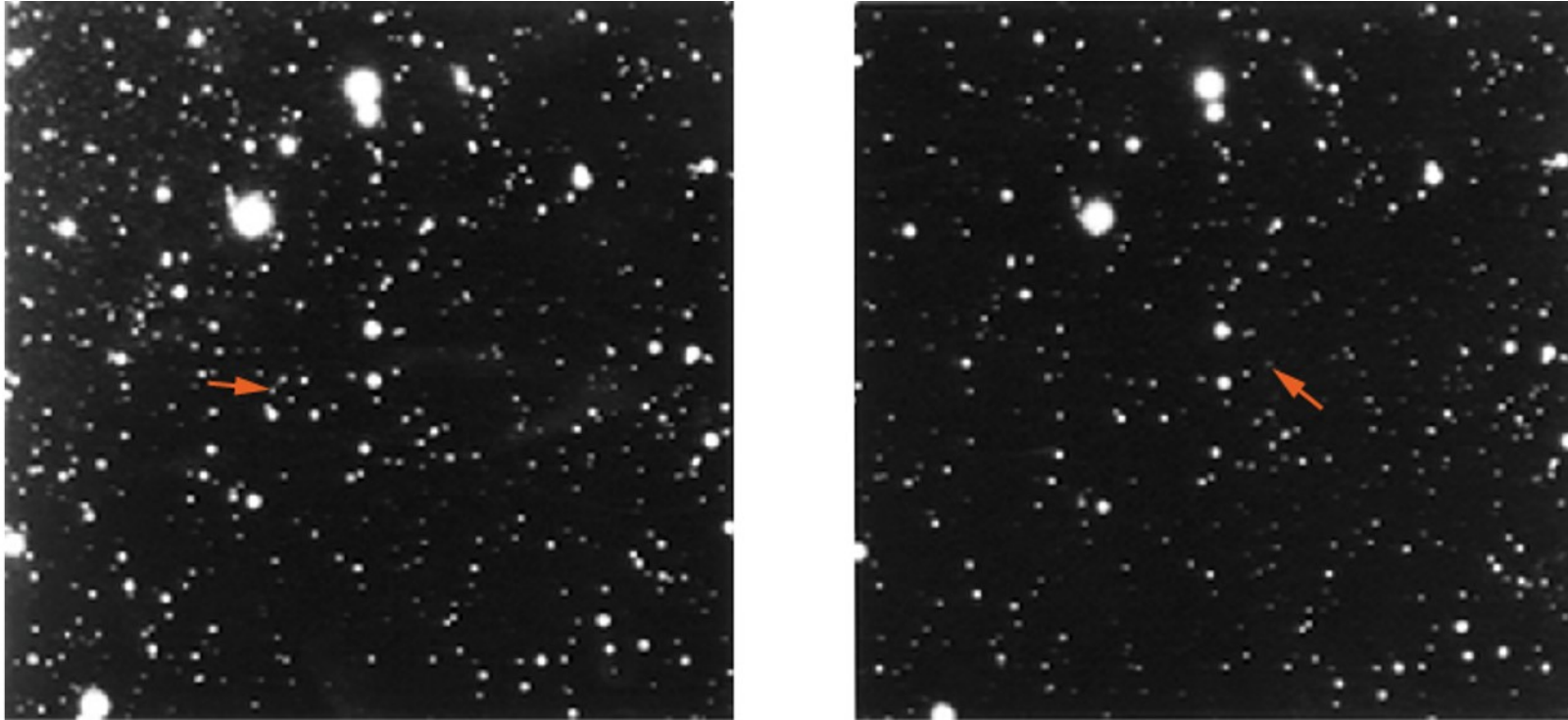


Rings Moons and Pluto Part 2

DR. DAVID YENERALL



Pluto's Moon



Portions of the two photographs by which Clyde Tombaugh discovered Pluto in 1930. The left one was taken on January 23 and the right on January 29. Note that Pluto, indicated by an arrow, has moved among the stars during those six nights. If we hadn't put an arrow next to it, though, you probably would never have spotted the dot that moved. (credit: modification of work by the Lowell Observatory Archives)

