

'WE ARE NOT ALONE'

Nasa's Kepler telescope finds 10 rocky Earth-like planets:

Rocky worlds discovered by Kepler telescope are the right distance from their parent stars for water to pool on the surface

Astronomers have added 219 candidates to the growing list of planets beyond our solar system, 10 of which may be about the same size and temperature as Earth, boosting their chances of hosting life.

Scientists found the candidates in a final batch of NASA's Kepler Space Telescope observations of 200,000 sample stars in the constellation Cygnus.



This artist rendering shows some of the 219 new planet candidates, 10 of which are near-Earth size and in the habitable zone of their star.

They include 10 newly discovered rocky worlds that are the right distance from their parent stars for water, if it exists there, to pool on the surface. Scientists believe liquid water is a key ingredient for life.

“An important question for us is, ‘Are we alone?’” Kepler program scientist **Mario Perez** said in a conference call with reporters. “Maybe Kepler today is telling us indirectly that we are not alone.” NASA launched the Kepler telescope in 2009 to learn if Earth-like planets are common or rare. With the final analysis of Kepler data in hand, scientists said they will now work on answering that question, a key step in assessing the chance that life exists beyond Earth.

During a four-year mission Kepler found 2,335 confirmed planets and another 1,699 candidates, bringing its tally to 4,034. That number includes about 50 worlds that may be about the same size and temperature as Earth.

Including other telescope surveys, scientists have confirmed the existence of nearly 3,500 planets beyond the solar system.

Kepler's data also provided a new way to assess whether a planet has a solid surface, like Earth, or is made mostly of gas, like Neptune. The distinction will help scientists home in on potential Earth-like planets and better the odds for finding life.

The Kepler team found that planets which are about 1.75 times the size of Earth and smaller tend to be rocky, while those two to 3.5 times the size of Earth become gas-shrouded worlds like Neptune.

“It's like finding what we thought was a single species of animal is really two different things,” said **Benjamin Fulton**, a graduate student in astronomy who analysed the Kepler data.

So far, these planets, which scientists refer to as “super-Earths” and “mini-Neptunes”, have not been

found in Earth's solar system, though scientists are on the hunt for a potential ninth planet far beyond Pluto. **“It is interesting that we in our Solar System don't seem to have what appears to be the most common type of planet in the galaxy,”** Fulton said.

Kepler is a space observatory launched by NASA to discover Earth-size planets orbiting other stars. Named after astronomer **Johannes Kepler**, the spacecraft was launched on March 7, 2009, into an Earth-trailing heliocentric orbit. Designed to survey a portion of our region of the Milky Way to discover Earth-size exoplanets in or near habitable zones and estimate how many of the billions of stars in the Milky Way have such planets, Kepler's sole scientific instrument is a photometer that continually monitors the brightness of over 145,000 main sequence stars in a fixed field of view. These data are transmitted to Earth, then analysed to detect periodic dimming caused by exoplanets that cross in front of their host star.



A conceptual drawing of Kepler