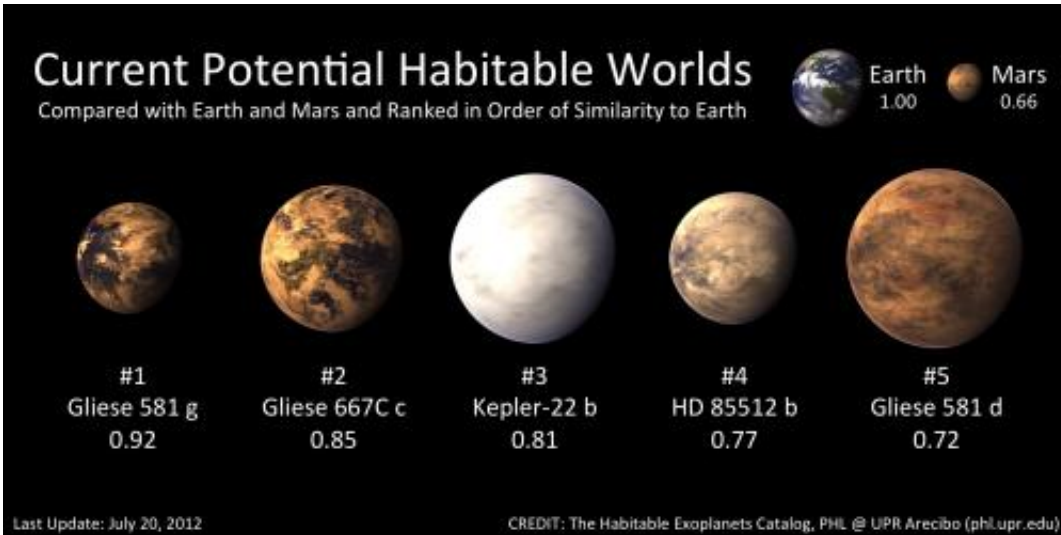


# Five potential habitable exoplanets now

July 20 2012, By Abel Mendez Torres

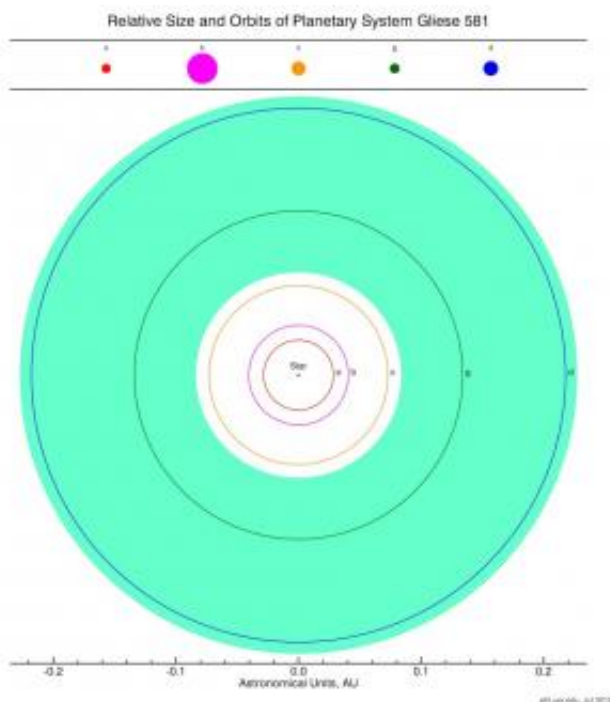


Artistic representation of all the five known potential habitable worlds including now Gliese 581g, the best candidate for an Earth-like exoplanet so far. All of these planets are superterrans (aka Super-Earths) with masses estimated between two and ten Earth masses. Numbers below the planet names correspond to their similarity with Earth as measured in a scale from zero to one with the Earth Similarity Index, one being identical to Earth.

(Phys.org) -- New data suggest the confirmation of the exoplanet Gliese 581g and the best candidate so far of a potential habitable exoplanet. The nearby star Gliese 581 is well known for having four planets with the outermost planet, Gliese 581d, already suspected habitable. This will be the first time evidence for any two potential habitable exoplanets orbiting the same star. Gliese 581g will be included, together with Gliese 667Cc, Kepler-22b, HD85512, and Gliese 581d, in the Habitable

Exoplanets Catalog of the PHL @ UPR Arcibo as the best five objects of interest for Earth-like exoplanets.

Doubts about the existence of Gliese 581g appeared only two weeks after its announcement on September 29, 2010 by [astronomers](#) of the Lick-Carnegie [Exoplanet](#) Survey. Scientists from the HARPS Team from the Geneva Observatory, which discovered all the previously known four planets around Gliese 581, were not able to detect Gliese 581g out of their own data, which included additional observations. Further analysis by others scientists also questioned the existence of Gliese 581g in the last two years.



Comparison of the estimated relative size and orbits of the five exoplanets around Gliese 581. The green shade represent the size of the habitable zone, or the orbital region where an Earth-size planet could have surface liquid water. Planets e, b, and c are too hot for liquid water and life but g and d are in the habitable zone. Planet g is specially in the right spot for Earth-like conditions while d is marginally within these limits, and colder. This is the first case of a

stellar system with two potential habitable exoplanets orbiting the same star.

Now the original discoverers of Gliese 581g, led by Steven S. Vogt of UC Santa Cruz, present a new analysis with an extended dataset from the HARPS instrument that shows more promising evidence for its existence. The new analysis strength their original assumption that all the planets around [Gliese 581](#) are in circular and not elliptical orbits as currently believed. It is under this likely assumption that the Gliese 581g signal appears in the new data.

“This signal has a False Alarm Probability of

Based on the new data Gliese 581g probably has a radius not larger than 1.5 times Earth radii. It receives about the same light flux as Earth does from the Sun due to its closer orbital position around a dim red dwarf star. These factors combine to make Gliese 581g the most Earth-like planet known with an Earth Similarity Index, a measure of Earth-likeness from zero to one, of 0.92 and higher than the previously top candidate Gliese 667Cc, discovered last year.

“The controversy around Gliese 581g will continue and we decided to include it to our main catalog based on the new significant evidence presented, and until more is known about the architecture of this interesting stellar system” said Abel Méndez, Director of the PHL @ UPR Arecibo.

Authors on the original paper are Steven S. Vogt, UCO/Lick Observatory, UCSC; Paul Butler, Department of Terrestrial Magnetism, Carnegie Institution; and Nader Haghighipour of the Institute for Astronomy and NASA Astrobiology Institute. Their research is published online on July 20, 2012 in the journal *Astronomical Notes*, 333,

No. 7, 561-575.

**More information:** [arxiv.org/abs/1207.4515](https://arxiv.org/abs/1207.4515)

[phl.upr.edu/projects/habitable-exoplanets-catalog](http://phl.upr.edu/projects/habitable-exoplanets-catalog)

Provided by Planetary Habitability Laboratory

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