

Earth-like planets could number “billions” in our galaxy

March 29, 2012
Courtesy of ESO
and World Science staff

The first direct estimate of the number of small planets around red dwarf stars suggests that billions of those worlds, potentially with liquid water, exist in our galaxy alone.

Red dwarf stars are faint, relatively cool stars that live long because they go through their fuel slowly, and account for an estimated 80 percent of all the stars in our galaxy.



This artist's impression shows a sunset seen from the super-Earth Gliese 667 Cc. The brightest star in the sky is the red dwarf Gliese 667 C, which is part of a triple star system. The other two more distant stars, Gliese 667 A and B appear in the sky also to the right. Astronomers have estimated that there are tens of billions of such rocky worlds orbiting faint red dwarf stars in the Milky Way alone. (Credit: ESO/L. Calçada)

Scientists used observations from a light-analyzing instrument known as the HARPS spectrograph at the European Southern Observatory's La Silla Observatory in Chile.

Xavier Bonfils of the Sciences Observatory at the University of Grenoble, France, who led the research team, said the findings “mean that about 40 percent of all red dwarf stars have a super-Earth orbiting in the habitable zone where liquid water can exist on the surface of the planet.” A super-Earth is a planet approximately like Earth in its makeup, but somewhat larger. Planets smaller than Earth weren't a focus of the study because they are extremely hard to detect.

“Because red dwarfs are so common — there are about 160 billion of them in the Milky Way —

this leads us to the astonishing result that there are tens of billions of these [super-Earths] in our galaxy alone,” he added. Temperatures would be suitable for liquid water in areas relatively close to those red dwarfs, creating a real possibility of life, he added. On the other hand, members of his team noted, red dwarfs are prone to stellar eruptions that could affect their surrounding planets and make life difficult, quite literally.

The team surveyed what they described as a carefully chosen sample of 102 red dwarf stars in the southern skies over a six-year period. Nine super-Earths—planets weighing the equivalent of one to ten Earths—were found, including two in the “habitable zones” of the stars Gliese 581 and Gliese 667 C respectively. Habitable zones are areas where temperatures allow for liquid water.

By combining all the data, including observations of stars that did not have planets, and looking at the fraction of existing planets that could be discovered, the team worked out how common different sorts of planets are around red dwarfs. On the other hand, giant gaseous planets like Jupiter and Saturn were found to be rare around red dwarfs.

As there are many red dwarf stars close to the Sun, the new estimate means that there are probably about 100 super-Earth planets in the habitable zones of stars less than 30 light-years from the Sun, according to Bonfils’s group. A light-year is the distance light travels in a year.

The new research is to appear in a paper in the journal *Astronomy & Astrophysics*.