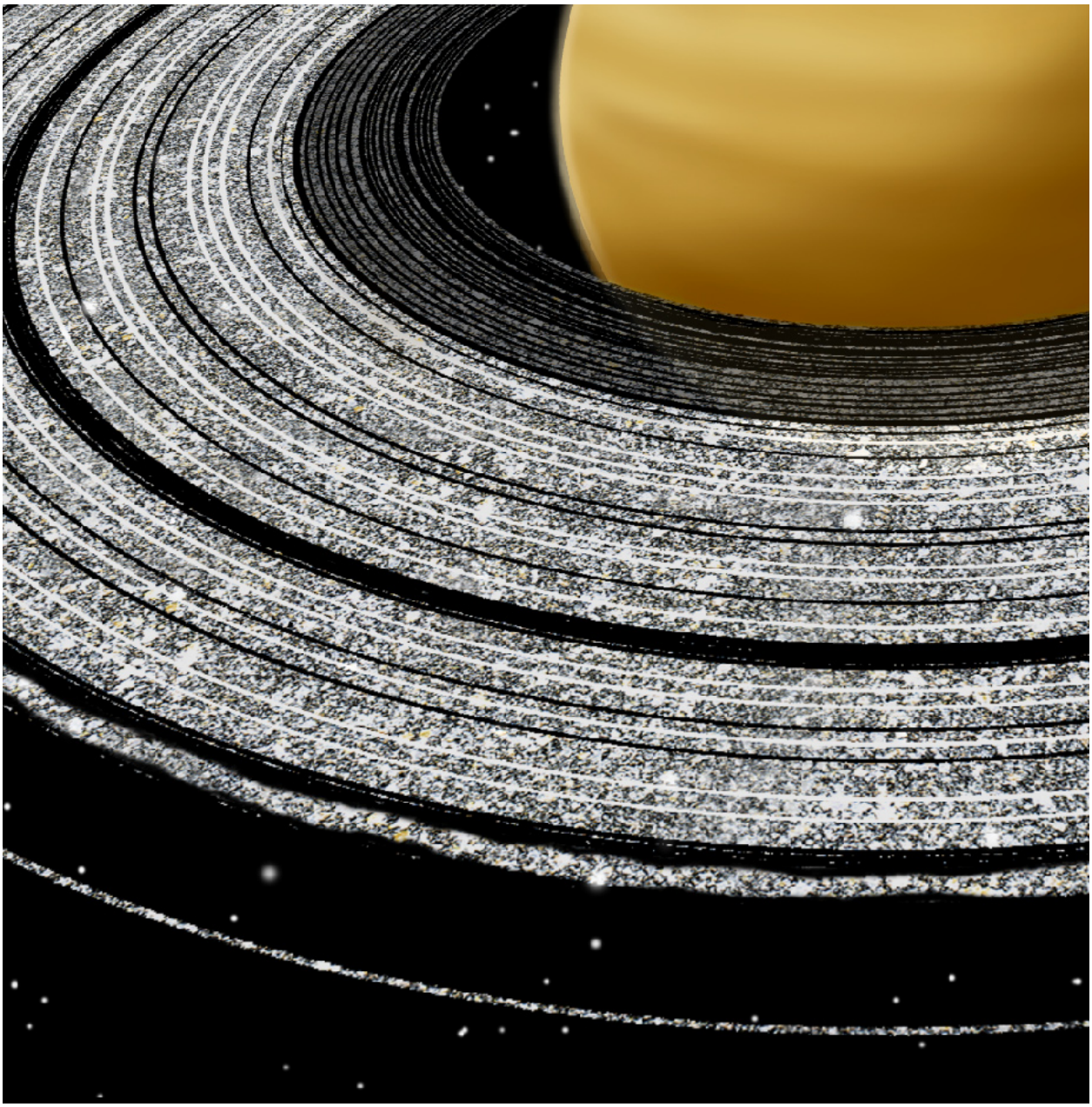
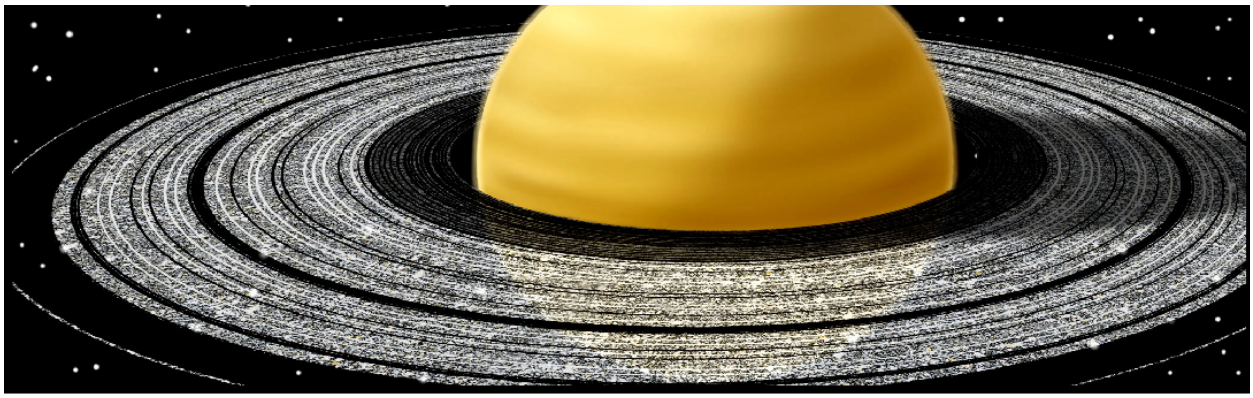
Those Amazing Rings!

