

Jovian Planets I:

Jupiter and Saturn

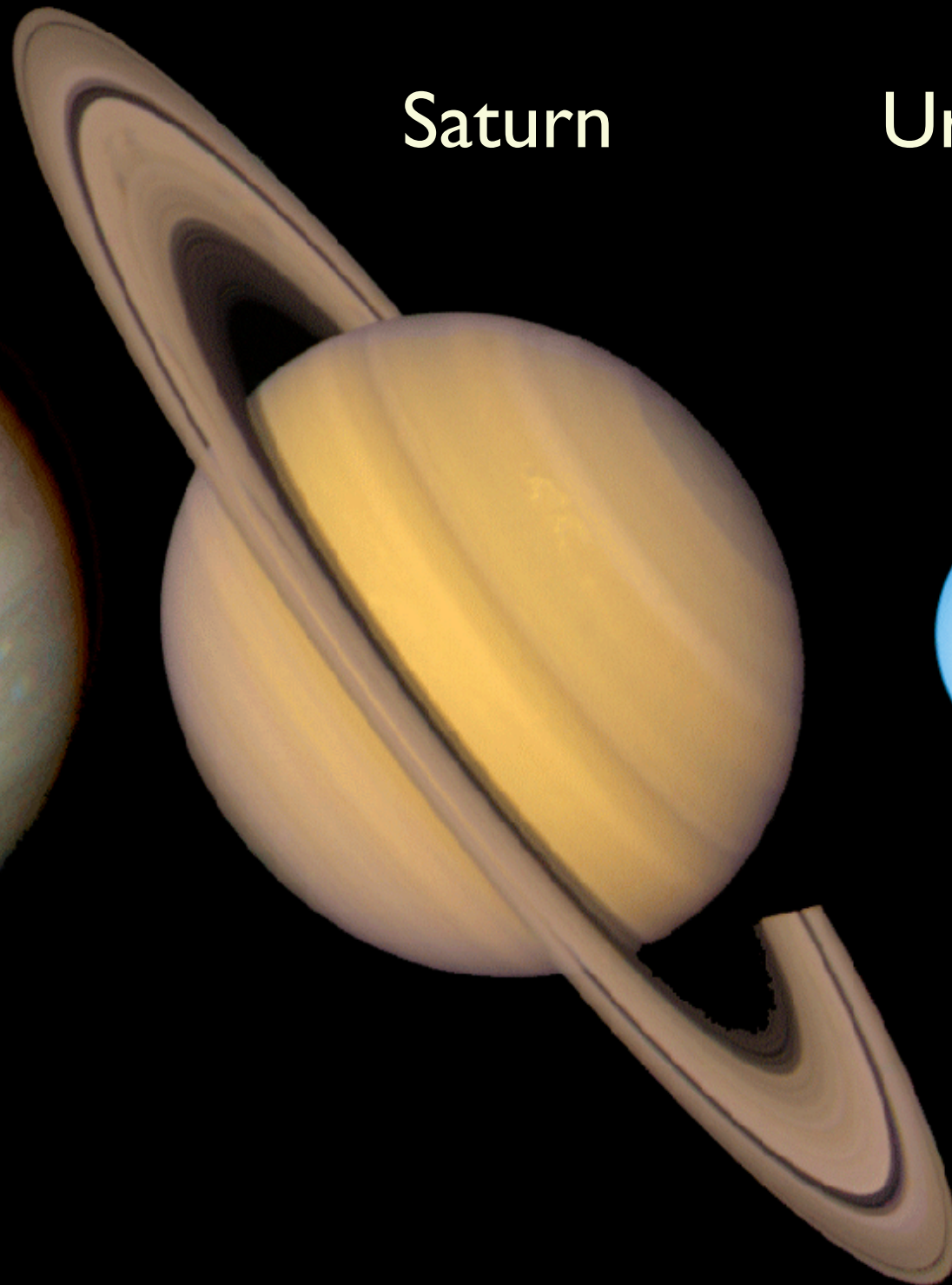
Jovian planets:

Large, gaseous objects. They are composed mostly of hydrogen and helium. Each jovian planet has rings. There are many moons of all sizes.

Jupiter



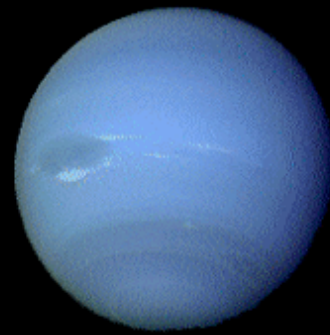
Saturn



Uranus



Neptune



Planet	Distance (AU)	Radius (Earth radii)	Mass (Earth Masses)	Density (g/cm ³)
Jupiter	5.2	11.2	318	1.33
Saturn	9.5	9.4	95	0.69
Uranus	19.2	4.0	14.5	1.27
Neptune	30.1	4.0	17.2	1.64
Pluto	39.7	0.18	0.0018	2.1

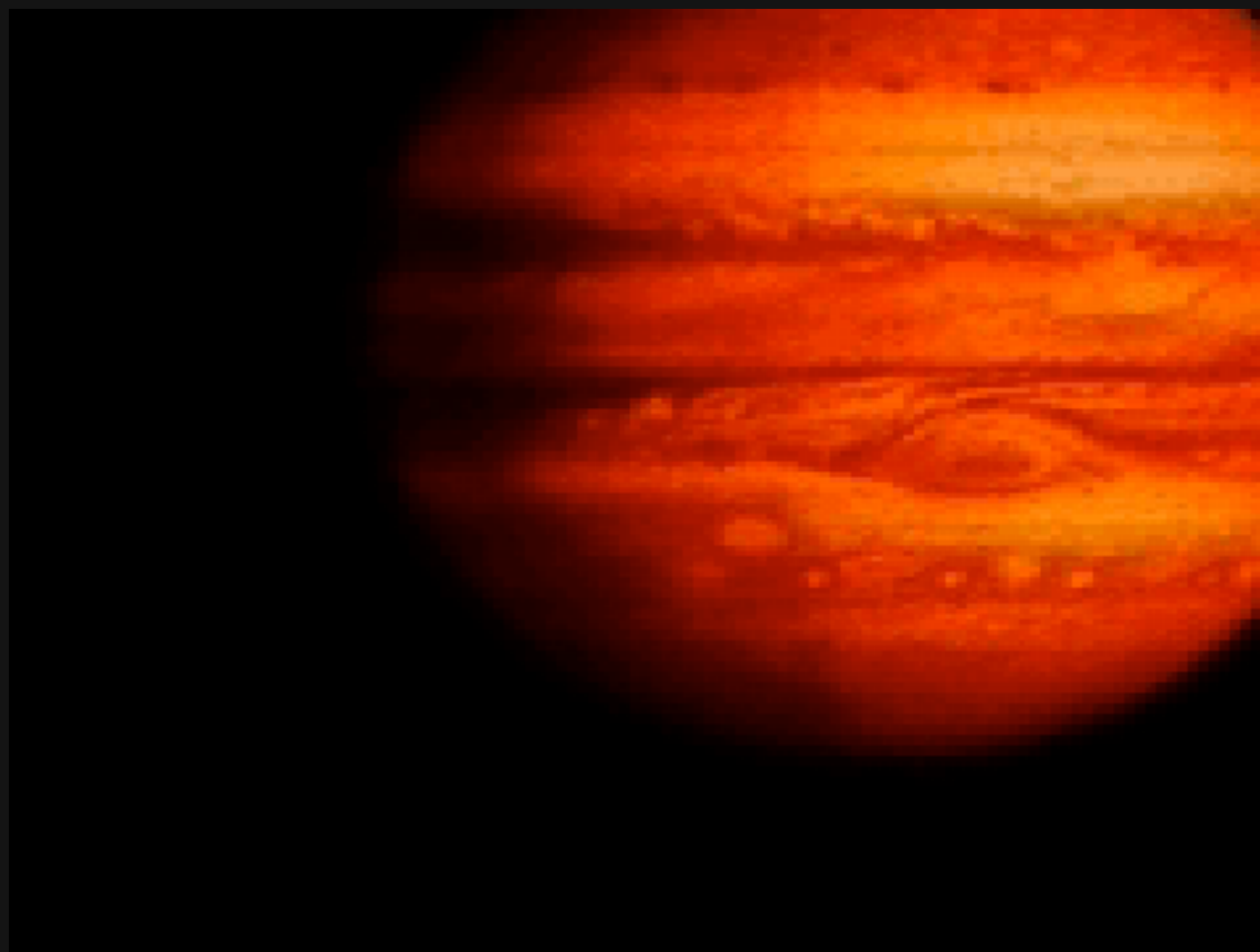
Jupiter

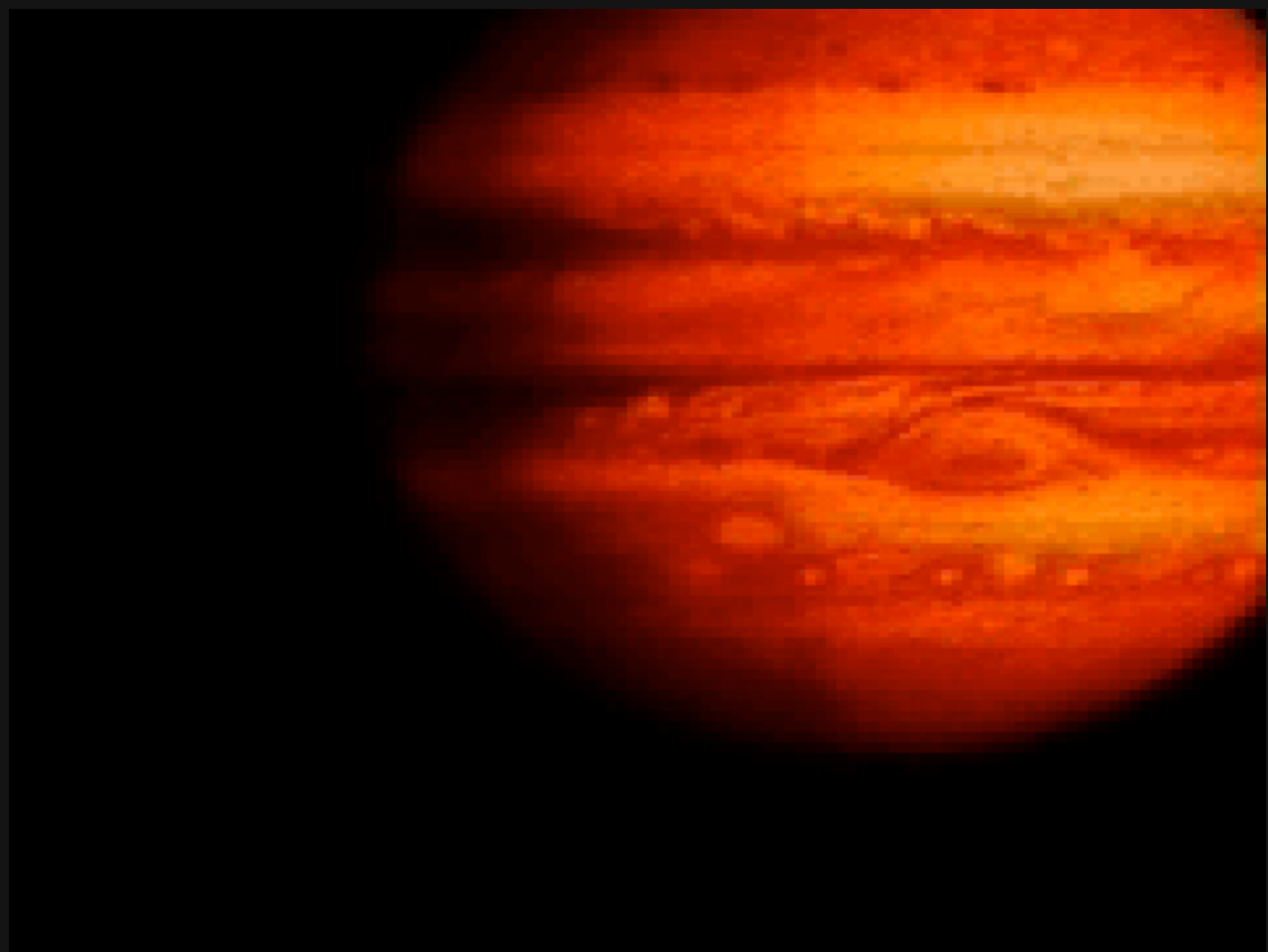


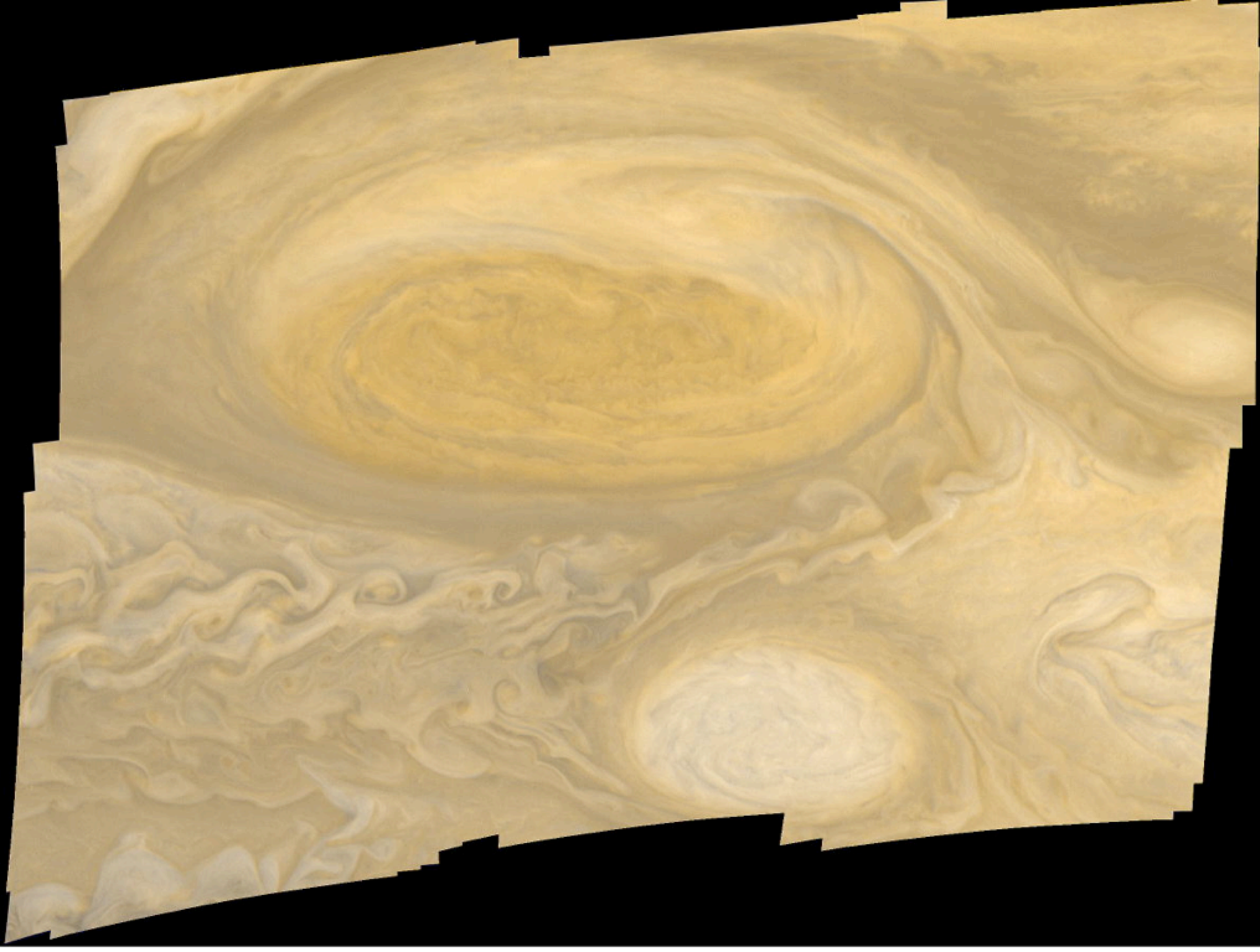
🪐 Jupiter is the largest planet in the Solar System. Its mass is 318 times that of Earth. Its radius is 11 times that of Earth. Jupiter's density is 1.3 gm/cm^3 . So, it is composed mainly of gases with a rocky and (liquid) metallic core. This core generates a strong magnetic field (10 times that of Earth)

