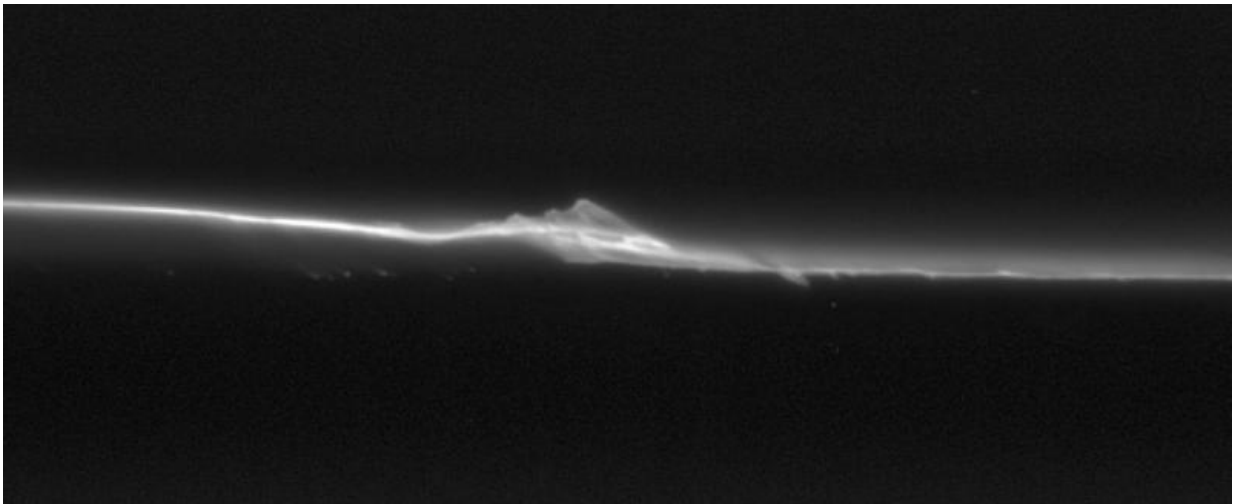


Image: Saturn's moonlets disrupting a core ring

February 9 2016



Credit: NASA/JPL/Space Science Institute

Saturn has the most extensive ring system in the Solar System. Sitting in the region of space spanning 7000 to 80 000 km above the planet's equator, these rings are mostly composed of particles of water ice contaminated with traces of rocky material, varying in size from dust grains to mountain-sized chunks, laced throughout.

Rather than a number of concentric rings, Saturn's ring system can be thought of as a disc with bright, dense clumps and darker, sparser patches occurring at different radii. Distinct gaps are relatively rare, but

there are a couple of key breaks—the Cassini and Roche divisions—and several named ring gaps, features that are created and shaped by Saturn's many moons. In places, moons have opened up spaces within the rings, clearing their orbital paths of icy particles, while in other regions gaps have opened up because of disruptive orbital resonances.

The major rings are named the D, C, B, A, F, G, and E rings, in order of increasing orbital distance, with others taking on monikers made up of other letters, or related to moons they are thought to be associated with.

The F ring, a section of which is featured in this image from the Cassini spacecraft, is only a few hundred kilometres wide and is the most active of Saturn's rings, with features that shape-shift over the course of just a few hours. It has two 'shepherding' satellites that orbit just inside and outside its bounds, named Prometheus and Pandora respectively. However, these aren't the only orbiting bodies associated with the F ring—it is also parent to numerous small natural satellites known as 'moonlets'.

Moonlets can be detected by the ways in which they disturb their surroundings. Such a disturbance is shown in this Cassini image; scientists believe that a small population of differently sized moonlets were responsible for forming this feature as they collide with and perturb the core of the ring – some of the small moonlets can be seen emerging below the ring just left of the centre. In fact, most of the F [ring](#)'s morphology and behaviour is caused by the continual gravitational and collisional effects of its embedded moonlets, often combined with the perturbing effect of Prometheus.

The image was taken in visible light with the Cassini spacecraft's narrow-angle camera on 25 September 2006, at a distance of approximately 255 000 km from Saturn. The scale in the original image was 1 km per pixel. The image has been magnified by a factor of two and contrast enhanced.

Provided by European Space Agency

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