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Double Pleasure In Planet Quest

From: Stig Agermose <Stig.Agermose@online.pol.dk>
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Stig

Double pleasure in planet quest

Two teams of researchers come up with new surprises

By Alan Boyle
MSNBC

Sept. 23 -- Two revelations about possible planets beyond our solar system have astronomers seeing double: One team of researchers has seen signs of planet creation in a double-star system. Another team has found evidence of yet two more planets - one of which appears to have an Earthlike orbit around its parent star.

THE PLANET HUNT is only a few years old, but in the past few months the pace of the quest has accelerated dramatically. So far, several planets have been detected indirectly by analyzing variations in the light from distant stars. Such variations, scientists believe, are caused by the gravitational effect of giant planets circling those stars.

A research team including two pioneers in the field, San Francisco State University's Geoffrey Marcy and the Anglo-Australian Observatory's Paul Butler, announced Wednesday that they have detected two more planets using the technique. That brings the number of extrasolar planets found so far up to at least a dozen, the researchers said, with nine discovered by Marcy and Butler. Scores more are likely to follow in the months and years ahead.

At the same time, other planet-searching strategies are being developed - including the use of powerful radio telescopes to sense the dusty disks that are thought to spawn planets around young stars. Another research team led by Luis Rodriguez of the National Autonomous University in Mexico City announced that they have found two such disks in what appears to be a binary star system.

If multiple-star systems can indeed develop planets, that opens up a whole new front in the planet search - and, eventually, in the search for extraterrestrial life.

Here are further details about the day's revelations:

A PLANET IN THE RIGHT SPOT

Marcy, Butler and their colleagues were particularly intrigued by a planet detected around HD 210277, a sunlike star in the constellation Aquarius, 68 light-years from Earth. (One light-year equals about 6 trillion miles.)

Based on an analysis of the star's gravitational wobble, the planet appears to be about the size of Jupiter, with an orbit just a little wider as Earth's. One year on this planet would equal 437 Earth days, the researchers said.

"We had discovered planets that orbit much closer and much farther from their stars than the Earth-sun distance," Marcy said in a statement. "We wondered if nature rarely puts planets at one Earth-sun distance. Now we know that such planets are not rare."

Marcy said the next goal would be to find Jupiter-size planets that have Jupiter-size orbits as well.

"What we're all about is discovering (planets) where evolution might have gotten a toehold," he said. "Jupiter-sized planets at a greater distance from their star would suggest a solar system that could host a rocky Earthlike planet."

If no such worlds are found circling the hundreds of stars being targeted by planet-hunters, that could lead to a different conclusion.

"It might be the first sign that Earth is truly unusual and so life may be rare," Marcy said.

The second planet appears to orbit HD 187123, a sunlike star in the constellation Cygnus, 154 light-years away. The researchers say this planet is also about Jupiter's size, but whirls only about 4 million miles away from its parent star, well within Mercury's distance from our own sun. Each "year" takes only 3.097 Earth days, the researchers said.

In both cases, the observations were made using the Keck telescope in Hawaii. The planet with the Earthlike orbit is the subject of a paper to be submitted to the Astrophysical Journal Letters, while a paper on the close-in giant planet has been accepted by Publications of the Astronomical Society of the Pacific.

BINARY-STAR BONANZA

Not too long ago, the prevailing view was that the gravitational interplay within multiple-star systems would tear apart any planets before they were even born. But new observations appear to show disks of dust - the suspected birthplace of planets - surrounding twin stars about 450 light-years away in the constellation Taurus.

The latest findings were developed using the National Science Foundation's Very Large Array radio telescope in New Mexico and published in Thursday's issue of the journal Nature.

Rodriguez and his colleagues focused on a source of infrared and radio emissions within a giant cloud of gas and dust where sunlike stars are being born.

Observations of the source, known as L1551 IRS5, were made in the 7mm wavelength using radio receivers built in 1993 and 1994 by the National Radio Astronomy Observatory. The resolution of the source was 10 times as good as previous observations at similar wavelengths, making out structures measuring seven times as wide as the radius of Earth's orbit around the sun (that's about 650 million miles).

For the first time, astronomers were able to see two swirling disks of dust, presumably with a star at the center of each disk. The disks appeared to be separated by slightly more than the distance between our own sun and Pluto, the solar system's outermost planet. Each disk was as wide as Saturn's orbit around the sun.

Astronomers hadn't thought such disks could hold enough mass to form planets, but the new results indicate otherwise.

"Each of these disks contains enough mass to form a solar system like our own," David Wilner of the Harvard-Smithsonian Center for Astrophysics said in a statement. "However, we don't think these solar systems would be able to form outer, icy planets like Uranus and Neptune, because of the small size of the dust disks."

The stars might well develop hot planets that could be thrown off into deep space due to the complex orbital mechanics of a multiple-star system, astronomer Alan P. Boss of the Carnegie Institute of Washington said in a commentary written for Nature.

Boss said such a process might explain the recent observations of what appears to be a "runaway planet" - although he acknowledged that the planet could be a "background star masquerading as a planet."

Rodriguez said the theories spawned by the new observations broadened the possibilities in the search for distant planets.

"Most stars in the universe are not alone, like our sun, but are part of double or triple systems," he said, "so this means that the number of potential planets is greater than we realized."

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