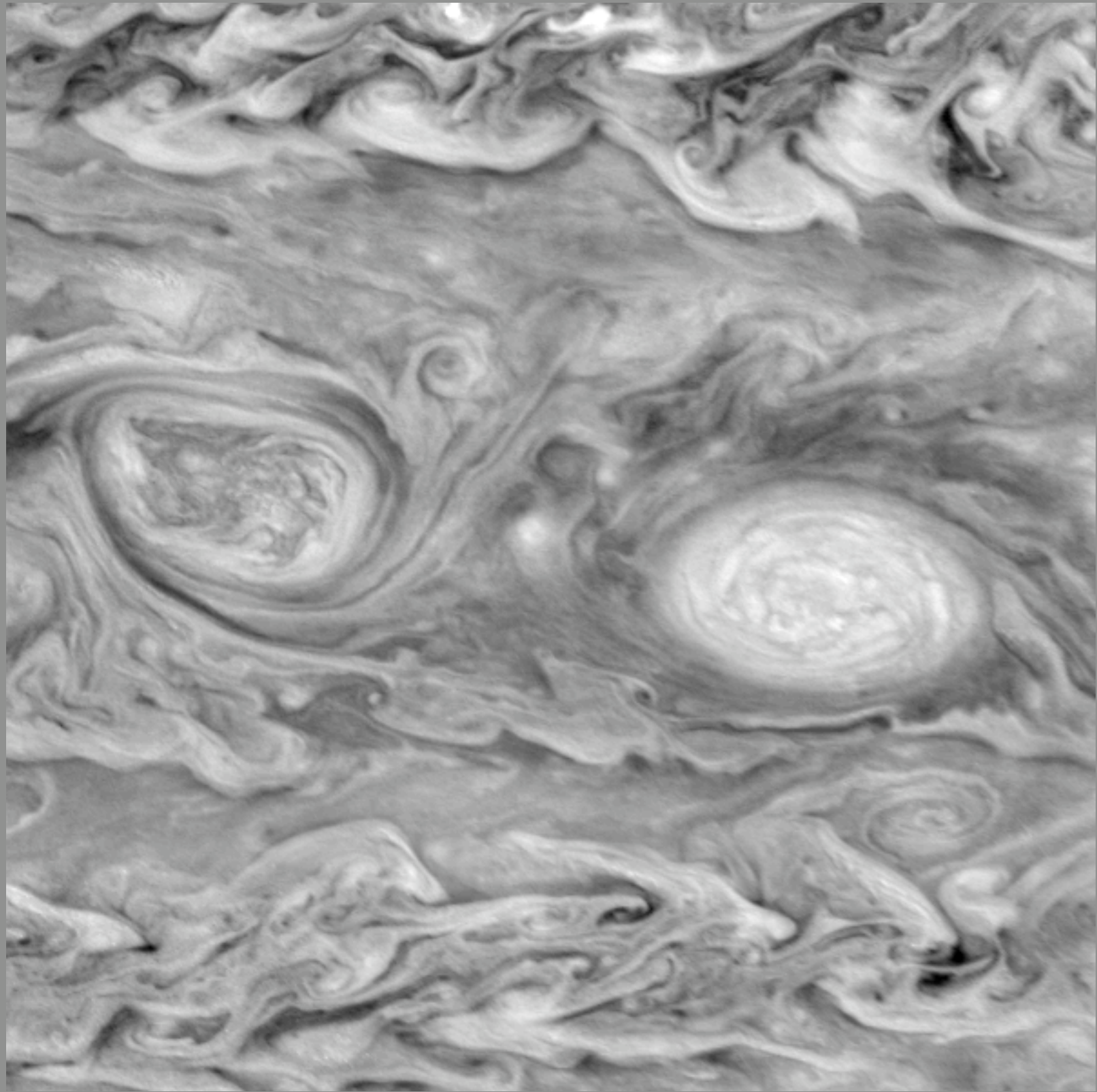
🪐 The atmosphere is 79% hydrogen (H), 20% helium (He). Alternating zones and belts in atmosphere are produced by rising and sinking of hot gas (convection).

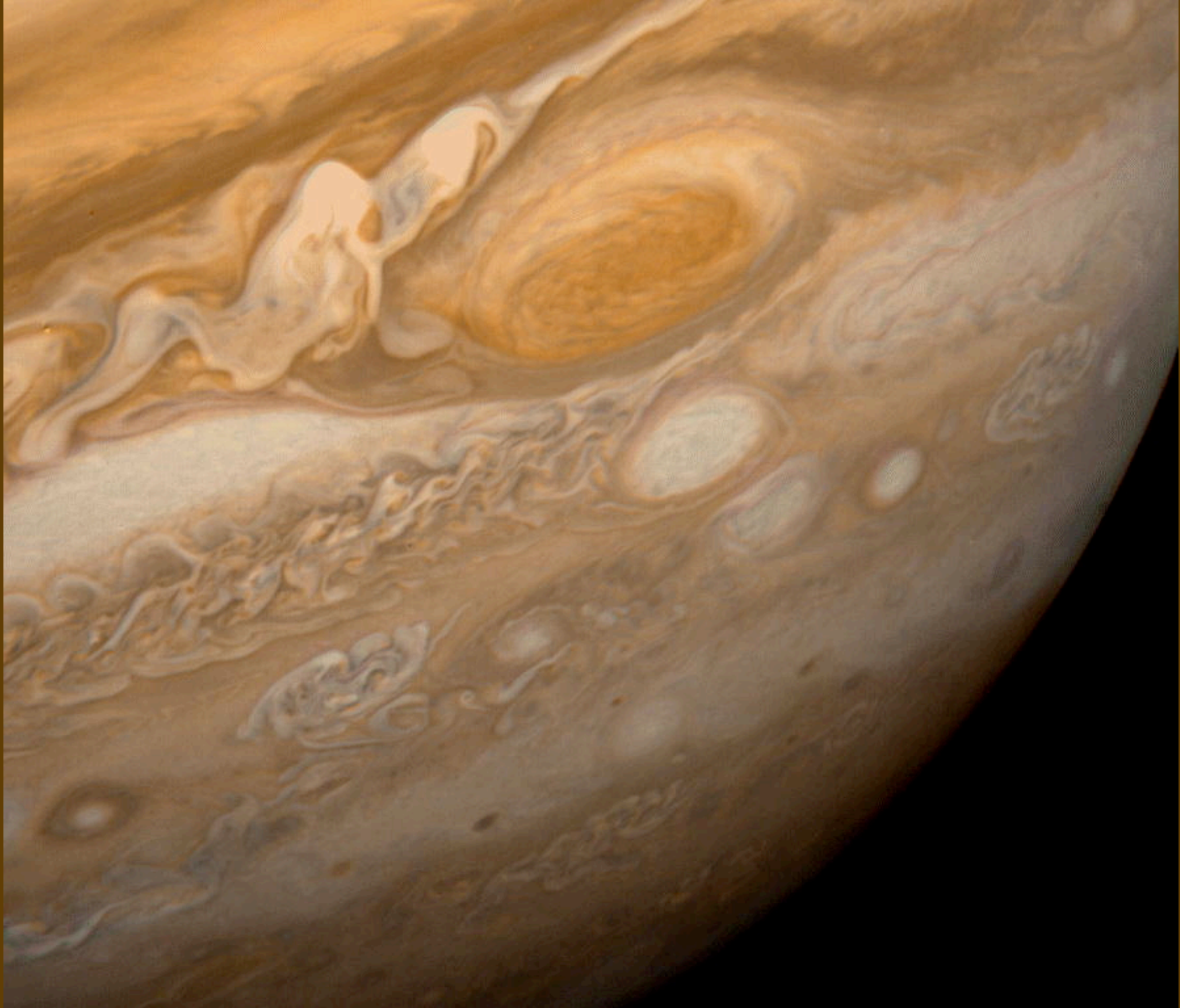
🪐 Jupiter has many moons (>20), including 4 satellites first discovered by Galileo (Galilean satellites). One moon, Io, has active volcanoes! Another moon, Europa, has oceans (icebergs!)











