

## **Pan**

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The ring system of Saturn is certainly an interesting system to explore and one of the things I find captivating is the interaction between Saturn's moons and the rings. I think that Cassini's Spacecraft next mission should focus on target 1 - Pan, Saturn's tiny moon, because, for such a small satellite, Pan has a considerable activity.

The Encke Gap, one of the two observed gaps in the A ring, is created by the moonlet Pan. The moon developed and maintains the gap opened by sweeping away the particles that fall into it, a process known as shepherding. This role makes a connection to the satellite's name - in Greek mythology, Pan was the god of shepherds. However, when the moon shepherded particles away from its orbit, some particles remained in the center of the gap, caught in the same orbit as the moon, and formed a tiny ringlet. The observations show that the Encke Gap is cleared by the small moon Pan, anyhow a small ringlet remains in the center of the gap. That ringlet probably consists of dust escaping off the surface of Pan and stabilized by Pan's gravity. After Cassini entered Saturn's orbit, the cameras discovered three faint new ringlets in the Encke Gap. These ringlets suggest that Pan is not the only moon maintaining openings through the Encke Gap, and that is another reason the satellite mission should take Pan as an object of observation.

Even if it's very small, having about 17 miles, or 28 kilometers, from pole to pole, the moonlet has visible effects on the ring. A wavy pattern on the inner edge of the Encke Gap and a pattern moving inwards from that edge show Pan's gravitational influence, as the scientists discovered. These waves are present at some, but not all longitudes, so they are atypical. Therefore, Pan has a very important part in the process of forming the model.

Pan's unusual shape is another intriguing aspect. The odd shape may come from fast rates of spin that might have stretched the moon, but somehow it doesn't whirl very quickly and taking about 14 hours to complete a rotation. So the question is asked: How did Pan get the peculiar form? And is it possible that the moonlet's appearance is related to its assignments? Pan has solid, rocky composition and the scientists think that it was born from icy particles, given the fact that the A ring consists of frozen water. To have knowledge of how the particles combined to make this shape could lead to understanding how other planets were formed.

The Cassini mission will provide new information that will help in giving an explanation for Pan's structure, dynamics, or origin. Also, new data can reveal more on Pan's "artistic" part, the wavy pattern, confirm or deny a theory such as the one about Pan not being the only moonlet of the Encke Gap, and other unknown aspects.

