institute, and the Canada-France-Hawaii Telescope on Mauna Kea, Hawaii (operated by CNRS, CNRC, and University of Hawaii).

Source: University of Exeter

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