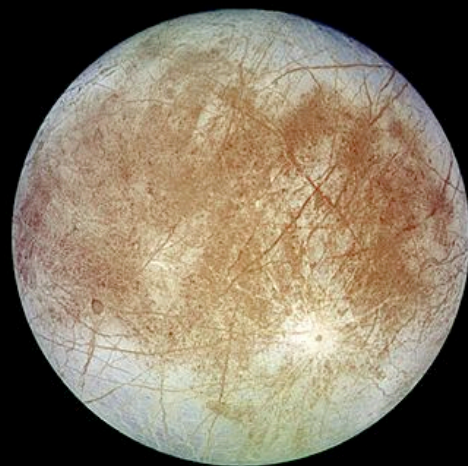
Moons of Jupiter

Io

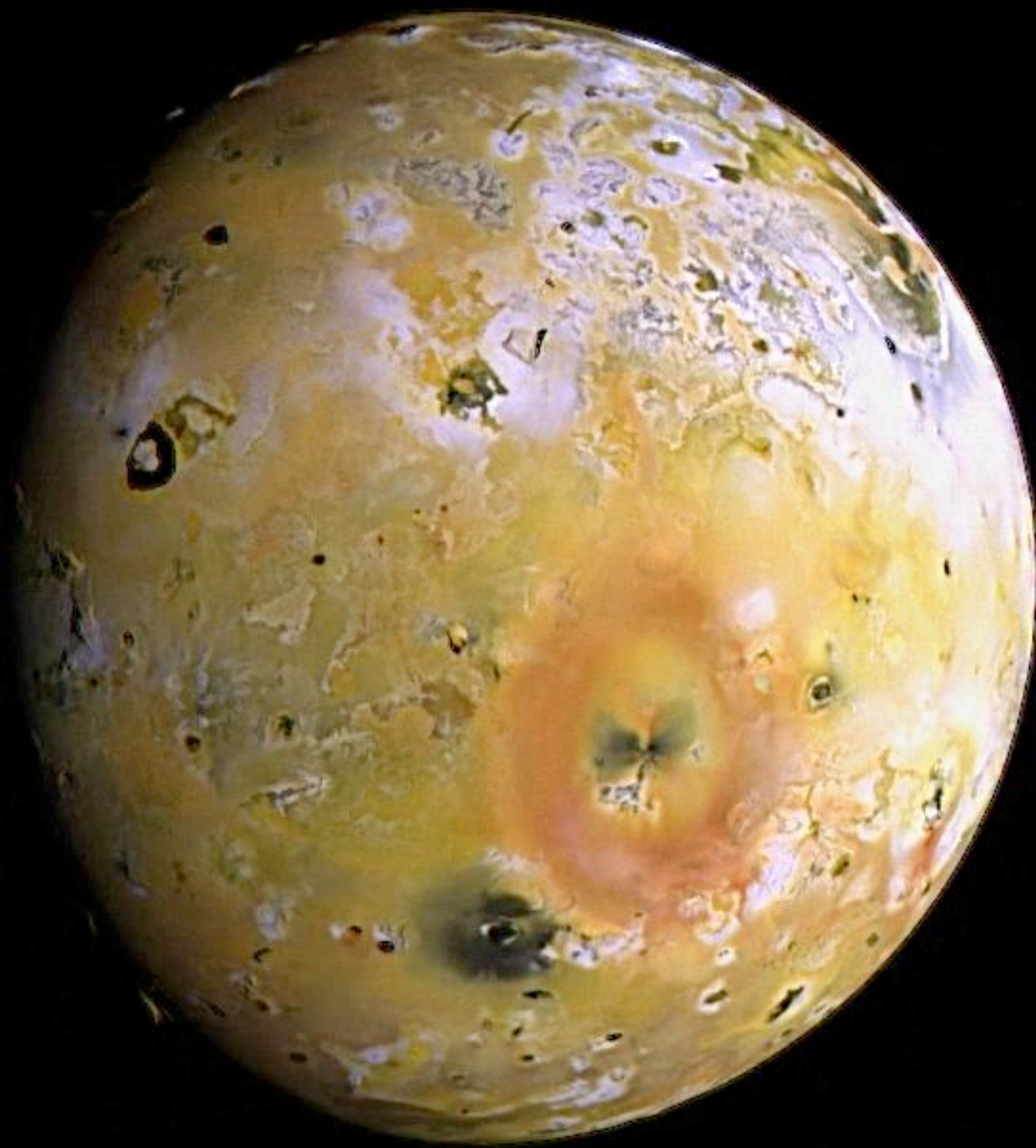
Europa

Ganymede

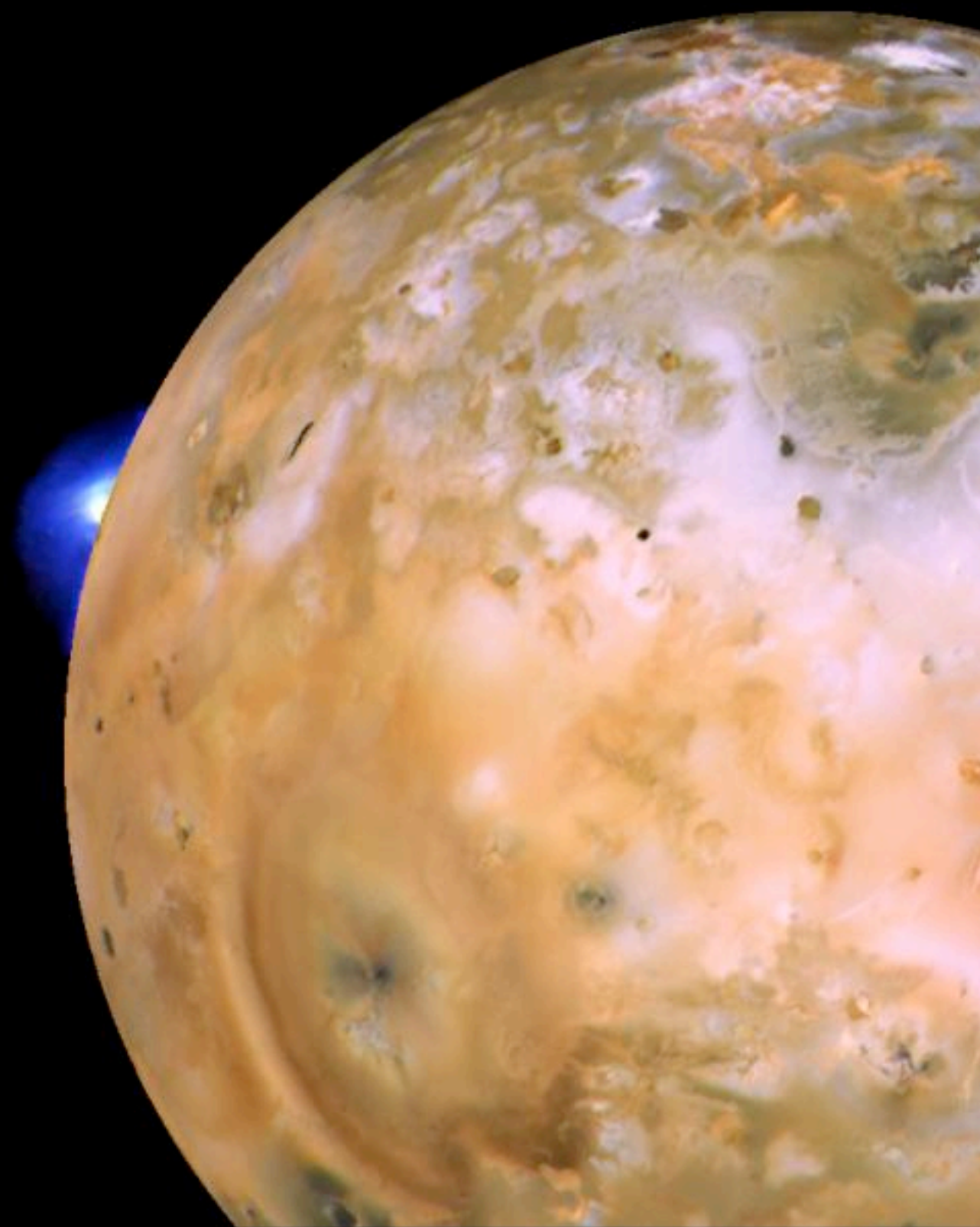
Callisto



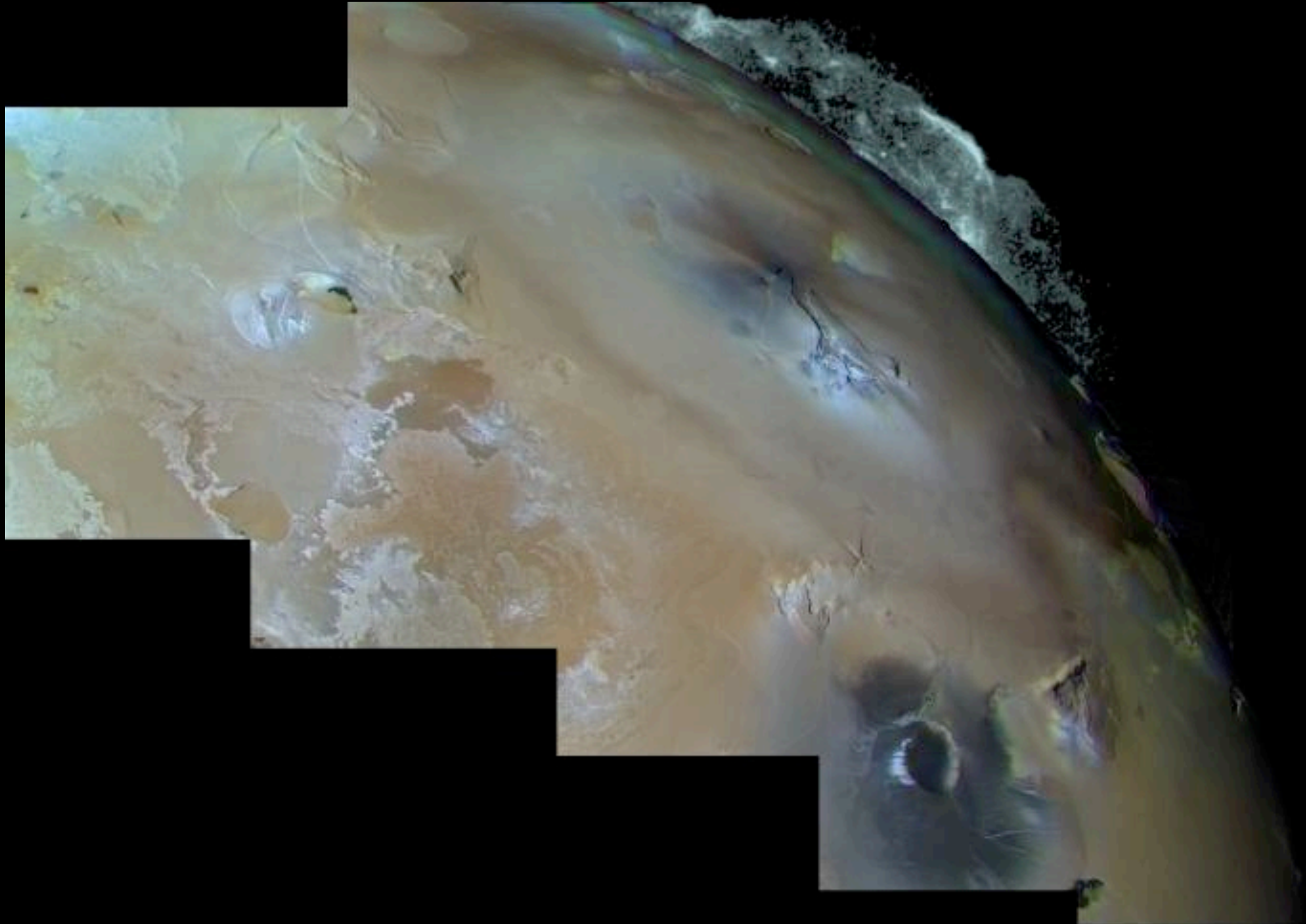
Io



Io



Io



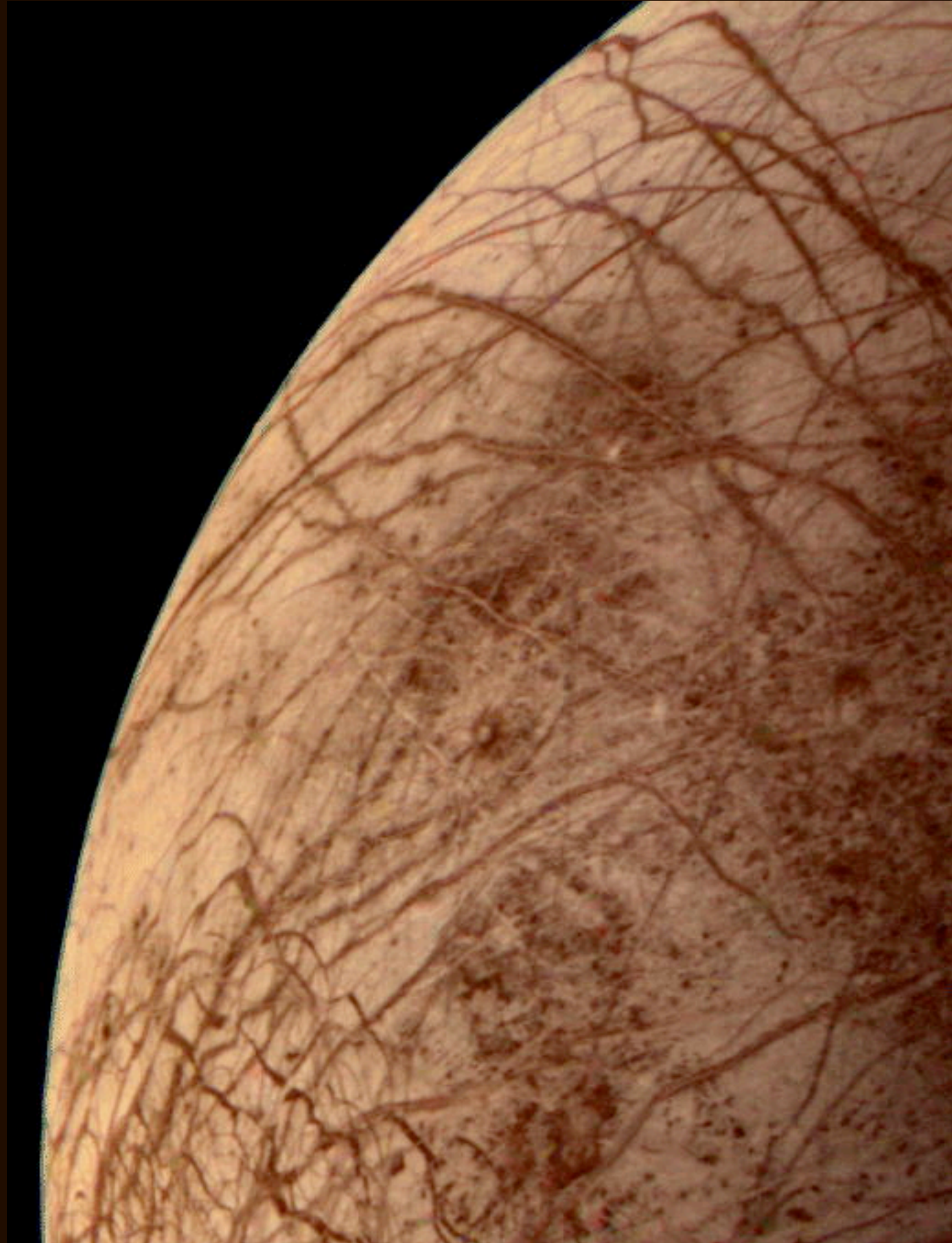
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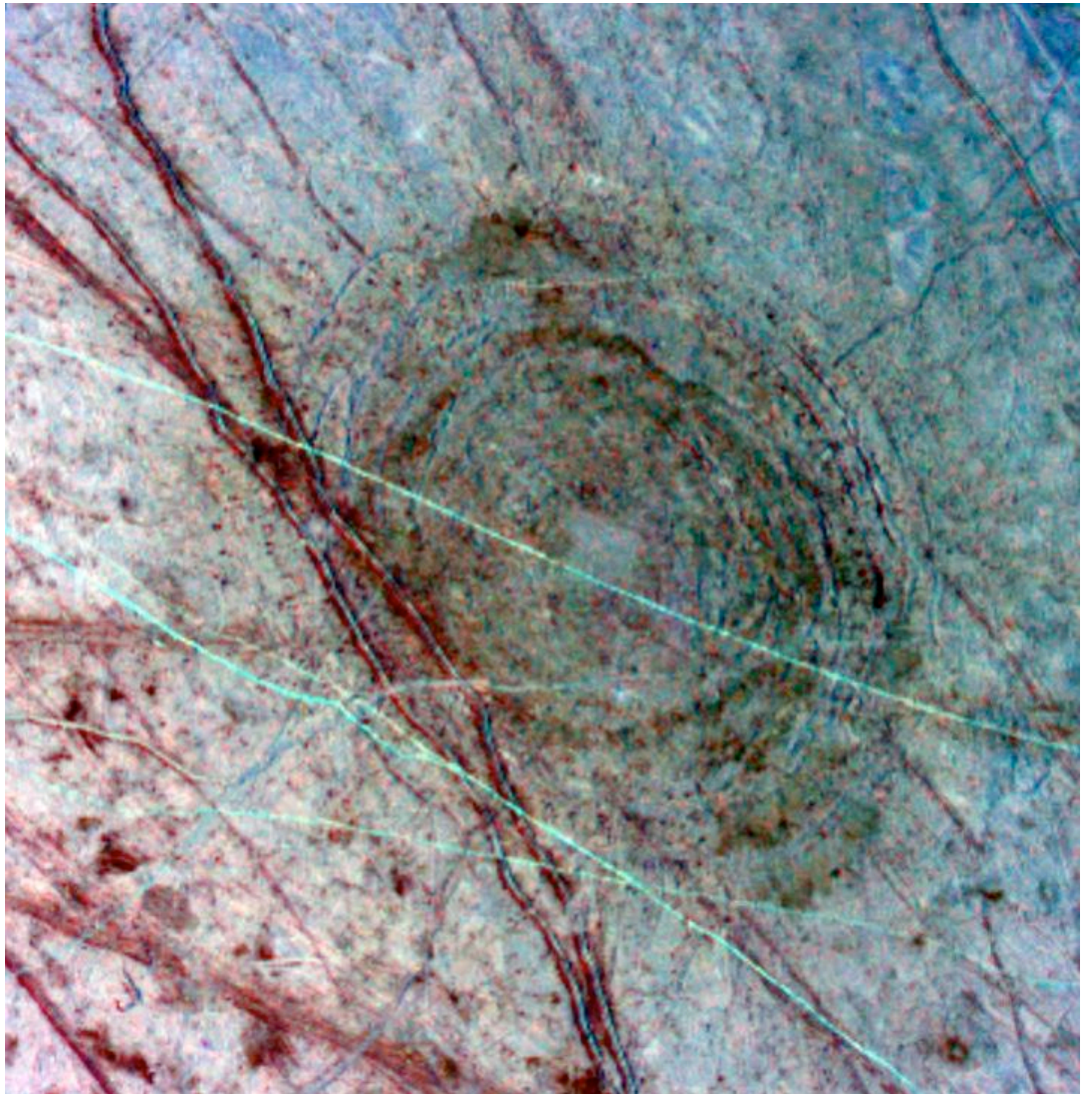