Questions, Answers, and Cool Things to Think About



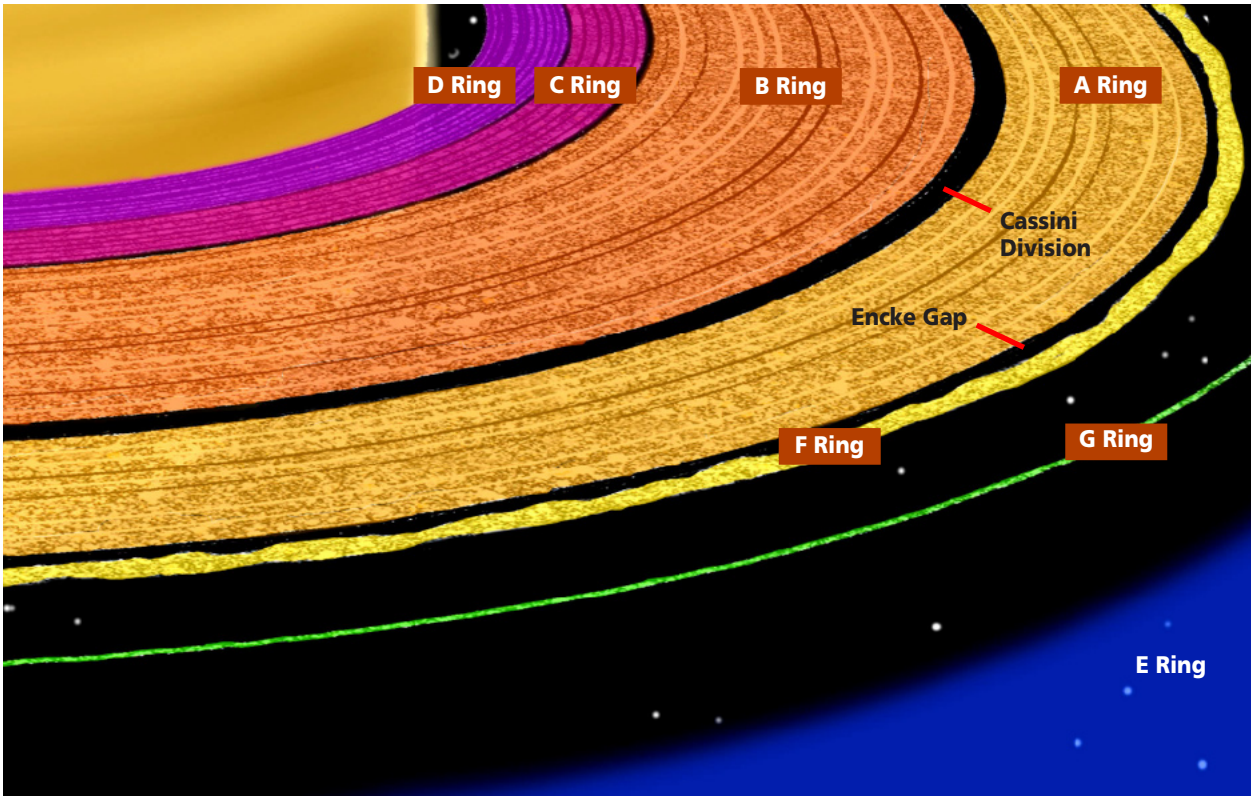
Discovering Saturn: The Real Lord of the Rings