Comparison of the Sizes of Pluto and Its Moon Charon with Earth



This graphic vividly shows how tiny Pluto is relative to a terrestrial planet like Earth. That is the primary justification for putting Pluto in the class of dwarf planets rather than terrestrial planets. (credit: modification of work by NASA)

Clyde Tombaugh (1906–1997)



(a)

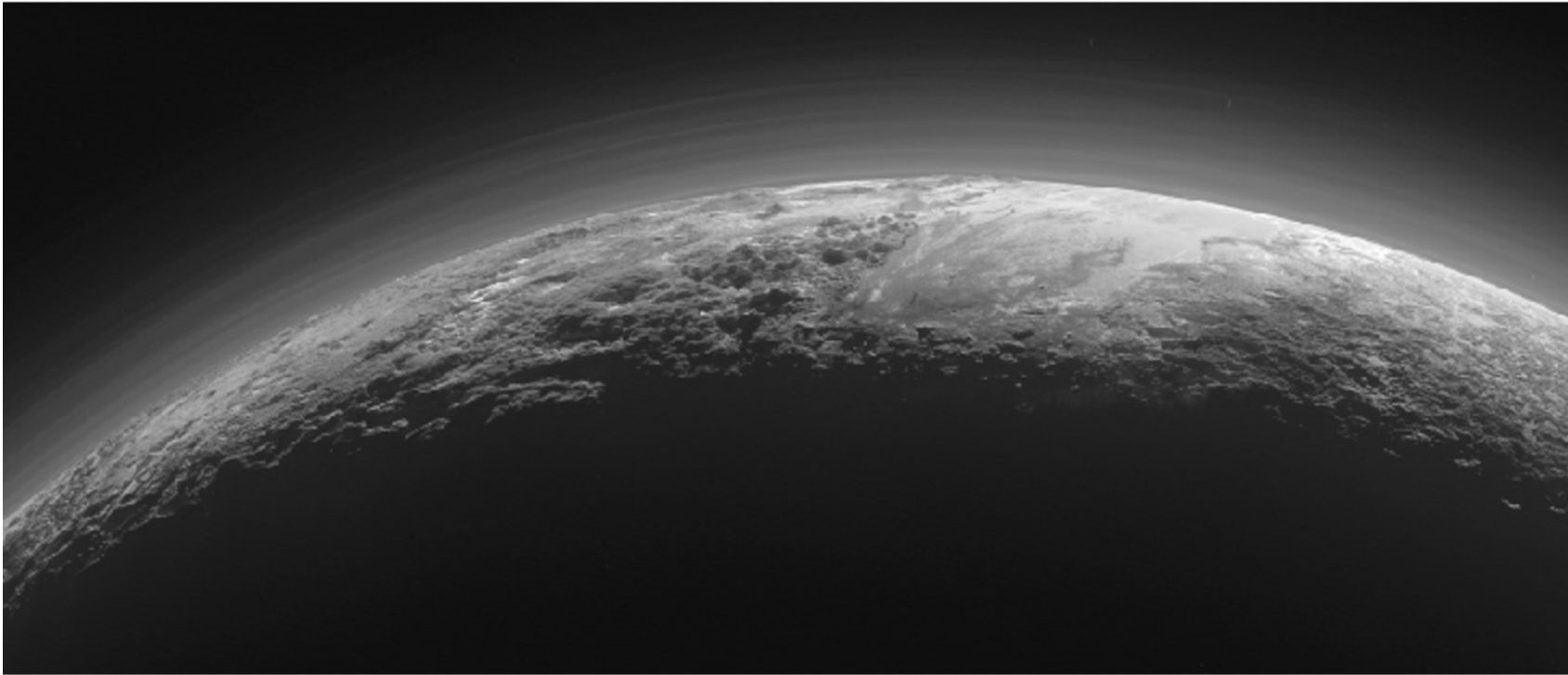


(b)

(a) Tombaugh is pictured on his family farm in 1928 with a 9-inch telescope he built.