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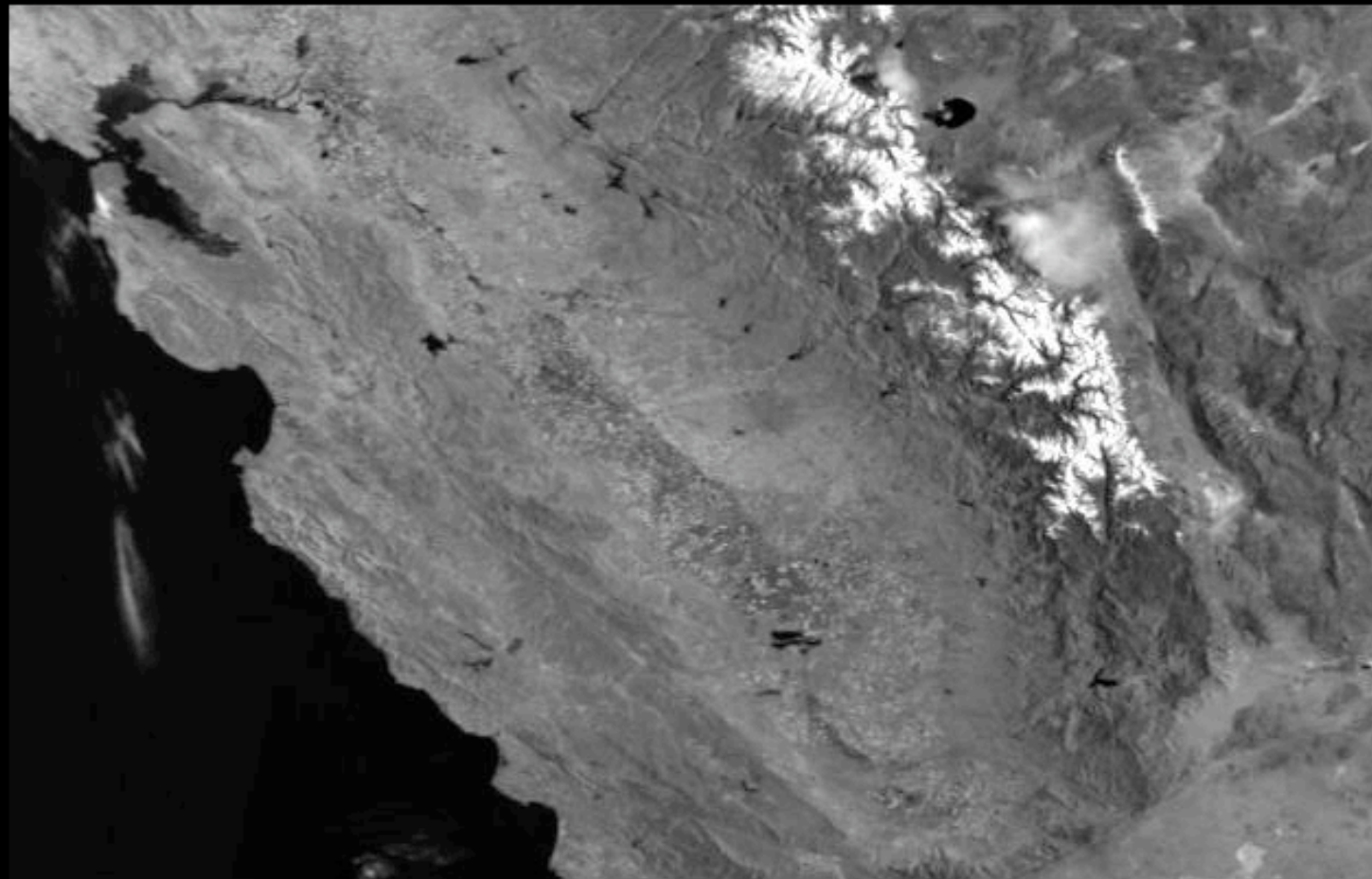
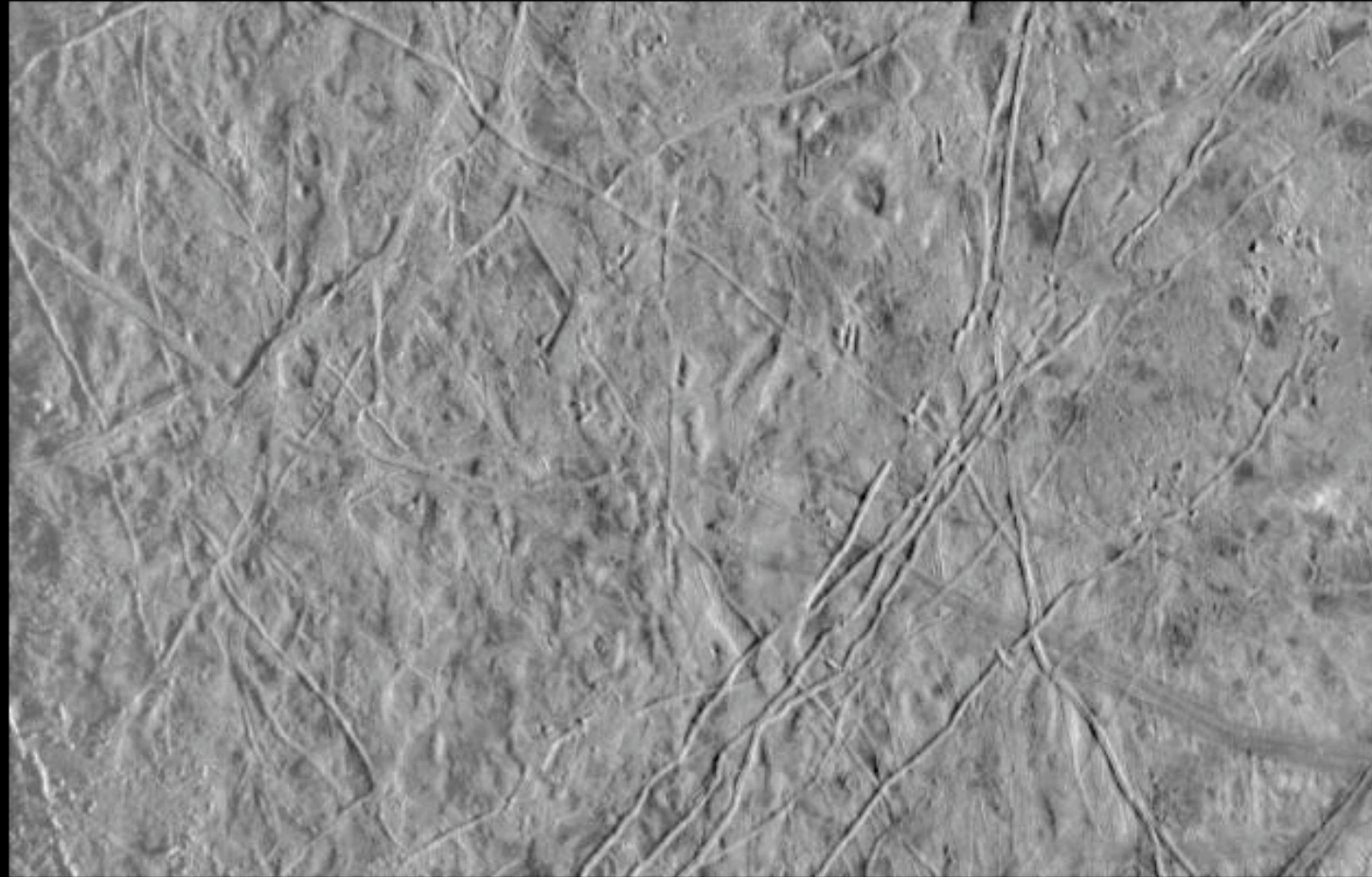
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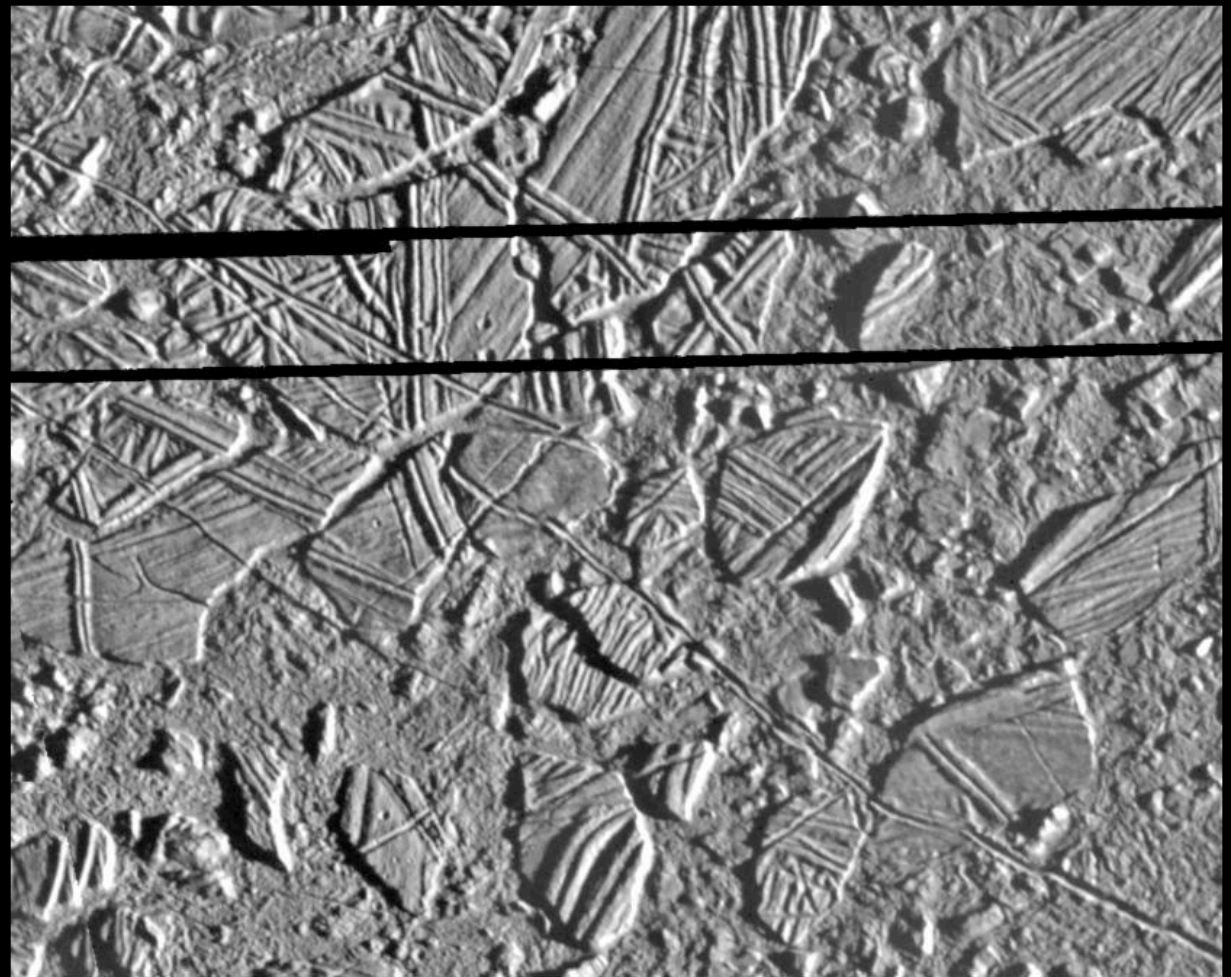
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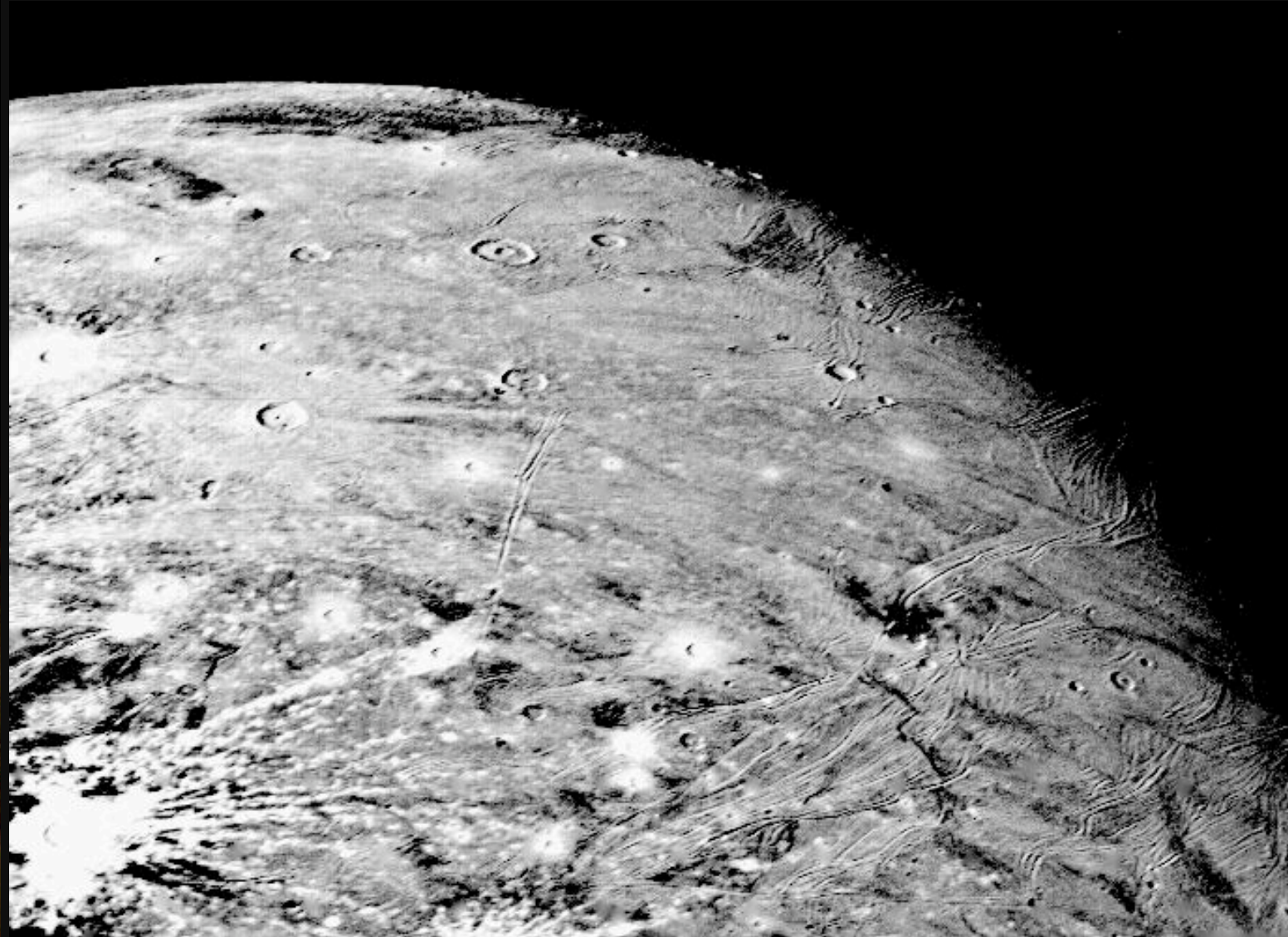
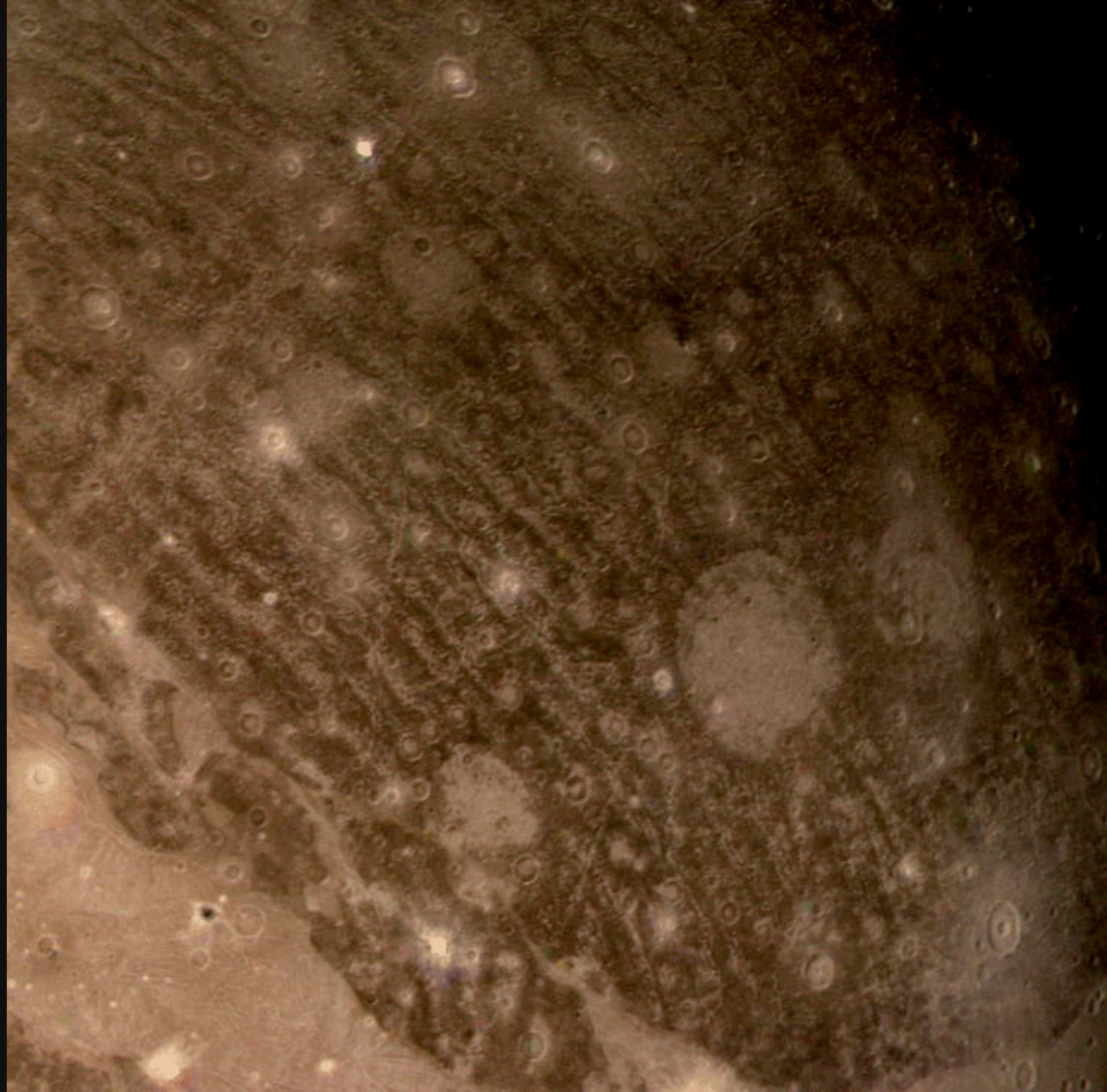


