

Suspected dust ring in Venus's orbit confirmed

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Venus. Photo courtesy of NASA

(Phys.org) —A trio of researchers from The Open University and the University of Central Lancashire in the U.K., has confirmed that a ring of dust surrounds the sun in the orbit of Venus. In their paper published in the journal *Science*, the team describes how they used data from NASA's twin STEREO probes to confirm the existence of the dust ring.

Scientists have known for many years that a cloud of dust exists throughout the solar system, ranging from the asteroid belt to the sun—it's called the [zodiacal cloud](#) and is made of [interplanetary dust](#).

Over the past few decades, space scientists have come to realize that some of that dust can be pulled into the [orbit](#) of a planet by that planet's gravity. The Earth travels through just such a ring—it was discovered approximately 20 years ago. Twenty years before that, probes sent into space by the Soviet Union sent back evidence suggesting that such a ring existed in Venus's path. Unfortunately, evidence from those probes wasn't strong enough to actually prove that the ring existed.

In this new effort, the researchers first created a model of what they believed a [dust ring](#) in Venus's orbit should look like, then compared it with data from a pair of NASA probes that allow for stereoscopic viewing of portions of space. That helped them find what they were looking for—evidence of Venus's dust ring. But it didn't conform exactly to the model they'd created (because it was partially based on data that describes the dust ring in Earth's orbit). Instead, they found that Venus's dust ring had two steps—one existed just outside of Venus's orbit, the other just inside of it.

Finding dust rings in the orbits of other planets is not easy—the difference in the density of such a dust cloud and the zodiacal cloud is roughly just 10 percent. Plus it's so large it's difficult to see from our vantage point. The [dust cloud](#) in Venus's orbit, for example, has a diameter of 220 million kilometers. Another problem is that the individual dust particles don't persist in a ring for very long—as a part of the zodiacal cloud, they are constantly moving slowly towards the sun. That means that the dust particles that exist in a ring are constantly being replenished.

Scientists believe gaining a better understanding of the dust clouds that exist in planetary orbits can help in studying exoplanets, offering information that may not be available in other ways.

More information: [Imaging of a Circumsolar Dust Ring Near the](#)

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ABSTRACT

The gravitational interaction of dust in the zodiacal cloud with individual planets is expected to give rise to ringlike features: Such a circumsolar ring has been observed associated with Earth, but such resonance rings have not been confirmed to exist for other planets. Here, we report on sensitive photometric observations, based on imaging from the STEREO mission, that confirm the existence of a dust ring at the orbit of Venus. The maximum overdensity of dust in this ring, compared to the zodiacal cloud, is ~10%. The radial density profile of this ring differs from the model used to describe Earth's ring in that it has two distinct steplike components, with one step being interior and the other exterior to the orbit of Venus.

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