(b) Here Tombaugh is looking through an eyepiece at the Lowell Observatory.
(credit b: modification of work by NASA)

Haze Layers in the Atmosphere of Pluto



This is one of the highest-resolution photos of Pluto, taken by the New Horizons spacecraft 15 minutes after its closest approach. It shows 12 layers of haze. Note also the range of mountains with heights up to 3500 meters. (credit: modification of work by NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute)

Global Color Image of Pluto



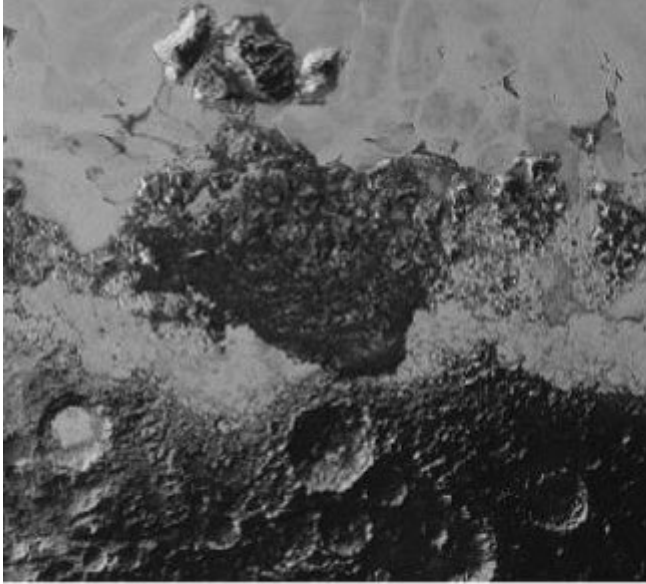
This New Horizons image clearly shows the variety of terrains on Pluto. The dark area in the lower left is covered with impact craters, while the large light area in the center and lower right is a flat basin devoid of craters. The colors you see are somewhat enhanced to bring out subtle differences. (credit: modification of work by NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute)

Diversity of Terrain on Pluto



This enhanced color view of a strip of Pluto's surface about 80 kilometers long shows a variety of different surface features. From left to right, we first cross a region of “badlands” with some craters showing, and then move across a wide range of mountains made of water ice and coated with the redder material we saw in the previous image. Then, at right, we arrive at the “shoreline” of the great sea of frozen nitrogen that the mission scientists have nicknamed the “Sputnik Plains.” This nitrogen sea is divided into mysterious cells or segments that are many kilometers across. (credit: modification of work by NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute)

Diversity of Terrains on Pluto



(a)



(b)

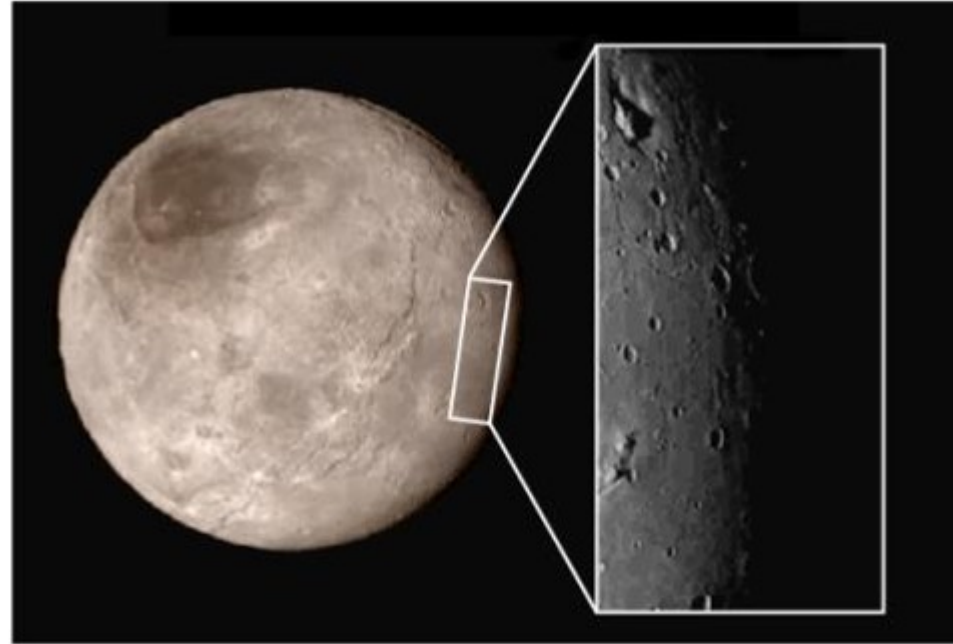
(a) In this photo, about 250 kilometers across, we can see many different kinds of terrain. At the bottom are older, cratered highlands; a V-shaped region of hills without cratering points toward the bottom of the image. Surrounding the V-shaped dark region is the smooth, brighter frozen nitrogen plain, acting as glaciers on Earth do. Some isolated mountains, made of frozen water ice, are floating in the nitrogen near the top of the picture.