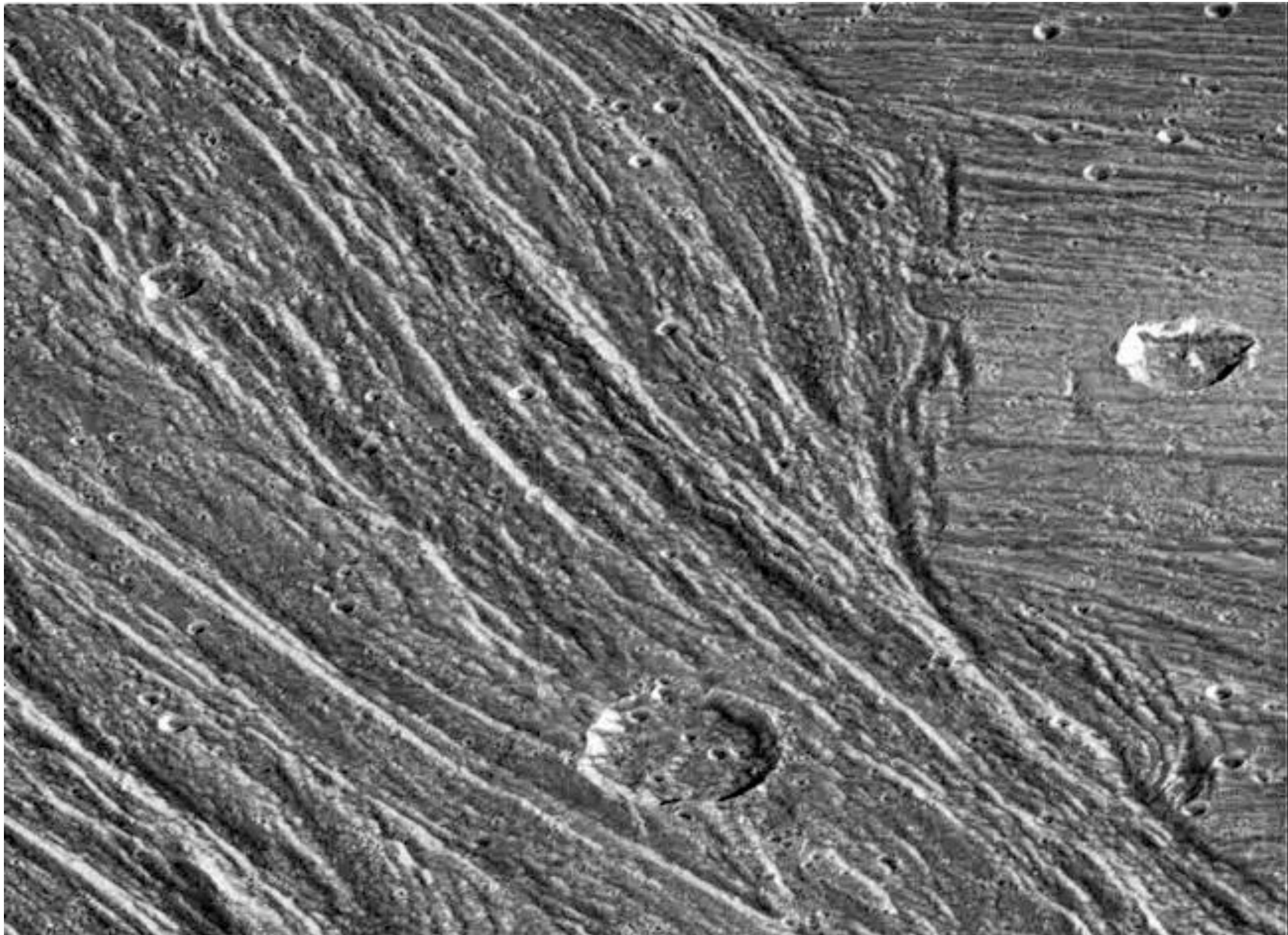
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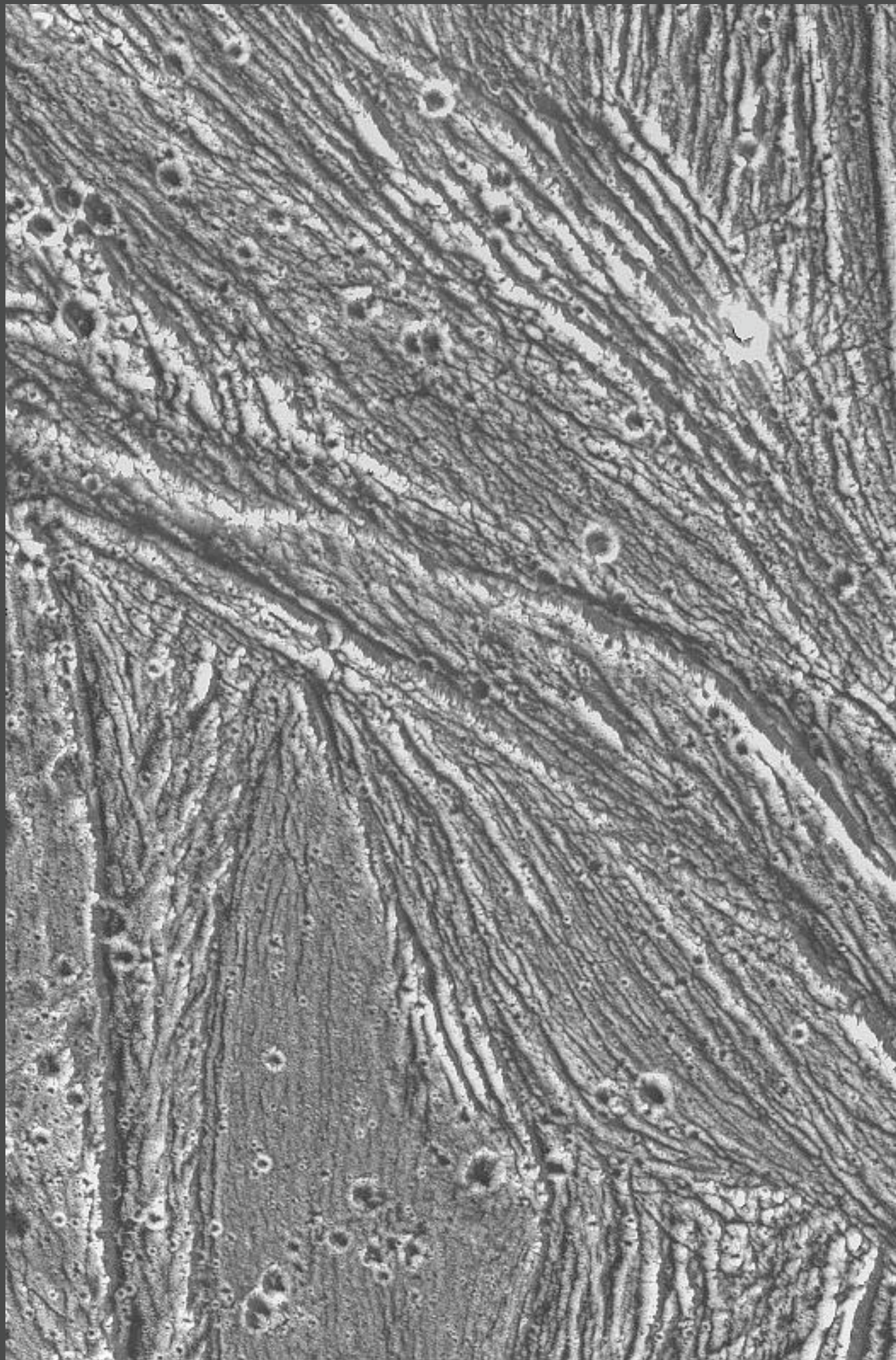




