

How Saturn ate up a moon and got its rings

One of the theories explaining the formation of Saturn's rings says they are the icy remains of a giant moon swallowed by the planet millions of years ago

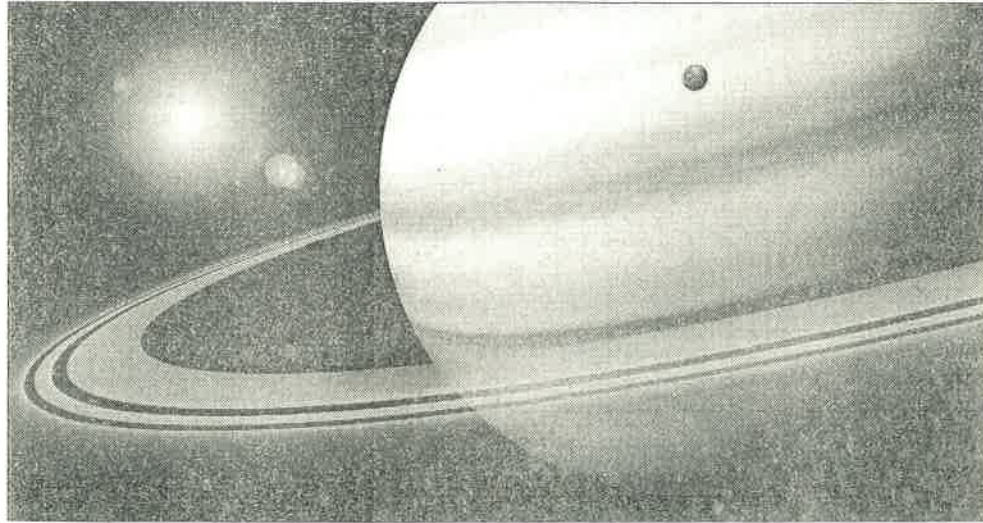
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HOW Saturn got its rings has been a mystery since Galileo first observed the planet, the second largest in the solar system, four centuries ago. Several theories have since been proposed, the dominant one suspecting that comets or asteroids shattered erstwhile moons, whose parts then huddled around the planet to form the rings.

Professor Wing-Huen Ip of Taiwan's National Central University, a scientist associated with NASA's Cassini mission, which currently orbits the gas planet, said in a lecture last week that the theory was im-

probable. When Saturn swallowed up one of its giant moons millions of years ago, the icy outer layers formed the exquisite rings, the professor said during his talk at Ahmedabad's Physical Research Laboratory (PRL). Moons in this cold part of the solar system are made up of ice and silicate material, with the ice forming the mantle and the silicate the core.

Scientists have found that up to 95 per cent of Saturn's rings are made up of icy material, posing the obvious question—if they were formed by the remnants of a moon, or several moons, where did all that silicate material go?



Another hiccup in the old theory is that such collisions could not have possibly taken place during the period the rings are calculated to have been formed. Images of Saturn's rings show luminous orbs that, scientists say, cannot be more than a few hundred million years old. This is because the brightness suggests there has been a lack of contamination by dark meteoritic materials, which takes quite a lot of time.

On the other hand, the Late Heavy Bombardment, the only probable astronomical event that mirrors the theoretical onslaught of comets and asteroids (and the resultant collisions

with moons) that may have formed the rings, happened about 3.5 billion years ago, considerably predating the rings' birth. So what did happen? Professor Ip proposes that a moon or object the size of Titan—Saturn's largest moon—may have come too close to the giant planet's ferocious winds and gravitational pull and got swallowed up. In the process, the object was stripped of its icy mantle, and huddled around the planet while the inner core, made up of silicate material like other moons in this freezing region of the solar system, plunged into the gaseous planet.