(b) This scene is about 390 kilometers across. The rounded mountains, quite different from those we know on Earth, are named Tartarus Dorsa. The patterns, made of repeating ridges with the more reddish terrain between them, are not yet understood. (credit a, b: modification of work by NASA/Johns Hopkins University Applied Physics Laboratory/Southwest Research Institute)

Pluto's Large Moon Charon



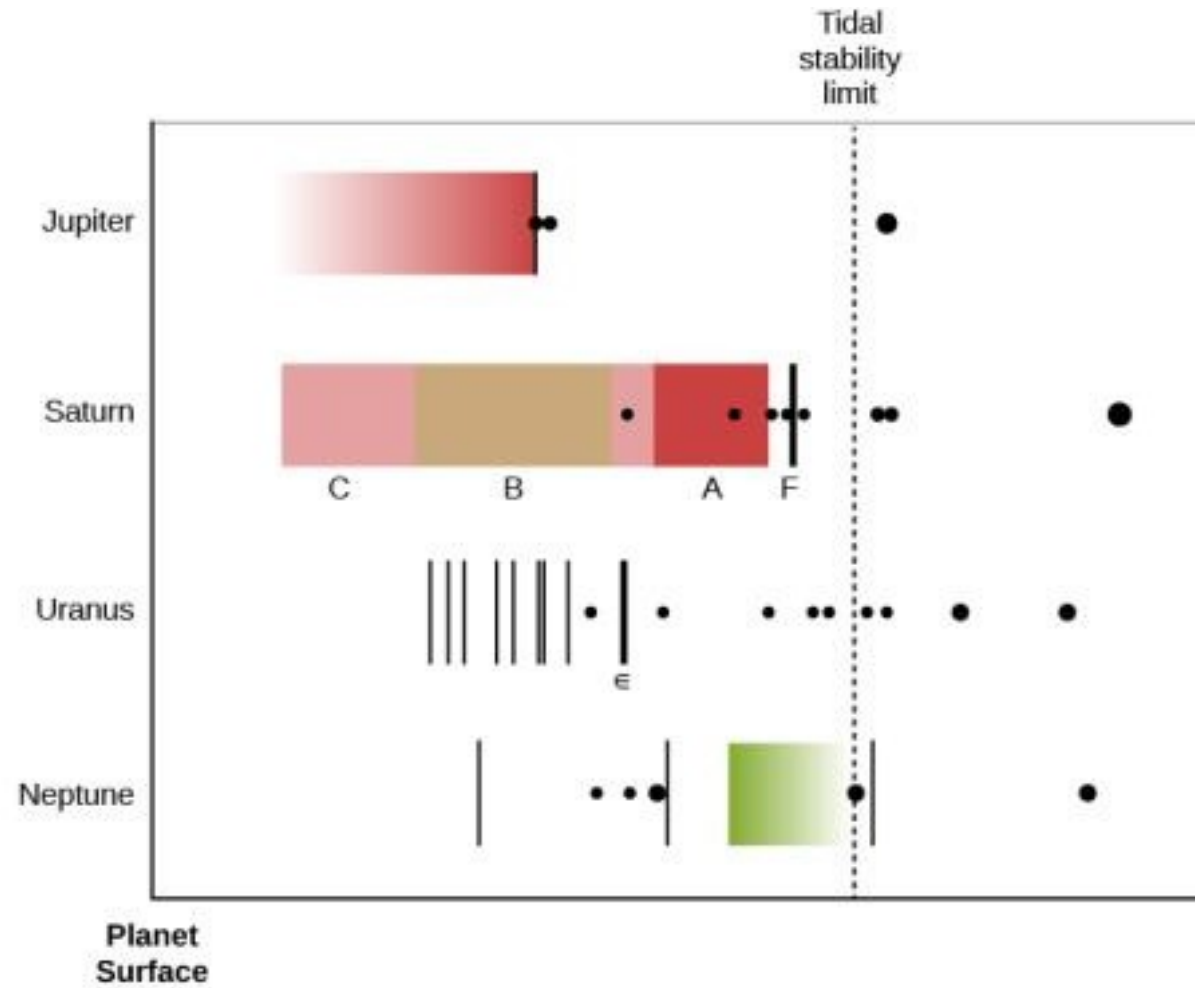
(a)



