

Astronomers on verge of finding Earth's twin

PLANET hunters say it's just a matter of time before they lasso Earth's twin, which almost surely is hiding somewhere in our star-studded galaxy.

Momentum is building: Recently, astronomers announced they had discovered three super-Earths worlds more massive than ours but small enough to most likely be rocky orbiting a single star. And dozens of other worlds suspected of having masses in that same range were found around other stars.

"Being able to find three Earth-mass planets around a single star really makes the point that not only may many stars have one Earth, but they may very well have a couple of Earths," said Alan Boss, a planet formation theorist at the Carnegie Institution of Washington in Washington, DC, USA.

Since the early 1990s, when the first planets outside of our solar system were detected orbiting the pulsar PSR 1257, astronomers have identified nearly 300 such worlds. However, most of them are gas giants called hot Jupiters that orbit close to their stars because, simply, they are easier to find.

"So far we've found Jupiters and Saturns, and now our technology is becoming good enough to detect planets smaller, more like the size of Uranus and Neptune, and even smaller," said one of the top planet hunters on this world, Geoff Marcy of the University of California, Berkeley.

Marcy, Boss and other scientists are optimistic that within the next five or so years headlines will be splashed with news of a near twin of Earth in another star system.

"What is amazing to me is that for thousands of years humans have gazed at the stars, wondering if there might be another Earth out there somewhere," Boss said. "Now we know enough to say that Earth-like planets are indeed orbiting many of those stars, unseen perhaps, but there nevertheless."

Two techniques are now standard for spotting other worlds. Most of the planets noted to date have been discovered using the radial velocity method, in which astronomers look for slight wobbles in a star's motion due to the gravitational tug of an orbiting planet. This favours detection of very massive planets that are very close to their host stars.

With the transit method, astronomers watch for a dimming of light when a planet passes in front of its host star. Though more haphazard, this approach works when telescopes scan the light from hundreds or thousands of stars at once.

Both methods are limited by their ability to block out the overshadowing light of the host star. For instance, the sun is 100 times larger, 300,000 times more massive and up to 10 billion times brighter than Earth. "Detecting Earth in reflected light is like searching for a firefly six feet from a searchlight that is 2,400 miles distant," writes a panel of astronomers recently in their final report of the Exoplanet Task Force. With upgrades in spectrometers and digital cameras attached to telescopes, astronomers' eyes have become more sensitive to relatively tiny stellar wobbles (measured by changes in certain wavelengths of light) and dips in starlight from ever smaller planets. The discovery of super-Earths announced last week reflects this technological leap.

"I think why astronomers are really excited [about the super-Earth discovery] is it just shows that technology has really matured and so they're able to see these very subtle wobbles due to these low-mass planets," said David Charbonneau of the Harvard-Smithsonian Center for Astrophysics in Massachusetts. "Those were fairly massive stars. If they were able to get the same precision on a lower-mass star, they would be able to look at even lower-mass planets and so those really would be analogues of the Earth."

To eek out even more sensitivity from current technologies, Charbonneau suggests astronomers look for worlds around small stars.

He and other astronomers are in fact probing the universe for transiting planets orbiting M dwarfs, or red dwarfs, which are about 50% dimmer than the sun and much less massive. Red dwarfs are also considered the most common star type in the universe.

Source: SPACE.com