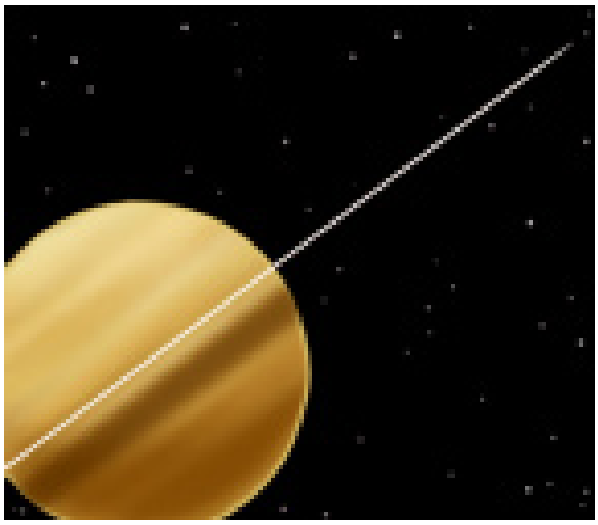
While all the gas giant planets have rings, Saturn's rings are the brightest and most spectacular, although we need a good telescope to see them from Earth. What other adjectives or describing words come to mind when you look at the rings?

(The colors shown below are not real.)

The rings are named in order of their discovery, so even though the A ring is not the closest ring to Saturn, it is called "A" because it was discovered first. From the planet outward, they are known as the D, C, B, A, F, G, and E rings. Can you think of a better way to name the rings?



The rings stretch all around Saturn and are about 170,000 miles in diameter. That is almost the distance from Earth to the Moon! While the rings stretch for hundreds of thousands of miles to circle Saturn, they are less than a kilometer (about half a mile) thick. In fact, scientists have found that in some places they are as little as 10 meters (30 feet) thick.

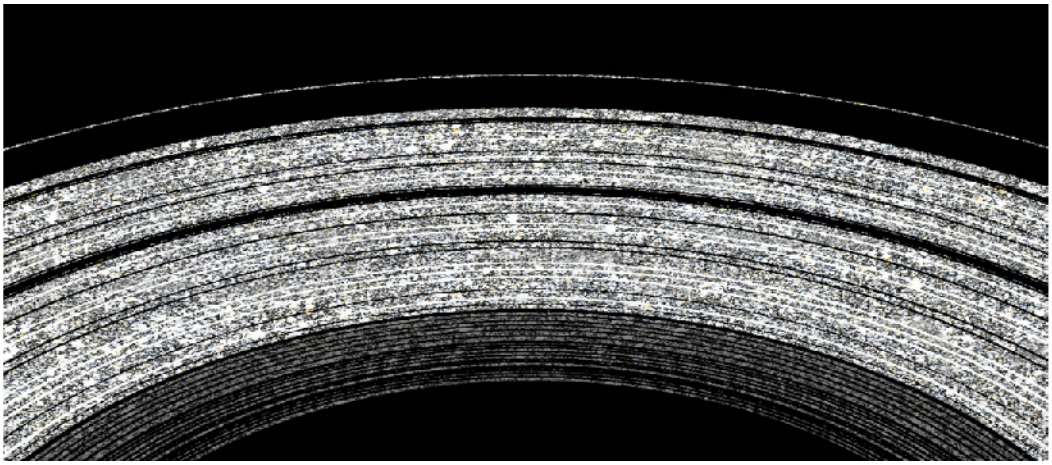


It is amazing that Saturn's rings can be hundreds of thousands of miles across and yet less than a soccer field in thickness. If you were to use a piece of paper to make a scale model of Saturn's A, B, and C rings, and have the thickness of the paper represent the thickness of the rings, you would need to cut out a circle with a diameter greater than 10,000 feet, or about two miles, across. The rings are really thin!

Long ago, when Jean-Dominique Cassini and Christiaan Huygens were alive, people thought the rings were solid bands. But Saturn's rings only look like solid bands when seen from far away.