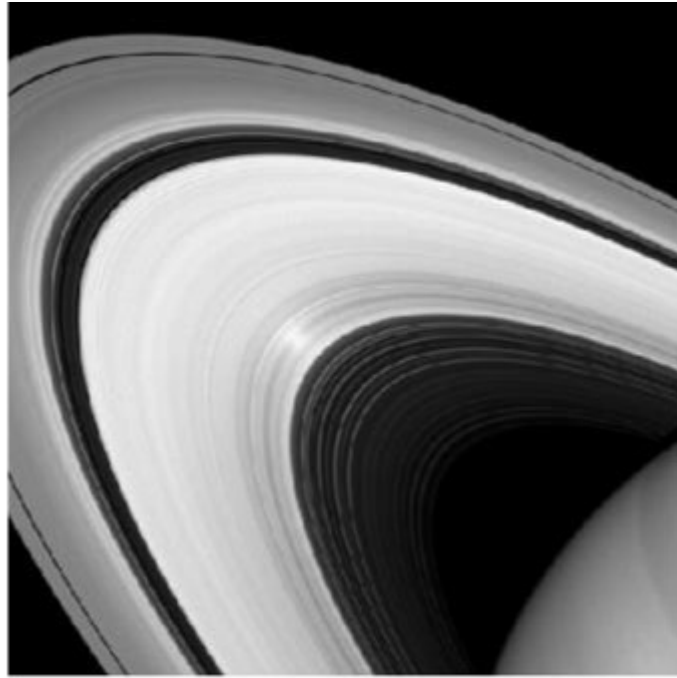
(b)

- (a) In this New Horizons image, the color has been enhanced to bring out the color of the moon's strange red polar cap. Charon has a diameter of 1214 kilometers.
- (b) Here we see the moon from a slightly different angle, in true color. The inset shows an area about 390 kilometers from top to bottom. Near the top left is an intriguing feature—what appears to be a mountain in the middle of a depression or moat. (credit a, b: modification of work by NASA/JHUAPL/SwRI)

