

How many moons does Venus have?

April 23 2014, by Elizabeth Howell



A radar view of Venus taken by the Magellan spacecraft, with some gaps filled in by the Pioneer Venus orbiter. Credit: NASA/JPL

There are dozens upon dozens of moons in the Solar System, ranging from airless worlds like Earth's Moon to those with an atmosphere (most notably, Saturn's Titan). Jupiter and Saturn have many moons each, and even Mars has a couple of small asteroid-like ones. But what about Venus, the planet that for a while, astronomers thought about as Earth's twin?

The answer is no moons at all. That's right, Venus (and the planet Mercury) are the only two [planets](#) that don't have a single natural moon orbiting them. Figuring out why is one question keeping [astronomers](#) busy as they study the Solar System.

Astronomers have three explanations about how planets get a moon or moons. Perhaps the moon was "captured" as it drifted by the planet, which is what some scientists think happened to Phobos and Deimos (near Mars). Maybe an object smashed into the planet and the fragments eventually coalesced into a moon, which is the leading theory for how Earth's Moon came together. Or maybe moons arose from general accretion of matter as the solar system was formed, similar to how planets came together.

Considering the amount of stuff flying around the Solar System early in its history, it's quite surprising to some astronomers that Venus does not have a moon today. Perhaps, though, it had one in the distant past. In 2006, California Institute of Technology researchers Alex Alemi and David Stevenson presented at the American Astronomical Society's division of planetary sciences meeting and said Venus could have been smacked by a large rock at least twice. (You can read the abstract [here](#).)



The International Space Station captured as it passed in front of the Moon on Dec. 6, 2013, as seen from Puerto Rico. Credit: Juan Gonzalez-Alicea.

"Most likely, Venus was slammed early on and gained a moon from the resulting debris. The satellite slowly spiraled away from the planet, due to tidal interactions, much the way our Moon is still slowly creeping away from Earth," Sky and Telescope wrote of the research.

"However, after only about 10 million years Venus suffered another tremendous blow, according to the models. The second impact was opposite from the first in that it 'reversed the planet's spin,' says Alemi. Venus's new direction of rotation caused the body of the planet to absorb the moon's orbital energy via tides, rather than adding to the moon's

orbital energy as before. So the [moon](#) spiraled inward until it collided and merged with Venus in a dramatic, fatal encounter."



Venus as photographed by the Pioneer spacecraft in 1978. Some exoplanets may suffer the same fate as this scorched world. Credit: NASA/JPL/Caltech

There could be other explanations as well, however, which is part of why astronomers are so interested in revisiting this world. Figuring out the answer could teach us more about the solar system's formation.

More information: To learn more about Venus, check out these links:

[Venus](#) (NASA)

[Venus Express](#) (European Space Agency spacecraft currently at the planet)[Venus](#) (Astronomy Cast))

[Magellan Mission to Venus](#) (NASA)

[Chasing Venus](#) (Smithsonian)

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Citation: How many moons does Venus have? (2014, April 23) retrieved 25 November 2024 from <https://phys.org/news/2014-04-moons-venus.html>

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