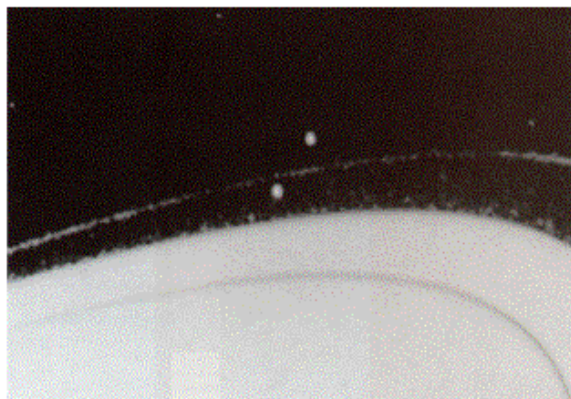


The structure of the F ring is believed to be controlled by the two 'shepherd moons' - Pandora and Prometheus - which orbit just inside and outside it. The gravitational influence of these moons confine the F ring to a band about 100km wide



Ring Systems of the other Jovian Planets

- Jupiter's ring system is much more tenuous than Saturn's. It was only detected by the Voyager space probes.

The ring material is believed to be primarily dust, and extends from near Jupiter to about 3 planetary radii.

- Uranus' rings were discovered in 1977, during the **occultation** of a star, and were photographed by Voyager 2 in 1986.

There are 11 rings in total, ranging in width from 10km to 100km. The ring particles are very dark (reflecting only 1% of sunlight) and about 1m across. Some rings are 'braided', and the thickest ring has shepherd moons. There is also a very thin layer of dust between the rings - probably the result of collisions.

- Neptune's rings were also first discovered from occultation observations, and were photographed by Voyager 2 in 1989. There are 4 rings: two narrow and two diffuse sheets of dust. One of the rings has 4 'arcs' of concentrated material.

Why are the ring systems so thin?

Collisions of ring particles are **partially inelastic**.

Consider two particles orbiting e.g. Saturn in orbits which are slightly tilted with respect to each other.

Collision reduces difference of y components, but has little effect on x components

⇒ thins disk of ring particles