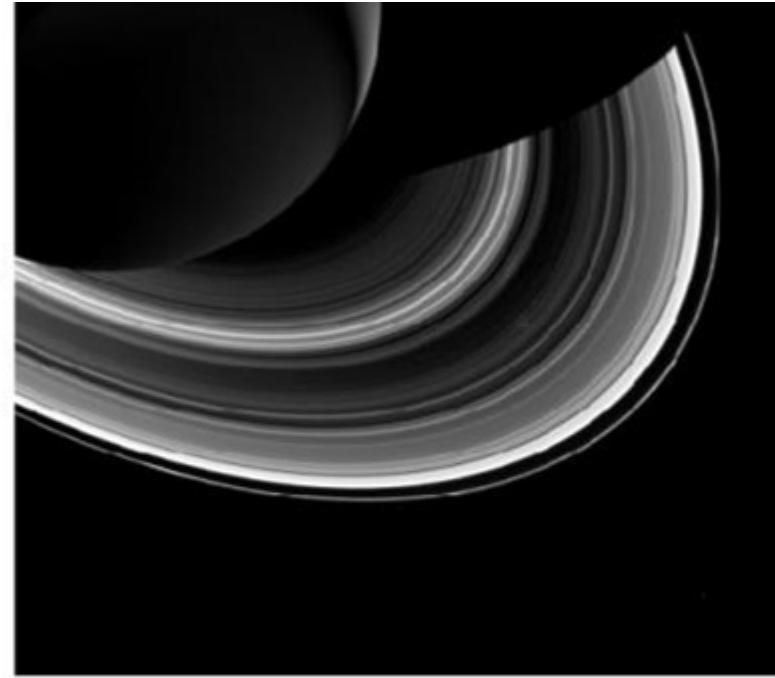
Four Ring System



Saturn's Rings as Seen from Above and Below



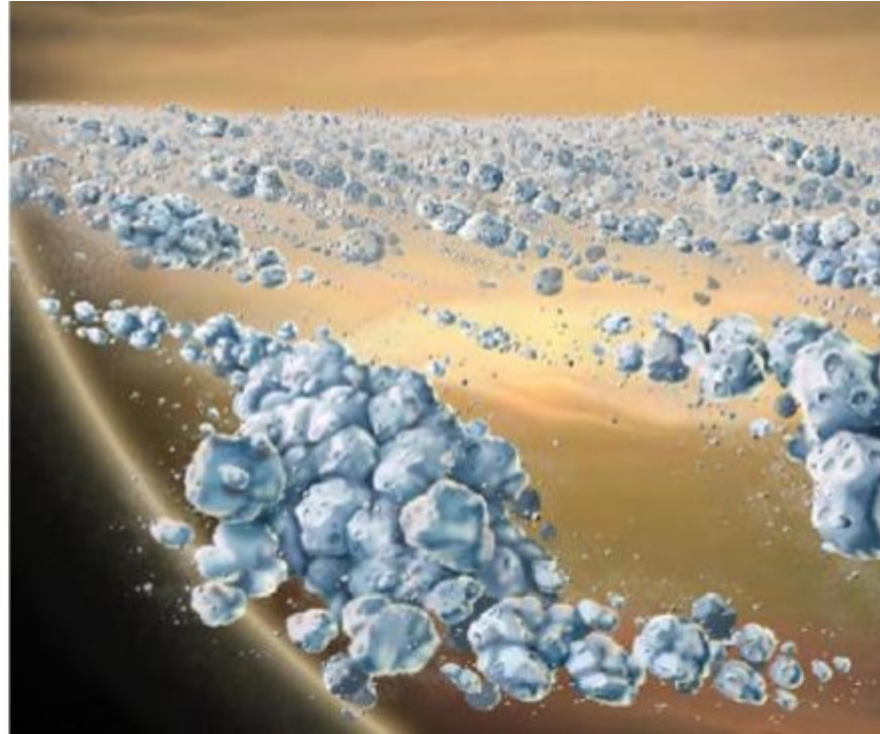
(a)



(b)

- (a) The view from above is illuminated by direct sunlight.
(b) The illumination seen from below is sunlight that has diffused through gaps in the rings. (credit a, b: modification of work by NASA/JPL-Caltech/Space Science Institute)

Artist's Idealized Impression of the Rings of Saturn as Seen from the Inside



Note that the rings are mostly made of pieces of water ice of different sizes. At the end of its mission, the Cassini spacecraft is planning to cut through one of the gaps in Saturn's rings, but it won't get this close. (credit: modification of work by NASA/JPL/University of Colorado)

