Scientists discover 10 new planets outside solar system

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An international team of astronomers has found 10 new “extra solar” planets, planets that orbit stars other than our sun. The team used a system of robotic cameras that yield a great deal of information about these other worlds, some of which are quite exotic. The system is expected to revolutionize scientific understanding of how planets form.

Two participating astronomers from the U.S. are Rachel Street and Tim Lister. Street is a postdoctoral fellow at the University of California, Santa Barbara and the Las Cumbres Observatory Global Telescope Network (LCOGTN) located in Santa Barbara. Lister is a project scientist with LCOGTN.

Team leader, Don Pollaco of Queen’s University, Belfast, Northern Ireland,
will announce the findings in his talk at the Royal Astronomical Society’s national astronomy meeting in the U.K. on Wednesday, April 2.

The new international collaboration is called “SuperWASP,” for Wide Area Search for Planets.

This technique of locating the planets gives more information about the formation and evolution of the planets than the gravitational technique. Astronomers look for “transits,” moments when the planets pass in front of the star, like an eclipse, as viewed from the Earth.

In the last six months the SuperWASP team has used two batteries of

cameras, one in Spain's Canary Islands and one in South Africa, to discover the 10 new extra solar planets.

With the gravitational technique, scientists have discovered around 270 extra solar planets since the early 1990s. They measured the gravitational pull on the star that is exerted by the orbiting planet. As the planet moves, it pulls on the star, tugging it back and forth. However, making these discoveries depends on looking at each star over a period of weeks or months, so the pace of discovery is slow.

The SuperWASP technique involves two sets of cameras to watch for events known as transits, where a planet passes directly in front of a star and blocks out some of the star's light. From the Earth the star temporarily appears a little fainter. The

SuperWASP cameras work as robots, surveying a large area of the sky at once. Each night astronomers receive data from millions of stars. They can then check for transits and hence planets. The transit technique also allows scientists to deduce the size and mass of each planet.

A team of collaborators around the world follows up each possible planet found by SuperWASP with more detailed observations to confirm or reject the discovery.

The astronomers working at the Las Cumbres Observatory Global Telescope Network (LCOGTN), affiliated with UC Santa Barbara, use robotically controlled telescopes in Arizona, Hawaii, and Australia. These telescopes provide high quality data used to select the best targets for intense observation. This, together with data from the Nordic Optical Telescope in La Palma, Spain; the Swiss Euler Telescope in Chile; and the Observatoire de Haute Provence in Southern France; provides the final confirmation of the new discoveries.

A total of 46 planets have been found to transit their stars. Since they started operation in 2004, the SuperWASP cameras have found 15 of these. SuperWASP is the most successful transit survey in the world.

The planets discovered by SuperWASP have masses between a middle weight of half the size of Jupiter to more than eight times the size of Jupiter, the largest planet in our solar system.

A number of these new worlds are very exotic. For example, a year, or one orbit, on WASP-12b, is just a bit over one day. This planet is so close to its star that its daytime temperature could reach a searing 2300 degrees Celsius.

Lister and Street from LCOGTN/UCSB are delighted with the results. Street described the discovery as a “very big step forward for the field.”

Lister said, “The flood of new discoveries from SuperWASP will revolutionize our understanding of how planets form. LCOGTN's flexible global network of telescopes is an indispensable part of the worldwide effort to learn about the new planets.”

Source: University of California - Santa Barbara