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Space telescope CoRoT discovers six new planets and a brown dwarf

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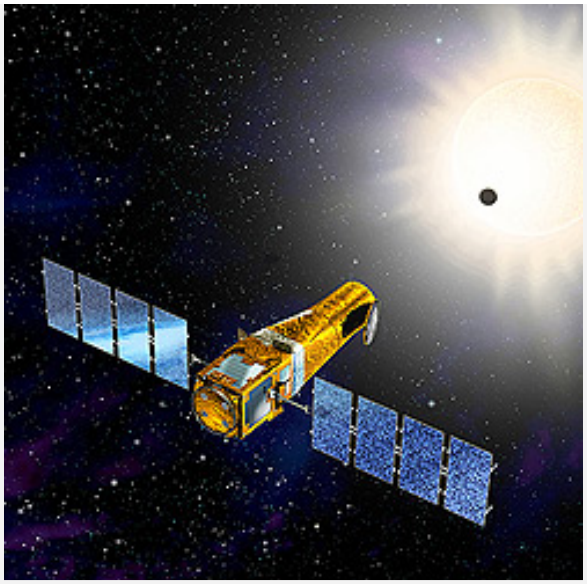

The CoRot space telescope

The CoRoT space telescope has made seven new discoveries during its observations from Earth orbit – six extrasolar planets and a brown dwarf. One of the new discoveries is the exoplanet CoRoT-13b. Dr Juan Cabrera, from the German Aerospace Center (DLR) Institute of Planetary Research in Berlin, led a team that authored the publication announcing its discovery.

The radius of CoRoT-13b is 90 percent that of Jupiter, making it nearly as big as the largest planet in the Solar System. It is very dense, indicating that it has a solid core. The planet orbits a Sun-like star in the constellation of the Unicorn, roughly 4,300 light years distant from us. The rocky exoplanet CoRoT-7b was found in the same region in 2008, causing a stir, as it is very similar to Earth in diameter and mass.

The newly-discovered planets also have distinctive characteristics. CoRoT-10b is a gas planet on an extremely eccentric orbit, so that as it orbits its parent star, it comes very close to the star and also moves very far away. Consequently, during a 13-day orbit, its temperature fluctuates between about 250 degrees and 600 degrees Celsius.

"The density of CoRoT-13b is very high for its mass –2.37 grams per cubic centimetre – nearly double that of Jupiter," says Dr Cabrera. "This suggests that CoRoT-13b has a solid core."

CoRoT-15b, on the other hand, is not a planet but a brown dwarf – the second to have been discovered by CoRoT. Brown dwarfs fill the gap between planets and stars. Because they are much more rare than planets, this finding represents something of a sensation.

Finding planets as they move in front of their stars

Whenever the orbital path of a planet causes it to traverse the line of sight between the CoRoT telescope and its star, it darkens the image of that star slightly for several hours. CoRoT measures this reduction in brightness. This technique, known as the planetary transit method, allows astronomers to

determine the orbital period of the planet, its distance from the star and its radius. The planet's mass can then be determined in combination with subsequent measurements taken by ground-based telescopes. Transiting exoplanets being tracked by CoRoT are of great interest, since this is the only way of determining the planet's density. From these measurements, it can be inferred whether the planets are rocky exoplanets such as Venus, Earth and Mars, or gaseous planets like Jupiter and Saturn.

Transiting exoplanets are the extrasolar planets about which the most accurate data has been obtained. Of the roughly 450 extrasolar planets that have been discovered in the last 15 years, 82 have been observed as transiting exoplanets. Of these 82, CoRoT has detected fifteen.

"We look forward to every new member of the CoRoT family. This shows how successful the mission is," said Prof. Heike Rauer of the DLR Institute of Planetary Research, who directs the German contribution to the CoRoT mission and whose department is involved in scientific analysis. "Every new discovery contributes to a deeper understanding of the formation and evolution of planetary systems. In this way, we can answer the question whether our Solar System is an exceptional case, or whether other, similar planetary systems exist."

CoRoT was launched at the end of 2006, and now orbits Earth every two hours in a polar orbit at an altitude of 900 kilometres. The mission is led by the French space agency CNES. DLR has also made substantial contributions to the mission from the outset. The CoRoT mission has now been extended until March 2013.

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