Ganymede

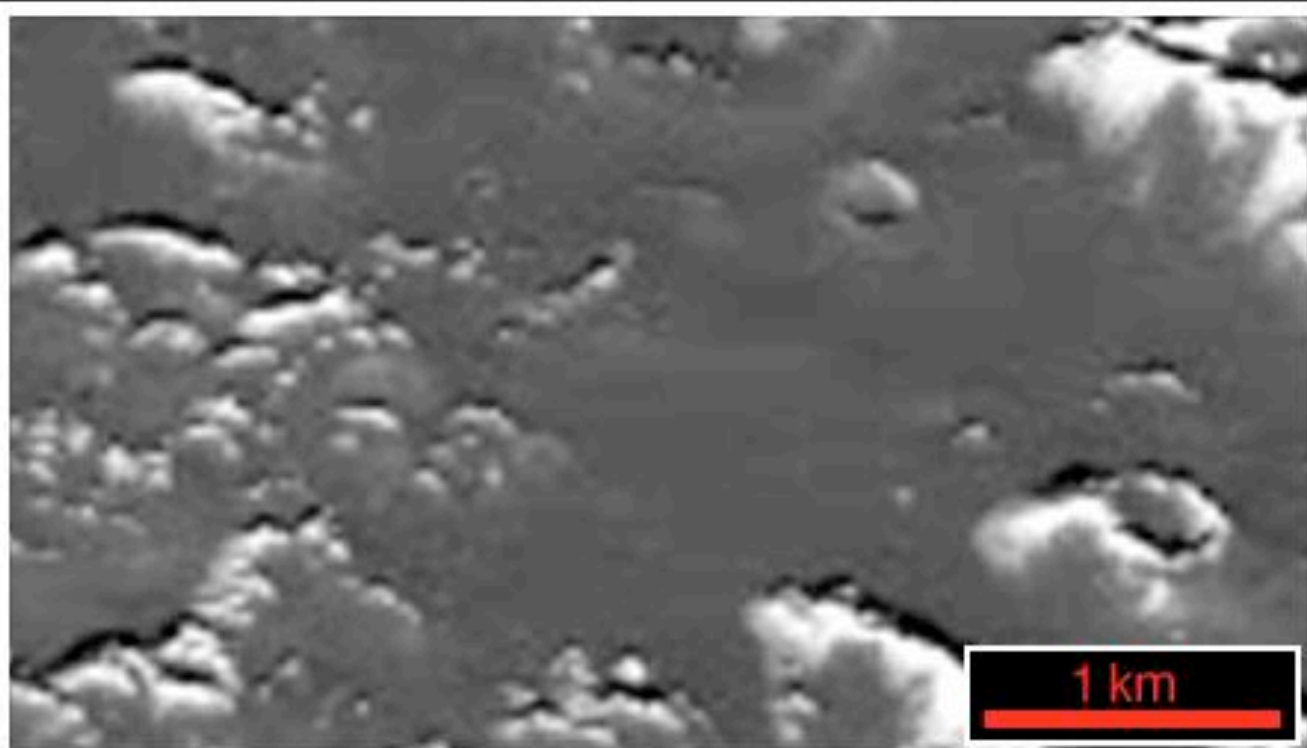
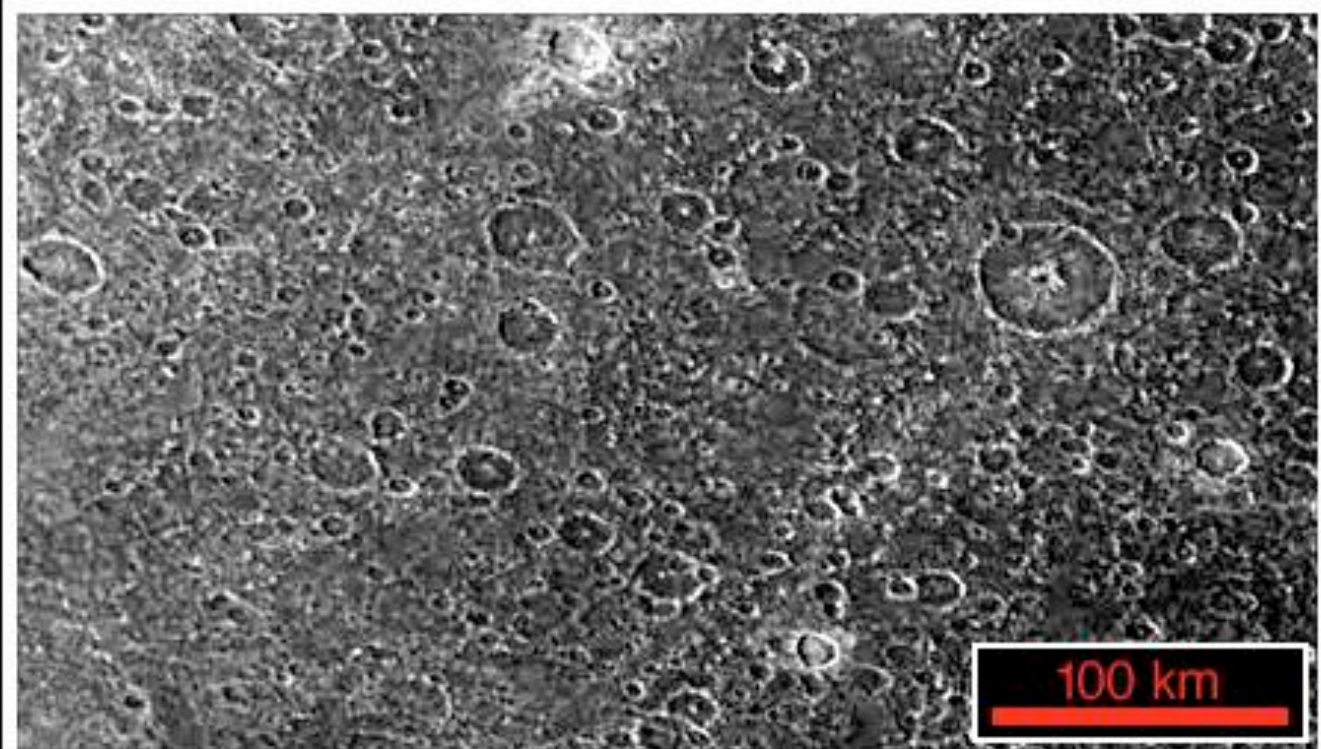
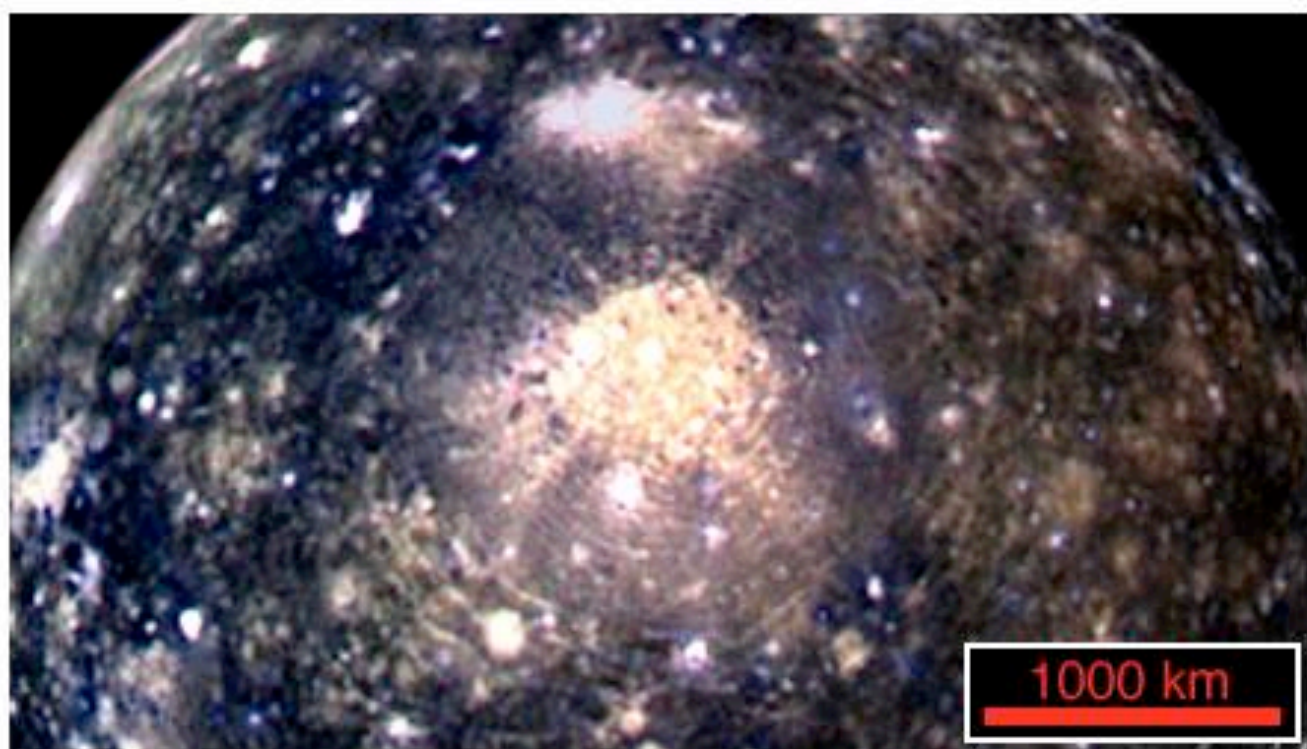




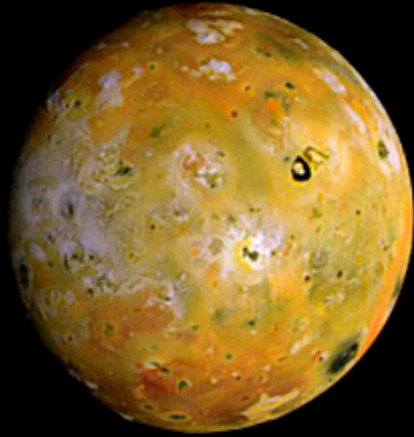


Callisto

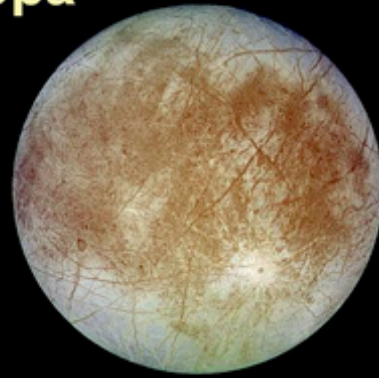




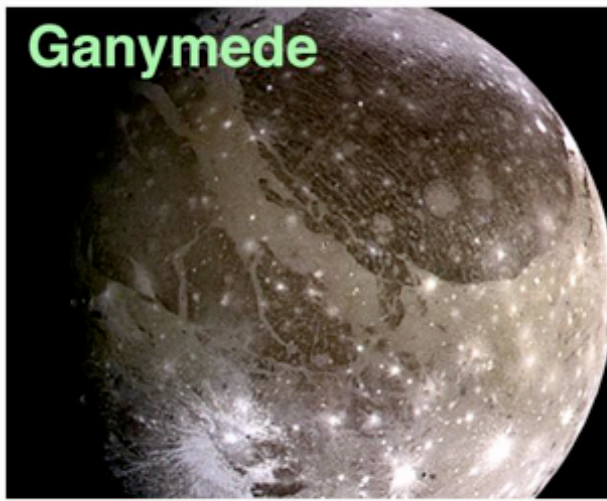
Io



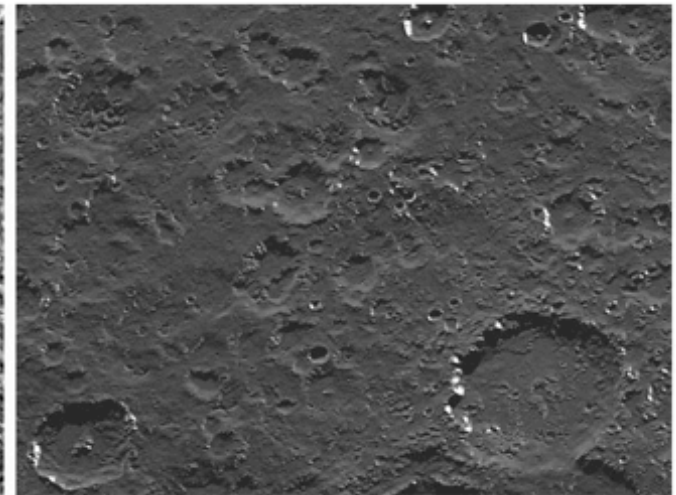
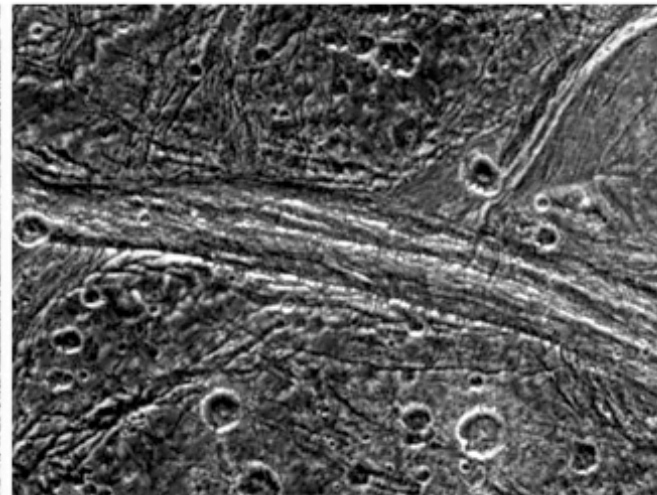
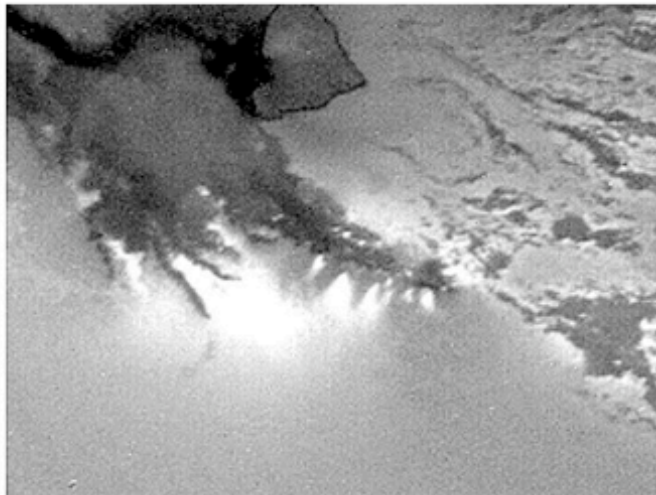
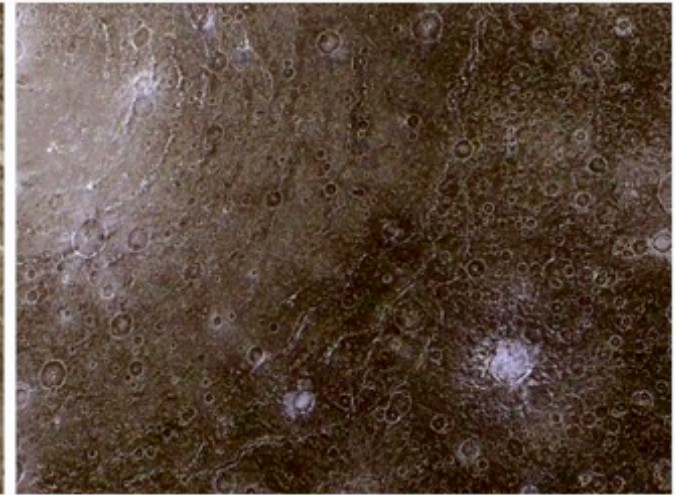
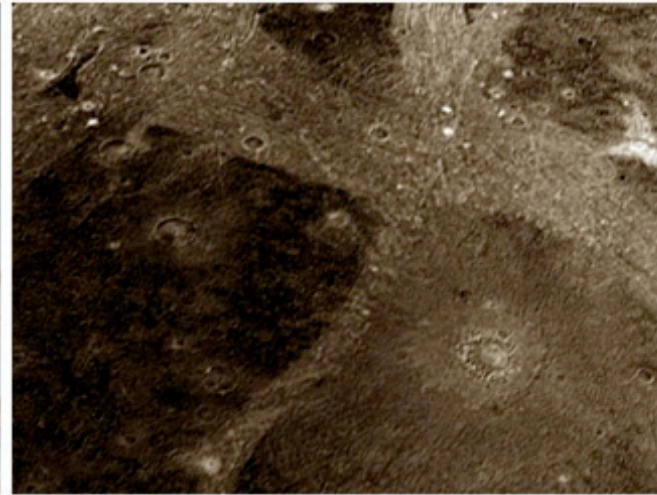
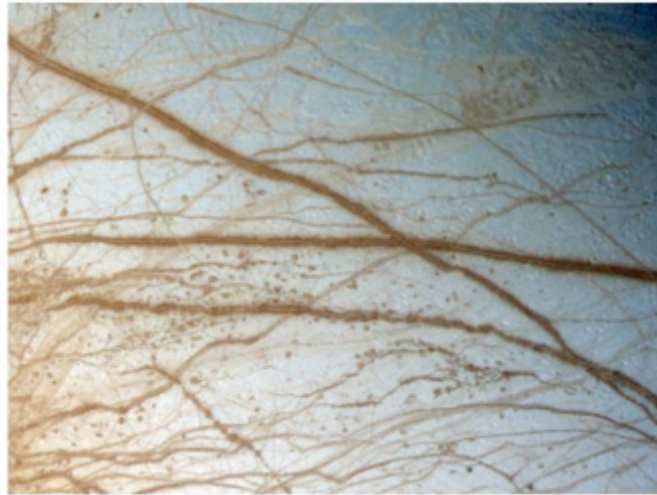
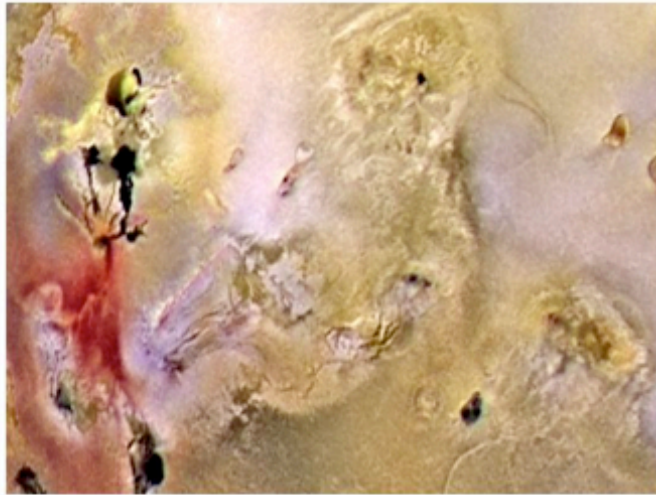
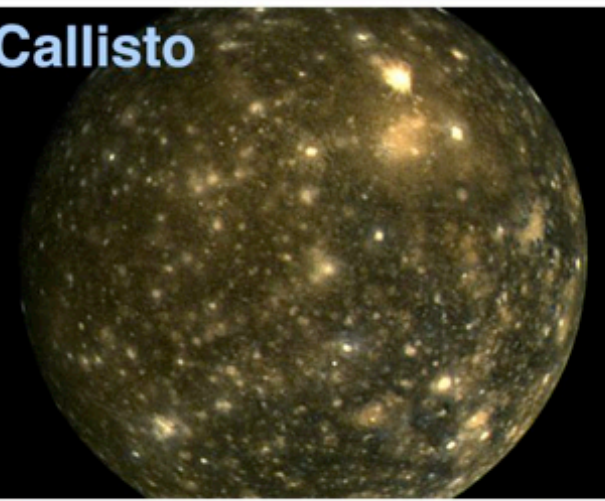
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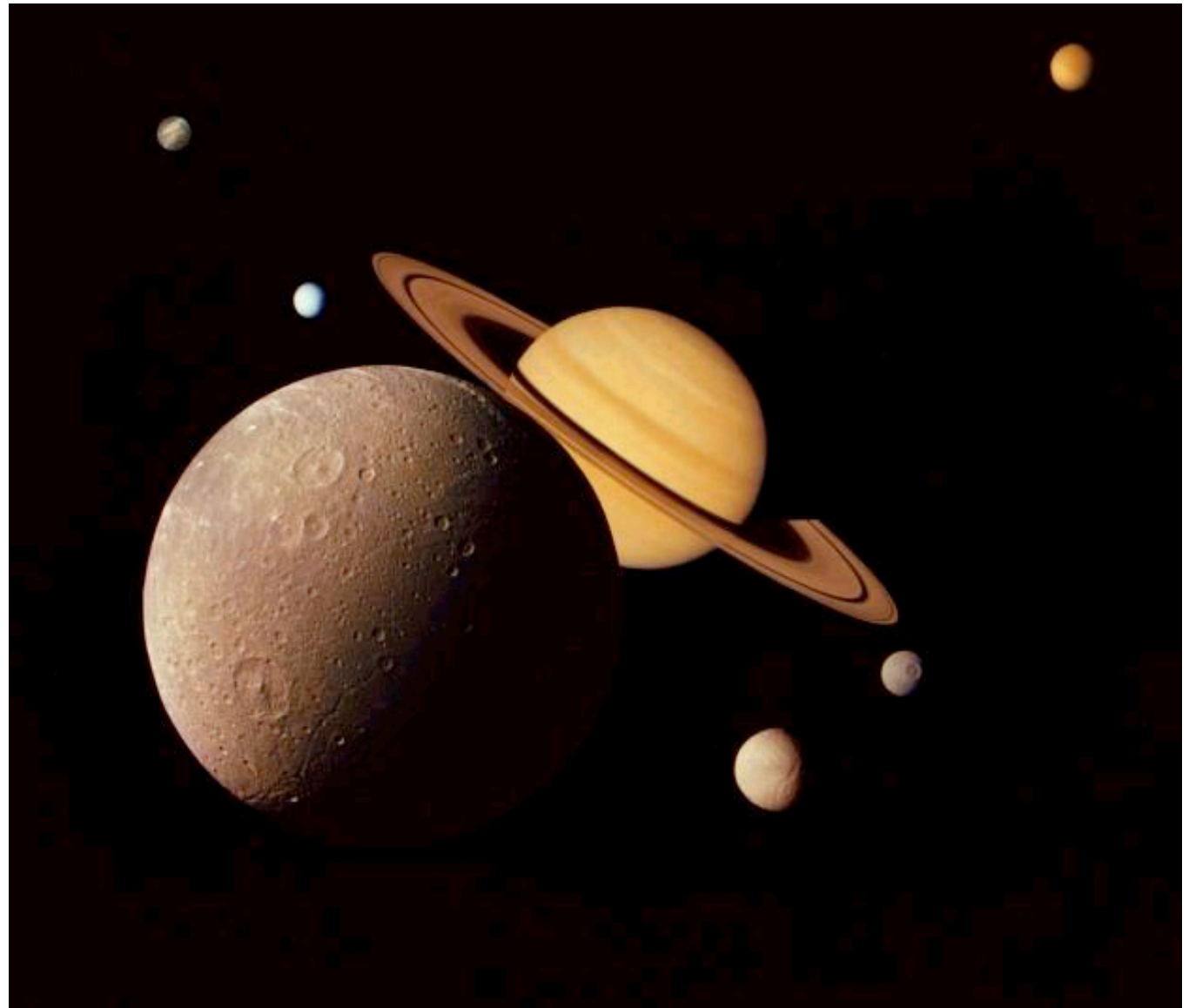
Ganymede



