

A Paucity of Worlds

Is our solar system a rare fluke, the exception rather than the rule? It seems so. At the very least we're not in the majority, and that's not good news for SETI researchers! In their quest to find solar systems analogous to ours, astronomers have determined how common our solar system is.

The consensus, after a 10-year study, seems to be that no more than 15% of stars in our galaxy host planetary systems like our own, with a sprinkling of gas giant planets making up the outer regions of their solar systems.

The find comes from a research program at Ohio State University called the Microlensing Follow-Up Network (MicroFUN), which searches the sky for extrasolar planets. Astronomers there use a method called gravitational microlensing, which occurs when one star appears to cross in front of another. The closer star acts as a kind of lens to magnify the light from the more distant star, boosting the magnification of planets as they briefly pass by.

Ten years ago astronomers concluded that less than 45% of stars could harbour a configuration similar to our own solar system. But in December 2009 a review of the range of properties among extrasolar planets discovered so far caused a rethink. Astronomers immediately saw a pattern – it was all in the statistics.

In the past 4 years the MicroFUN survey had discovered only one solar system like our own, with two gas giants resembling Jupiter discovered in 2006. Astronomers should have found more. The slow rate of discovery makes sense if only a small number of systems, around 15%, are like ours.

So what's the possibility now of life as we know it existing elsewhere in the galaxy? No one knows for sure, but scientists will be able to estimate that figure more closely now based on how many solar systems are like our own.

With billions of stars out there, even narrowing the odds to 15% leaves a few hundred million systems like ours. Watch this space!

The Coolest Place in the Solar System

The Moon appears to be the coldest place in the solar system, according to new research by NASA's Lunar Reconnaissance Orbiter. Onboard instruments have measured temperatures in the always shadowed craters of the Moon and found that it gets down to as low as -249°C .

The Moon has one of the most extreme thermal environments of any body in the solar system, and we're only just beginning to understand why. Since the Moon and the Earth are approximately the same distance from the Sun, they receive sunlight of the same strength, so you'd reasonably expect the temperature of the Earth and the Moon to be the same, but they're not.

The Moon doesn't have an atmosphere to absorb sunlight like the Earth does, so the surface remains hot during the lunar day, about 127°C at its equator. But at night the Moon's lack of an atmosphere lets the heat escape quickly. The coldest spot appears to be on the south-western edge of the floor of the Hermite crater.

When you have extreme sub-zero temperatures like this you'd expect to find ice left by the incessant bombardment of millions of icy comets over half a billion years. Scientists became curious.

NASA's Lunar Prospector, launched into lunar orbit in January 1998, went looking for lunar ice. Using its neutron spectrometer, the spacecraft found the tell-tale signature of frozen water at the Moon's South Pole, in a dark, cratered area where the Sun never shines. The instrument can detect water to a depth of about half a metre.

So it seems possible that the water (or ice) has survived there. Scientists hope that other observations can confirm this. If so, it would be a great boost for manned space travel in the solar system!

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