Enceladus



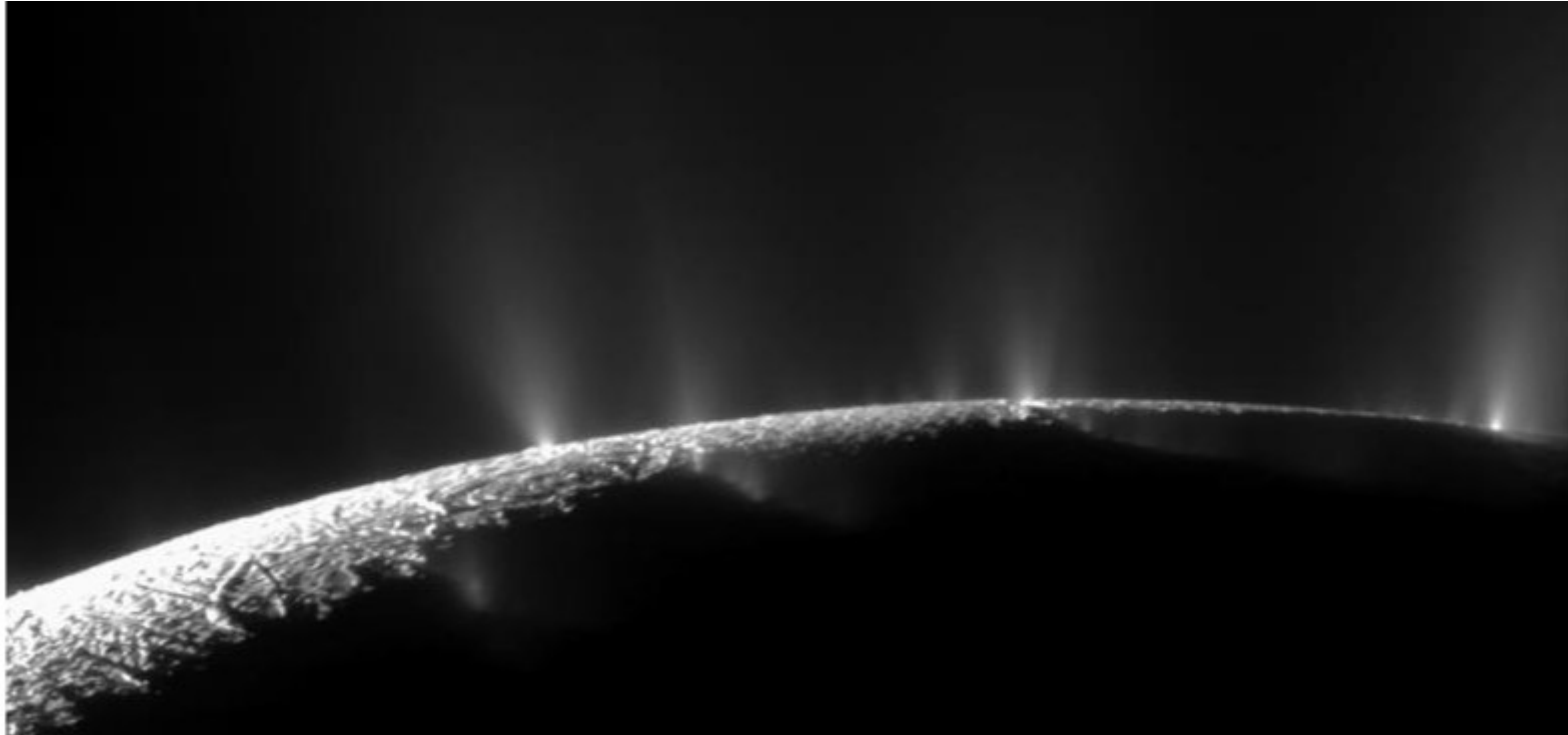
(a)



(b)

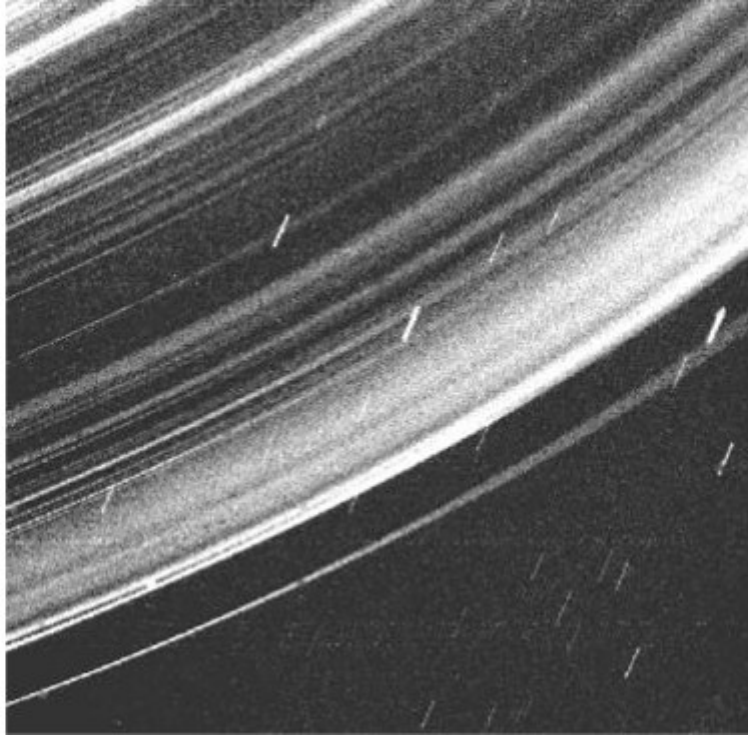
- (a) This image shows both smooth and cratered terrain on Saturn's moon, and also "tiger stripes" in the south polar region (lower part of image). These dark stripes (shown here in exaggerated color) have elevated temperatures and are the source of the many geysers discovered on Enceladus. They are about 130 kilometers long and 40 kilometers apart.
- (b) Here Enceladus is shown to scale with Great Britain and the coast of Western Europe, to emphasize that it is a small moon, only about 500 kilometers in diameter. (credit a, b: modification of work by NASA/JPL/Space Science Institute)