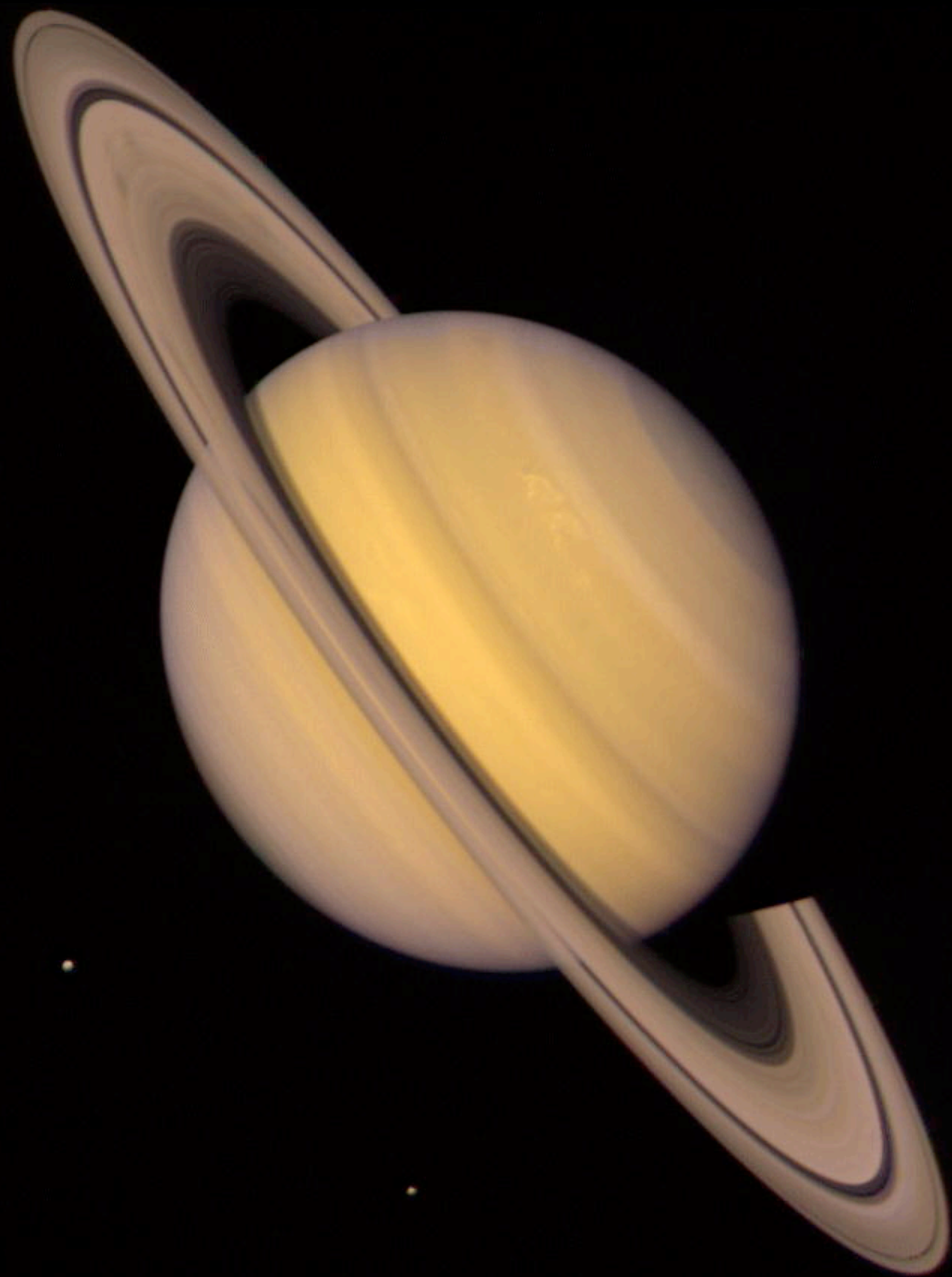
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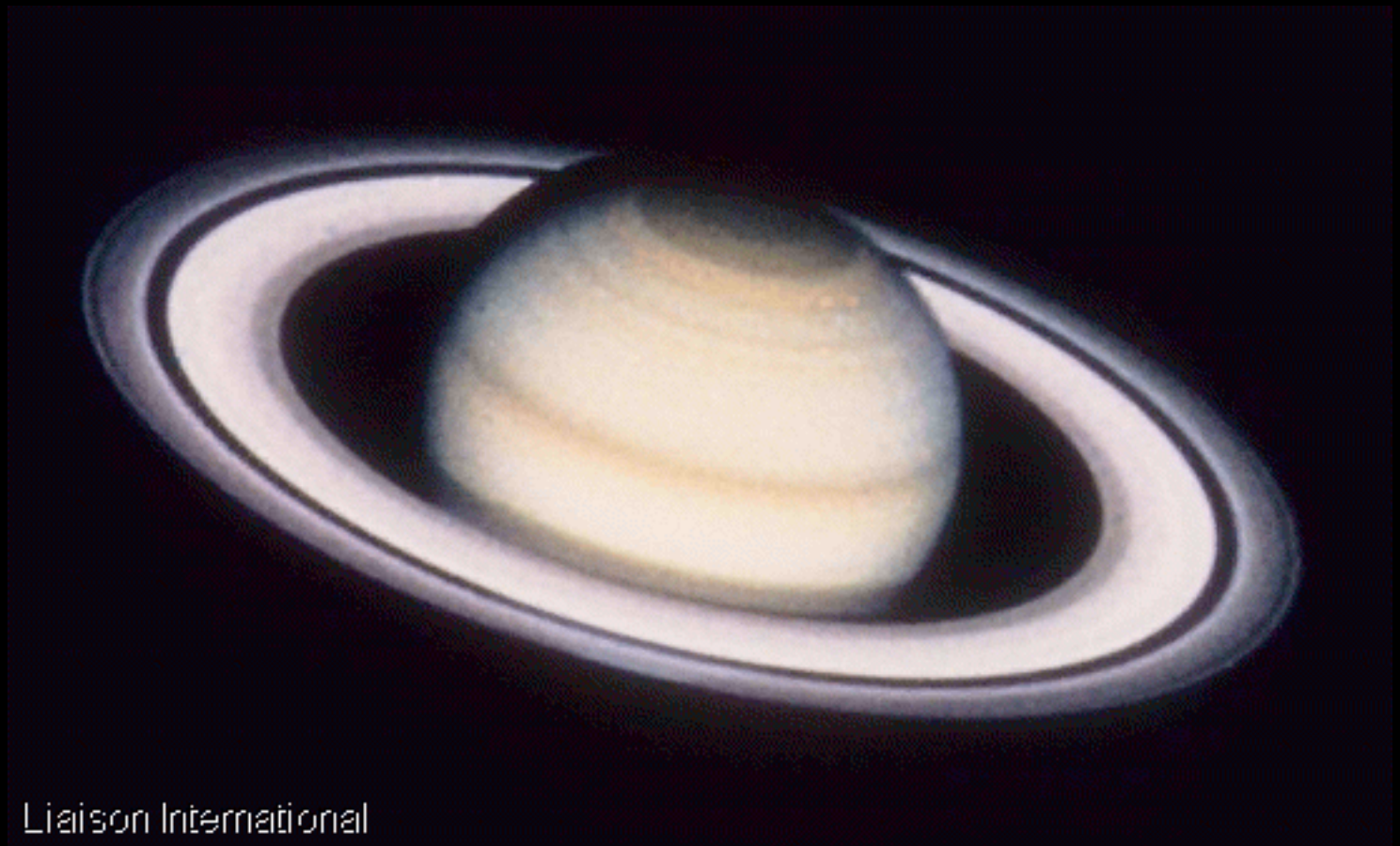
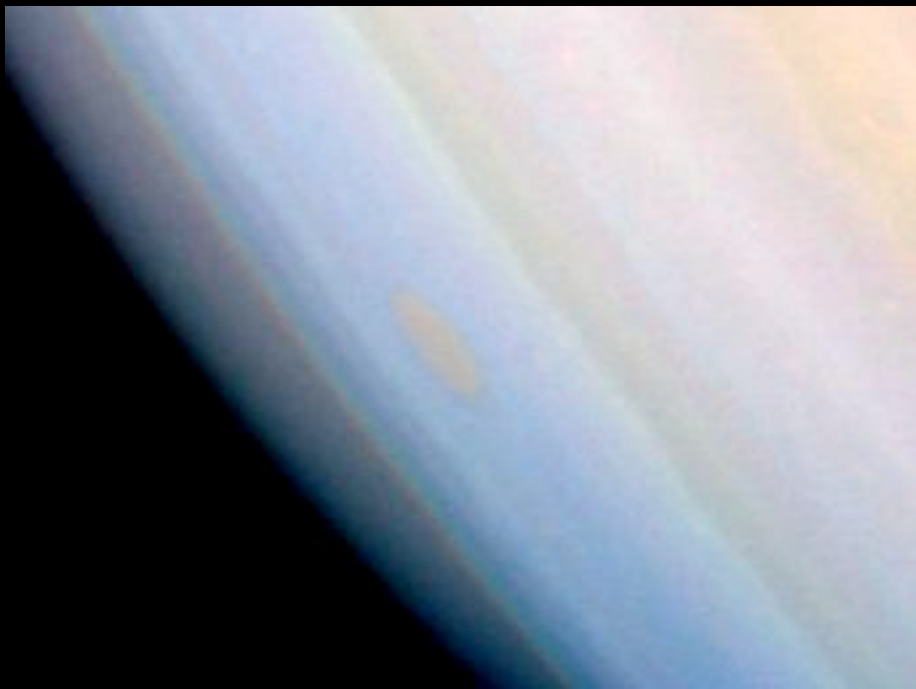


