

## WHY IS THE PLANET VENUS SO BRIGHT?

Our neighbouring world – orbiting one step inward from Earth around the Sun – is the third-brightest object in the sky, after the Sun and Moon. In late November and early December 2018, Venus is easily visible in the east before Sunup. It's at its brightest around this time for this entire morning apparition, which extends well into 2019.

Why is this world so bright?

As the planet next-inward from Earth in orbit around the sun, Venus is relatively nearby. But its nearness isn't the only reason Venus is bright. Consider that Mars orbits one step outward from Earth. And Mars waxes and wanes in brightness in our sky. It's only exceptionally bright around the time Earth passes between Mars and the Sun, when the red planet is at its closest to us, which it was earlier this year, around July.

**With Venus, something else is going on. Astronomers use the term albedo to describe how bright a planet is in absolute terms. When sunlight strikes a planet, some of the light is absorbed by the planet's surface or atmosphere – and some is reflected. Albedo is a comparison between how much light strikes an object – and how much is reflected.**

**As you might have guessed, Venus has the highest albedo of any major planet in our solar system.**

Throughout November 2018, Venus has been near a bright star, Spica in the constellation Virgo. Spica is one of the brightest stars in our sky but it's nowhere near as bright as Venus!

The albedo of Venus is close to .7, meaning it reflects about 70 percent of the sunlight striking it. When the Moon is close to full in Earth's sky, it can look a lot brighter than Venus, but the moon reflects only about 10 percent of the light that hits it. The Moon's low albedo is due to the fact that our companion world is made of dark volcanic rock. It appears bright to us only because of its nearness to Earth.

It's only about a light-second away, in contrast for several light-minutes for Venus. Venus has a high albedo because it's blanketed by highly reflective clouds. The clouds in the atmosphere of Venus contain droplets of sulfuric acid, as well as acidic crystals suspended in a mixture of gases. Light bounces easily off the smooth surfaces of these spheres and crystals. Sunlight bouncing from these clouds is a big part of the reason that Venus is so bright.

By the way, Venus isn't the most reflective body in our solar system. That honour goes to Enceladus, a moon of Saturn. Its icy surface reflects some 90 percent of the sunlight striking it.

We mentioned above that Mars is brightest when Earth passes between the red planet and the Sun. At such times, Mars is closest to us, and so it appears brightest in our sky. A similar situation occurs for Venus: the planet is brightest in our sky around the time Venus passes between us and the Sun, although not exactly at that time. Because Venus orbits the Sun inside Earth's orbit, when it goes between us and the Sun its lighted hemisphere, or day side, is facing away from us. At such times it can even be difficult or impossible to see Venus at all.

AK, with EarthSky and Wikipedia Notes



Variance of Venus in the sky in 2004. Since Venus passed between us and the Sun in late October 2018, its lighted half – or day side – is still facing mostly away. It's an interesting fact that the crescent Venus can appear brighter than the fuller Venus we see at other times.



The planet Venus and star Spica shine brightly at dawn before sunrise in Singapore. The pair looks so beautiful in the dark sky

