

BBC



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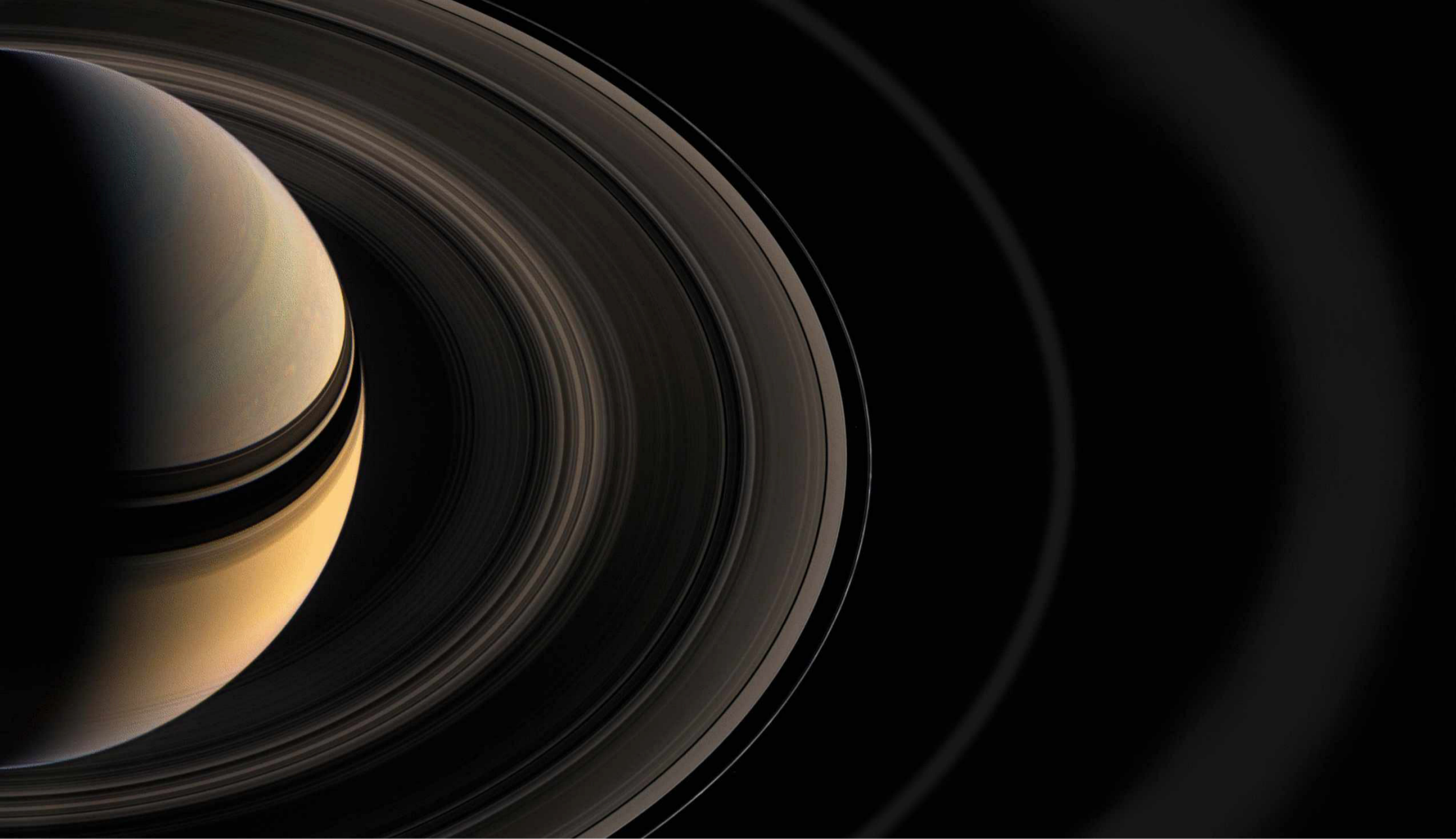
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SOLAR SYSTEM

SATURN'S ICONIC RINGS MAY HAVE BEEN FORMED BY ANCIENT MOON

Around 160 million years ago, the shattering apart of a moon named Chrysalis may have caused Saturn to tilt and created its signature icy rings

Saturn's iconic tilt and rings may all be down to an ancient moon

Thanks to its trademark disc of icy rings, Saturn is one of the most recognisable planets in the Solar System. But exactly how these distinctive rings formed has remained something of a mystery.

Now, a computer-modelling study carried out by researchers at MIT has suggested that the gas giant's rings, and the nearly 27° tilt at which it moves around the Sun, might be due to an ancient moon careering out of orbit, clipping its host planet and being smashed into hundreds of pieces.

The team made the discovery by using gravitational data collected by NASA's Cassini spacecraft, which orbited Saturn from 2004 to 2017. After running several computer models designed to emulate the orbits of Saturn and its satellites back through time, the researchers determined that billions of years ago, Saturn had at least one more moon, which they have named Chrysalis.

Through gravitational interactions with Chrysalis, Saturn kept its tilt in sync with Neptune. However, around 160 million years ago, Chrysalis became unstable, ventured too close to Saturn and subsequently pulled apart.

The loss of this additional moon was enough to push Saturn out of sync with Neptune, leaving it with its current tilt. Moreover, some fragments of Chrysalis's shattered body may have remained in orbit and eventually broken down to form the planet's signature rings.

The researchers estimate that Chrysalis would have been around 1,500km across – roughly the same size as Iapetus, Saturn's third-largest moon.

"Just like a butterfly's chrysalis, this satellite was long dormant and suddenly became active, and the rings emerged," said Jack Wisdom, professor of planetary sciences at MIT and lead author of the new study.

"It's a pretty good story, but like any other result, it will have to be examined by others. But it seems that this lost satellite was just a chrysalis, waiting to have its instability."

LUNAR LINE-UP

Just 53 of Saturn's 82 moons have been named. Here are two of the most important...

Titan is the largest of Saturn's moons. At 5,150km in diameter it is larger than Mercury, the Solar System's smallest planet.



Enceladus is Saturn's sixth-largest moon. It is of huge scientific interest as it is thought to have liquid oceans flowing beneath its frozen outer shell. This makes it one of the prime targets in the search for biological life in the Solar System.

