Planetary rings are a natural feature of the larger outer planets like Jupiter and Neptune, but none are as spectacular as Saturn's. However, in March and November 2025, these majestic rings will not be visible to observers on Earth. Fortunately, this rare event is only an optical illusion. It is caused by the orientation of Saturn's thin rings and the planet's tilt relative to Earth. The last time this occurred was in 2009.

The science behind the "vanishing" rings

Similar to Earth, Saturn's axis is tilted. For half of its 29.4 years, the ringed planet leans toward the Sun. This lights up the planet’s northern hemisphere and the top of its rings. During the other half, Saturn tilts away. This causes the sunlight to shine on its southern hemisphere and the bottom of the rings.However, every 13 to 15 years, there are two brief periods when Earth aligns perfectly with Saturn’s ring plane. This makes the rings appear edge-on from Earth. Since Saturn’s rings are incredibly thin — only about 30 feet (9 m) thick in some areas — they become nearly invisible when viewed from this angle.

To better understand this phenomenon, imagine holding a large, flat sheet of paper. When you look directly at its surface, you can see the entire sheet. But if you tilt it sideways and view it from the edge, all you see is a thin line. This is essentially what happens with Saturn's rings. Instead of viewing the full ring system, we only see the thin edge.

For how long will the rings be "gone?"

After "disappearing" on March 23, 2025, Saturn's rings will gradually become visible again over the following months through large telescopes. They will fade from view a second time in November 2025. Once again, the rings will slowly reappear, first through large telescopes and later through regular ones. By 2027, Saturn’s rings will be fully visible again for another 13 to 15 years.

Ringless Saturn provides learning opportunities The rare, unobstructed view of Saturn during these "ring plane" phases has given scientists the chance to learn more about the planet. During previous such phases, astronomers discovered 13 of Saturn’s 148 moons, including its largest, Titan, and its smallest, Mimas. In 1966, they also spotted Saturn’s outermost ring — now known as the "E ring" — for the first time during this phase.

However, the upcoming 2025 event is not expected to provide any new insights into the ringed planet. Similar to 2009, Saturn will be positioned close to the Sun, making it challenging to observe.