

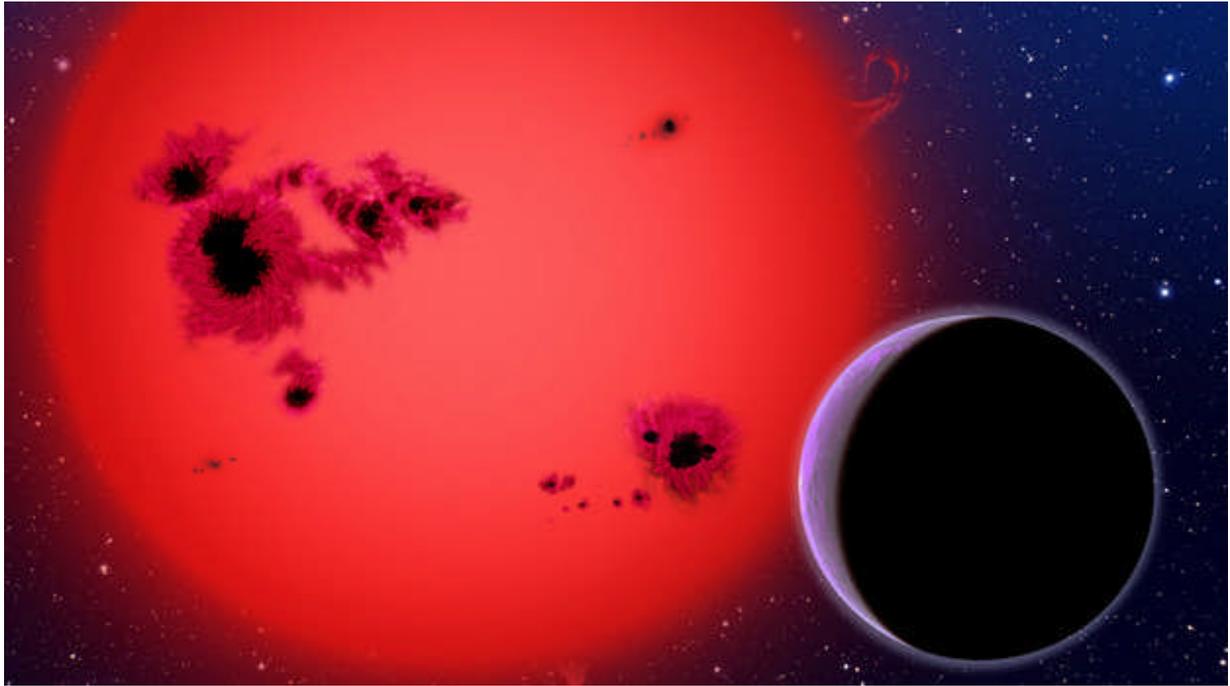
Newly Discovered Planet Could Be A Watery World

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David A. Aguilar/Harvard-Smithsonian Center For Astrophysics

This artist's conception shows the newly discovered planet, a super-Earth named GJ 1214b, orbiting its red dwarf star 40 light-years from our Earth.

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A newly discovered planet orbiting a small, nearby star appears to be a "water world," with a surface that might be covered with liquid water.

"This is certainly the first planet around another star which we think is mostly made of water," says David Charbonneau of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass., who led the research team that found the new planet, named GJ 1214b.

If you could ride a spaceship to this planet — which you couldn't, because it is 40 light-years away — you would first approach the small, feeble red star that the planet orbits once every 38 hours, Charbonneau says. Then you'd see the planet, bigger and heavier than Earth, and probably enshrouded in an alien atmosphere.

Plunging down through that atmosphere, Charbonneau says, the light from the star would most likely dim and disappear until you were in darkness. Then, if you kept going down and your ship could survive the crushing pressure of the atmosphere, you might splash into a hot ocean.

At least, that's what Charbonneau and his colleagues think this planet is like. There's no way to know for sure, with current technology.

But the scientists have been able to determine that the planet is about 2.5 times the size of Earth, with a mass of about 6.5 times that of our home planet. And given that planets can be made of a limited number of common ingredients — like light gases, rock and water — the scientists figured out what possible combinations of ingredients were likely for a planet of this size and weight.

"We think this planet is mostly made of water, with a thin atmosphere surrounding it, perhaps of hydrogen and helium," Charbonneau says.

The planet is pretty hot compared with Earth — around 400 degrees Fahrenheit — but even so, pressure from the atmosphere could keep any water liquid.

A report on the new planet appears in the journal *Nature*. An accompanying commentary by planet-hunter Geoffrey Marcy of the University of California at Berkeley calls it "the most watertight evidence so far for a planet that is something like our own Earth, outside our solar system."

The Presence Of Water

Even though liquid water excites researchers because it's essential for life on Earth, in this case the water would exist in extreme conditions that don't seem friendly enough for life, Charbonneau says. "The surface of our planet probably wouldn't be anything like the surface of Earth and therefore wouldn't host life as we know it."

Scientists have previously found hundreds of planets orbiting stars far from our solar system, but the vast majority are gas giants like Jupiter. The number of known super-Earths — meaning planets more massive than Earth but not as massive as a gas giant — is far smaller.

And this new planet find is only the second time that scientists have been able to determine the density, and thus the possible composition, for a super-Earth. The previous discovery, reported earlier this year, was CoRoT-7b, an extremely hot planet that researchers think may have a rocky core and be covered with lava.

Investigating The Planet's Composition



Dan Brocius/Harvard-Smithsonian Center For Astrophysics

The planet was first discovered back in May when eight MEarth project telescopes on top of Mount Hopkins, Ariz., watched its star and saw the star dim slightly as the planet crossed in front of it.

Now, with this discovery of a possible "water world," scientists have another super-Earth's composition to ponder. "And they're totally different," says Marc Kuchner of NASA's Goddard Space Flight Center in Maryland. "For a planetary scientist, and for someone who spends his time trying to predict what planets are going to look like, I'm having a heyday."

He says the water world hypothesis for this planet is appealing because it is analogous to things seen in our own solar system. "There are some moons around Jupiter that are made substantially out of ice, and of course Uranus and Neptune are made largely out of ice. And it's easy to imagine a world like that located much closer to its star so it's hot and the ice is melted into water," Kuchner says.

But he points out that there are still other, more exotic possibilities — for example, perhaps this new planet is made substantially out of carbon.

Charbonneau is hopeful that more will be learned about this new planet by using the Hubble Space Telescope to look at light from the star that passes through the planet's atmosphere. "Imprinted on that are the fingerprints of whatever gases are present in the atmosphere," he says. His team plans to look for water in the atmosphere. They'll also try to determine how thick the atmosphere is, to see if this planet truly does seem to be a relatively thin atmosphere surrounding what's basically a ball of water.