

Planets with Four Suns?

How many stars does it take to "raise" a planet? In our own solar system, it took only one -- our Sun. However, new research from NASA's Spitzer Space Telescope shows that planets might sometimes form in systems with as many as four stars.

Hi, I'm Daniel Brennan.

This Spitzer Space Telescope podcast is part of a series highlighting recent discoveries in infrared astronomy. It's produced by NASA's Spitzer Science Center at the California Institute of Technology in Pasadena. The Spitzer mission is managed by NASA's Jet Propulsion Laboratory.

Astronomers have now used Spitzer's infrared vision to study a dusty disk in a star system 150 light-years away. But unlike the many planet-forming disks Spitzer has seen around solitary stars, this disk lives in a quadruple star system called HD 98800.

The four stars in HD 98800 are paired off into two sets of binaries. The stars in each binary orbit around each other very closely. Meanwhile, the two stellar pairs are much further apart, circling each other at a distance about the same as the distance between our Sun and Pluto. One of the stellar pairs has a disk of dust around it, while the other pair has none.

Until now, technological limitations have hindered astronomers' efforts to look at the dusty disk more closely. With Spitzer, scientists finally have a detailed view.

Instead of a smooth, continuous disk, Spitzer detected gaps. Dr. Elise Furlan, of the NASA Astrobiology Institute at the University of California at Los Angeles, suspects that these gaps could be caused by a unique gravitational relationship among the system's four stars, or they could indicate that planets are carving out lanes in the dust. Furlan led the Spitzer observations of HD 98800.

Astronomers believe that planets form like snowballs over millions of years, as small dust grains clump together to form larger bodies. Some of these cosmic rocks then smash together to form rocky planets, like Earth, or the cores of gas-giant planets like Jupiter. Large rocks that don't form planets often become asteroids and comets. As these rocky structures collide, bits of dust are released into space. As planets form, they act like cosmic vacuum cleaners, and clear up all the dust in their path.

Using the Spitzer's Infrared Spectrometer, Furlan's team sensed the presence of two belts in the dust disk. One belt sits at approximately the same distance as Jupiter is from our Sun. It's likely made up of asteroids or comets. The other belt sits at a distance comparable to the area where Mars and the asteroid belt sit in our Solar System, and probably consists of fine grains.

According to Furlan, it is also possible that the presence of gaps in the debris disk may not be due to planets at all. Instead, the separate bands may be the result of a complex gravitational interplay with the second pair of stars.

But whether the gaps are caused by planets or gravity, Furlan believes that understanding HD 98800 is essential to understanding how planets form. After all, stellar loners like our Sun are a minority in the universe. Most stars live in systems with one or more siblings. By understanding the complex evolution of disks in these multiple-star systems, scientists hope to one day understand where habitable planets may be found.

For the Spitzer Science Center, I'm Daniel Brennan.

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