Geysers on Enceladus



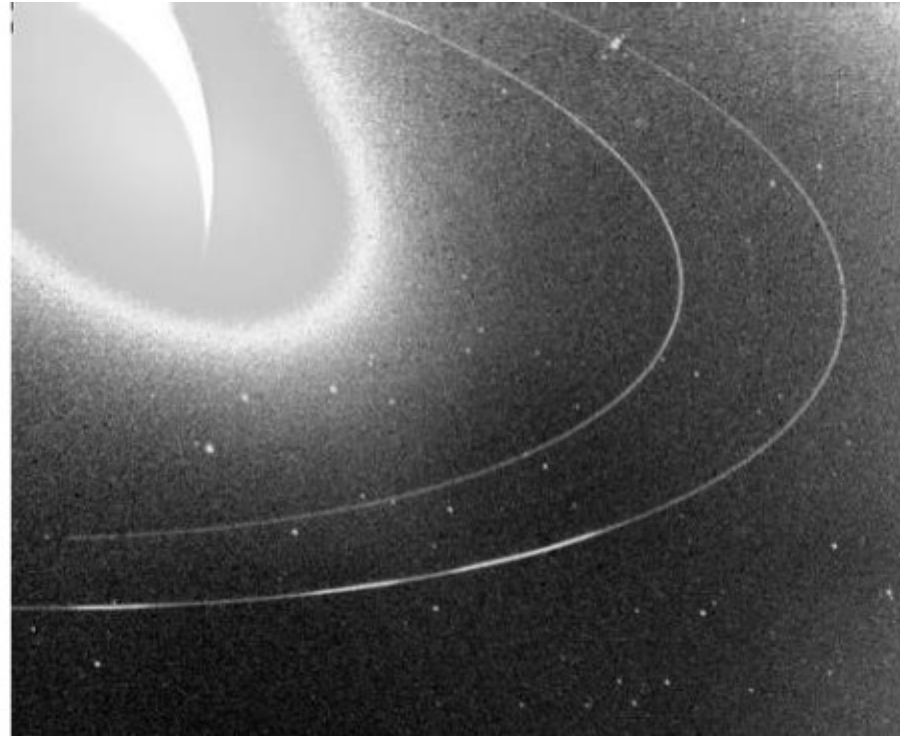
This Cassini image shows a number of water geysers on Saturn's small moon Enceladus, apparently salty water from a subsurface source escaping through cracks in the surface. You can see curved lines of geysers along the four "tiger stripes" on the surface. (credit: modification of work by NASA/JPL/Space Science Institute)

Rings of Uranus



The Voyager team had to expose this image for a long time to get a glimpse of Uranus' narrow dark rings. You can see the grainy structure of “noise” in the electronics of the camera in the picture background. (credit: modification of work by NASA/JPL)

Rings of Neptune



This long exposure of Neptune's rings was photographed by Voyager 2. Note the two denser regions of the outer ring. (credit: modification of work by NASA/JPL)

Saturn's F Ring and Its Shepherd Moons



(a)



(b)

- (a) In this closer view, the shepherd moon Pandora (84 kilometers across) is seen next to the F ring, in which the moon is perturbing the main (brightest) strand of ring particles as it passes. You can see the dark side of Pandora on this image because it is being illuminated by the light reflected from Saturn.
(credit a, b: modification of work by NASA/JPL/Space Science Institute)
- (b) This Cassini image shows the narrow, complex F Ring of Saturn, with its two small shepherd moons Pandora (left) and Prometheus (right).