Cassini

Huygens



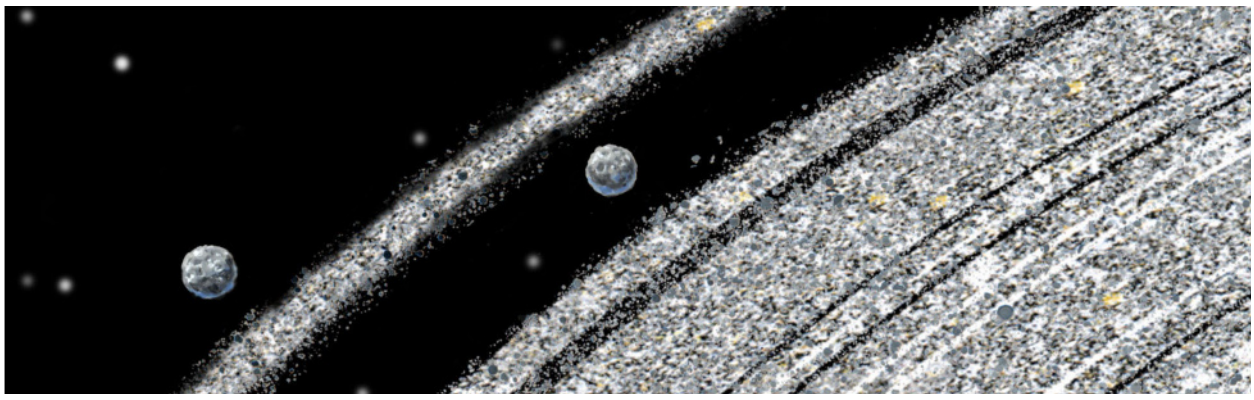
Kids: Look at this drawing from across the room and see if the rings look solid to you.

The A, B, and C rings are really made up of chunks of water ice and ice-covered rock, ranging in size from a grain of sand to as big as a house! Particles in the D and E rings are even smaller — about the size of particles in smoke. We don't know yet how big the particles are in the F ring.

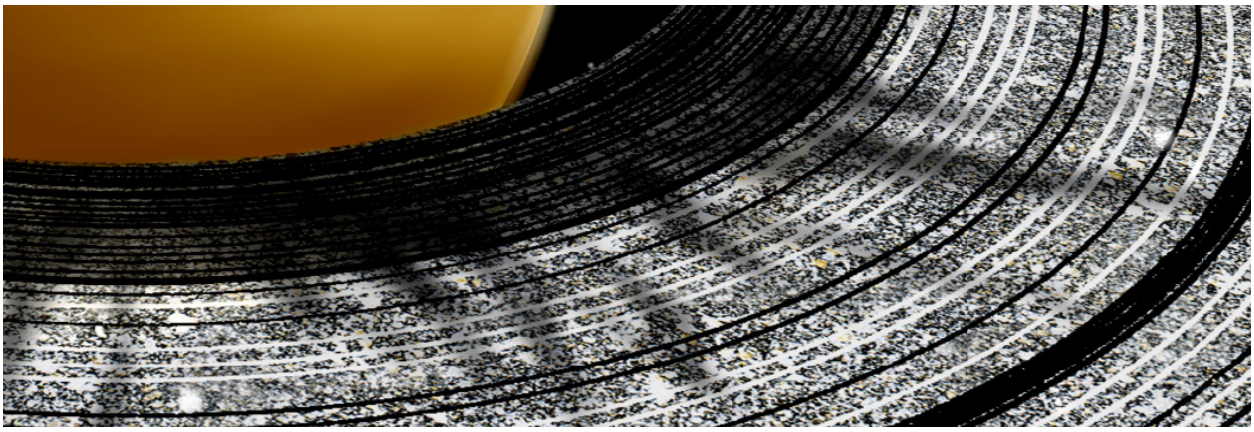
Where do you think these particles came from? Many scientists think they came from former moons that crashed into each other and smashed into pieces!

You might expect that all the pieces would eventually float away from each other and the rings would break up. But some of Saturn's moons act like shepherds herding sheep. Their gravity keeps the icy particles from straying out of the rings. In fact, they're called "shepherd moons."

Shepherd moons are less effective at holding the smallest particles in place, however. Many of these particles gradually fall into Saturn. But they are replaced by new particles that come from the ongoing collisions of large rocks and moons, so the rings are always in the process of being rebuilt.



Shepherd Moons



Spokes

Saturn's rings have gaps between them, though only a few of these gaps were known before space probes visited the planet. The largest of these gaps, located between the A ring and the B ring, is called the Cassini Division, after its discoverer, Jean-Dominique Cassini. It is about 4,800 kilometers wide (about the distance across the United States), although this varies quite a bit around the planet. There is another division between the A ring and the F ring called the Encke Gap. (See diagram on page 2.) The gaps are produced by the gravitational pull of one or more of Saturn's many moons on the particles in the rings.

There are other characteristics about the rings that puzzle scientists. The F ring almost seems to be braided in places, and there are features that look like spokes that stretch across the rings. What do you think these might be? Scientists are hoping that the Cassini spacecraft will help them to understand Saturn's amazing rings better.

Closeup of the Braided F Ring

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