

Distant planet judged possibly habitable

by Bend_Weekly_News_Sources

In a find that if confirmed could stand as a landmark in history, astronomers have reported discovering the most Earth-like planet outside our Solar System to date: a world that may have liquid oceans and thus life. Swiss, French and Portuguese scientists found the body, estimated as 50 percent wider than our Earth, orbiting a so-called red dwarf star relatively close to Earth. The star is thought to harbor two other planets also.

Artist's impression of a system of three planets surrounding the red dwarf Gliese 581. (Courtesy ESO) Artist's impression of a system of three planets surrounding the red dwarf Gliese 581. (Courtesy ESO)

The arrow marks the approximate location of the red dwarf star Gliese 581 with respect to the constellation Libra visible in the southern sky.

Artist's concept of a red dwarf, a dim star that burns slowly and very long. (Courtesy NASA) The newly found exoplanets as astronomers call planets around stars other than the Sun would be the smallest such body ever reported. Nonetheless, the object is estimated to weigh as much as five Earths, partly thanks to its greater width. For the same reason, it would have more than twice Earth's surface area. Historically, only large exoplanets lend themselves to human detection, though that is changing. Other curious features of the newly found planet are that gravity at its surface would be around twice as strong as on Earth; and its year is just 13 Earth days long, as it completes one orbit about its sun in that time. It's 14 times closer to its star than we are from our Sun, researchers said. But since its host star, the red dwarf Gliese 581, is smaller and cooler than the Sun, the planet nevertheless would lie in its habitable zone—the region around a star with suitable temperatures for liquid water. Average temperatures on this "super-Earth" lie between 0 and 40 degrees Celsius (32 to 104 degrees Fahrenheit), and water would thus be liquid, said Stéphane Udry of Switzerland's Geneva Observatory, lead author of a paper reporting the result. "Models predict that the planet should be either rocky like our Earth or covered with oceans," he added. "Liquid water is critical to life as we know it," noted Xavier Delfosse, a member of the team from Grenoble University, France. "Because of its temperature and relative proximity, this planet will most probably be a very important target of the future space missions dedicated to the search for extra-terrestrial life. On the treasure map of the Universe, one would be tempted to mark this planet with an X."

The host star, Gliese 581, is among the 100 closest stars to us, lying 20.5 light-years away in the constellation Libra (the Scales). A light-year is the distance light travels in a year. Gliese 581 has one third the mass of our Sun. Such small stars, called red dwarfs, are at least 50 times fainter than the Sun and are believed to be the most common stars in our galaxy. Among the 100 closest stars to the Sun, 80 belong to this class. Red dwarfs are ideal targets for the search for such planets because they emit less light, and the habitable zone is thus much closer to them than it is around the Sun, said Xavier Bonfils, a co-researcher from Lisbon University. Planets near a star are easier to detect because their gravitational pull affects the parent star noticeably, inducing some wiggling motion. Red dwarfs are also expected to live extraordinarily long because they burn fuel slowly. A red dwarf one-third the Sun's mass, like Gliese 581, would typically shine for some 130 billion years, outliving the Sun by thirteen times. That might relieve at least one source of stress for any inhabitants of a red dwarf system. We on Earth are already halfway through the Sun's

life-time, though much time remains.

Two years ago, Udry and his team found another planet around Gliese 581, estimated to weigh as much as 15 Earths – about as much as Neptune – and orbiting the star in 5.4 days. At the time, the astronomers had already noted hints of another planet, Udry and colleagues said. They thus took new measurements and found the new “super-Earth,” dubbed Gliese 581c, along with a likely third planet weighing eight Earths and orbiting in 84 days. The findings have been submitted to the research journal *Astronomy and Astrophysics*, the scientists said. The find was possible thanks to an instrument known as a spectrograph on the European Southern Observatory’s 3.6-meter telescope at La Silla, Chile, according to the group. The instrument, called the High Accuracy Radial Velocity Infamy Searcher, is touted as one of the most successful tools for detecting exoplanets to date. The instrument measured wiggles in the star’s motion corresponding to velocity changes of just two to three meters per second – the speed of a brisk walk, according to the Geneva Observatory’s Michel Mayor, principal investigator for the instrument. Given the results so far, “Earth-mass planets around red dwarfs are within reach” of discovery, he predicted.

Courtesy ESO and World Science staff

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