Saturn



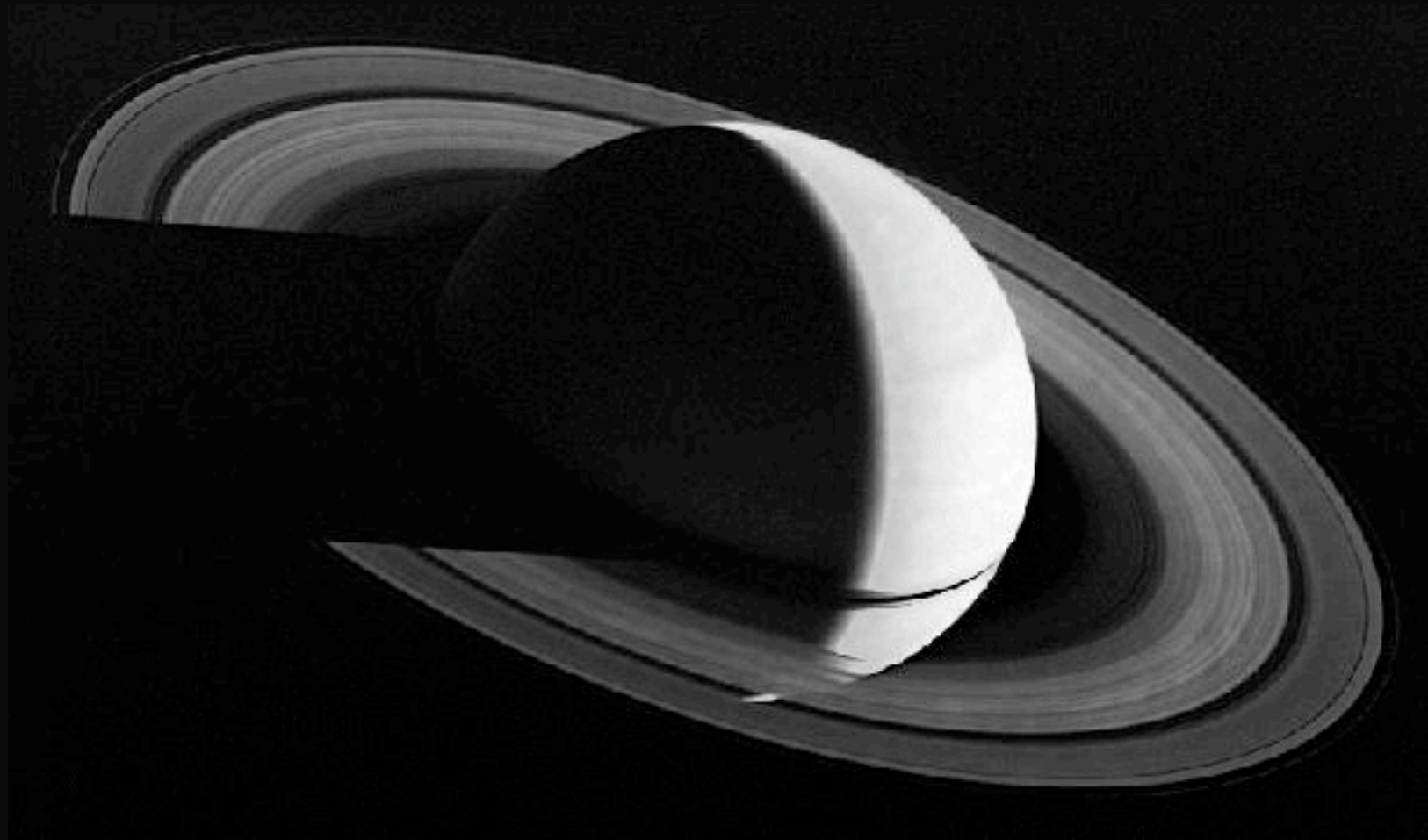
Saturn is the 2nd largest planet with a mass of 95 times that of Earth and a radius of 9 times that of Earth. Saturn's density is the lowest in the solar system at 0.68 gm/cm^3 . The atmosphere is similar to that of Jupiter. Saturn is best known for its spectacular ring system (although all the Jovian planets have rings).

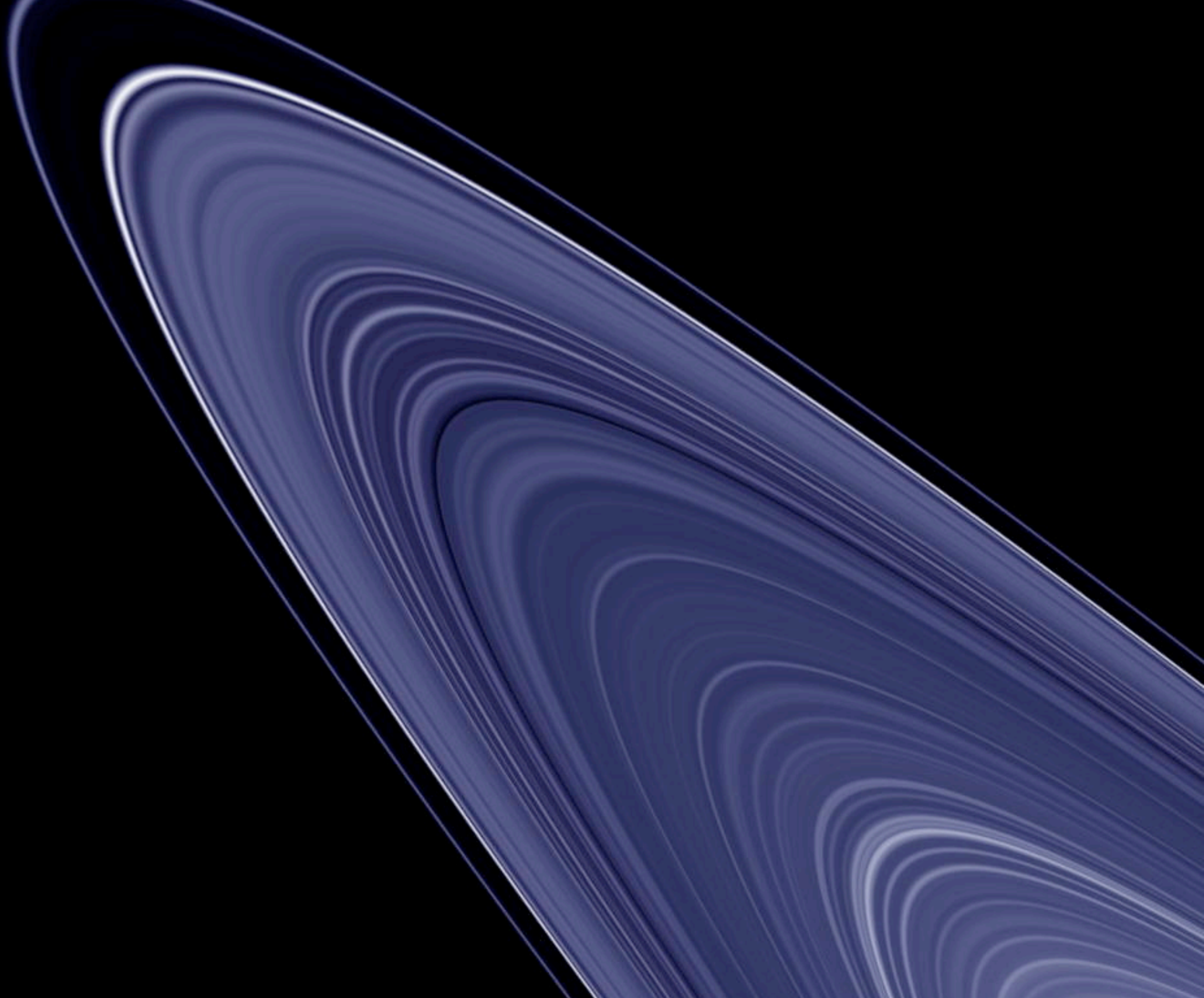


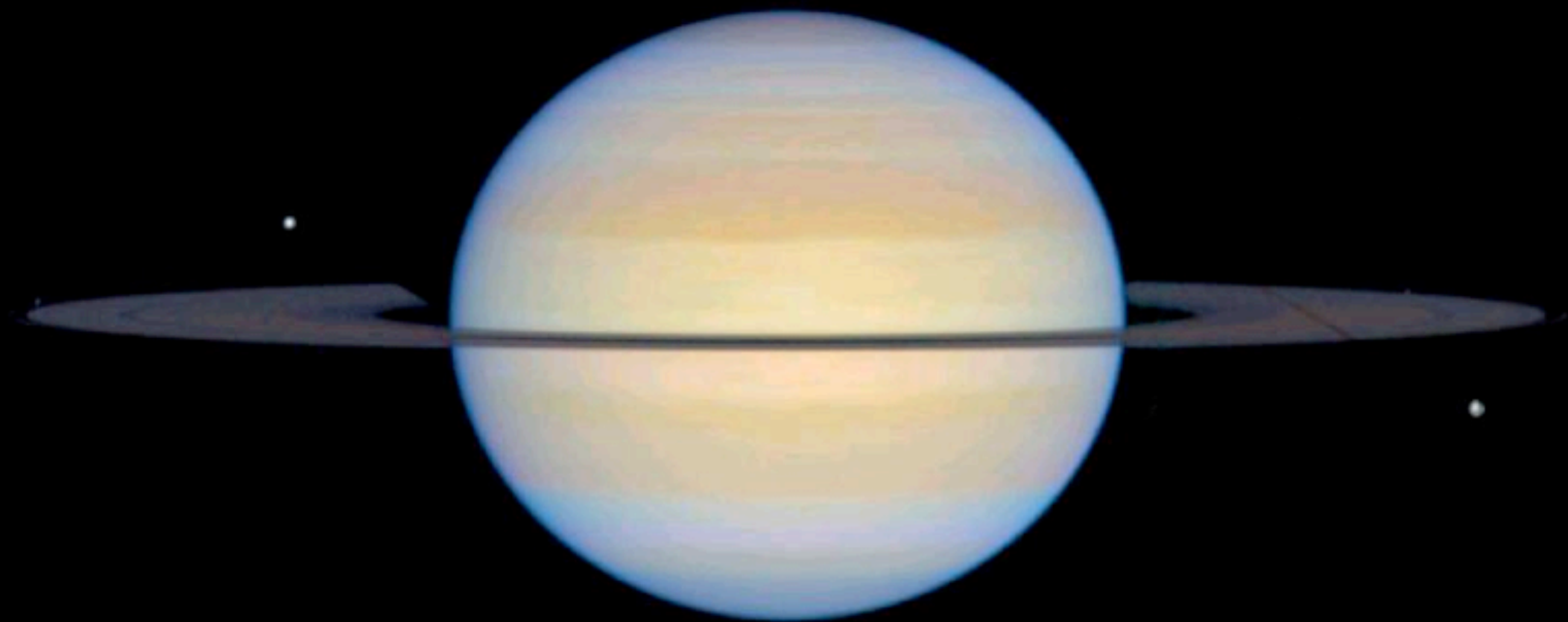
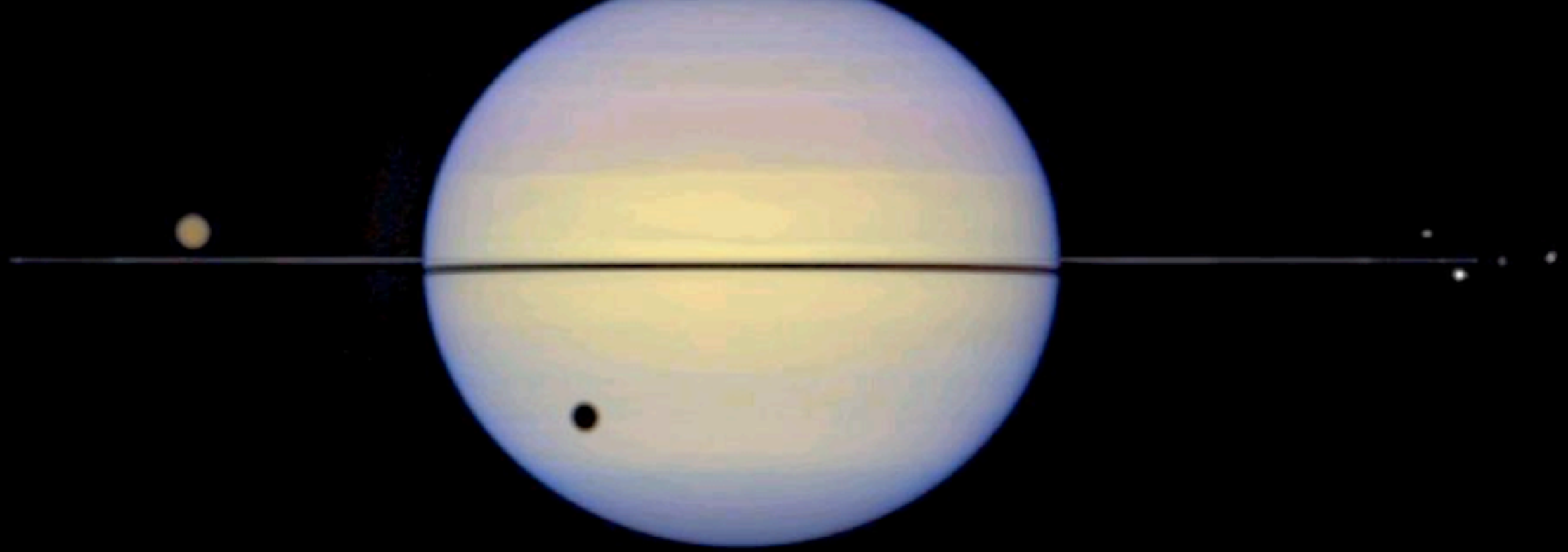


Liaison International









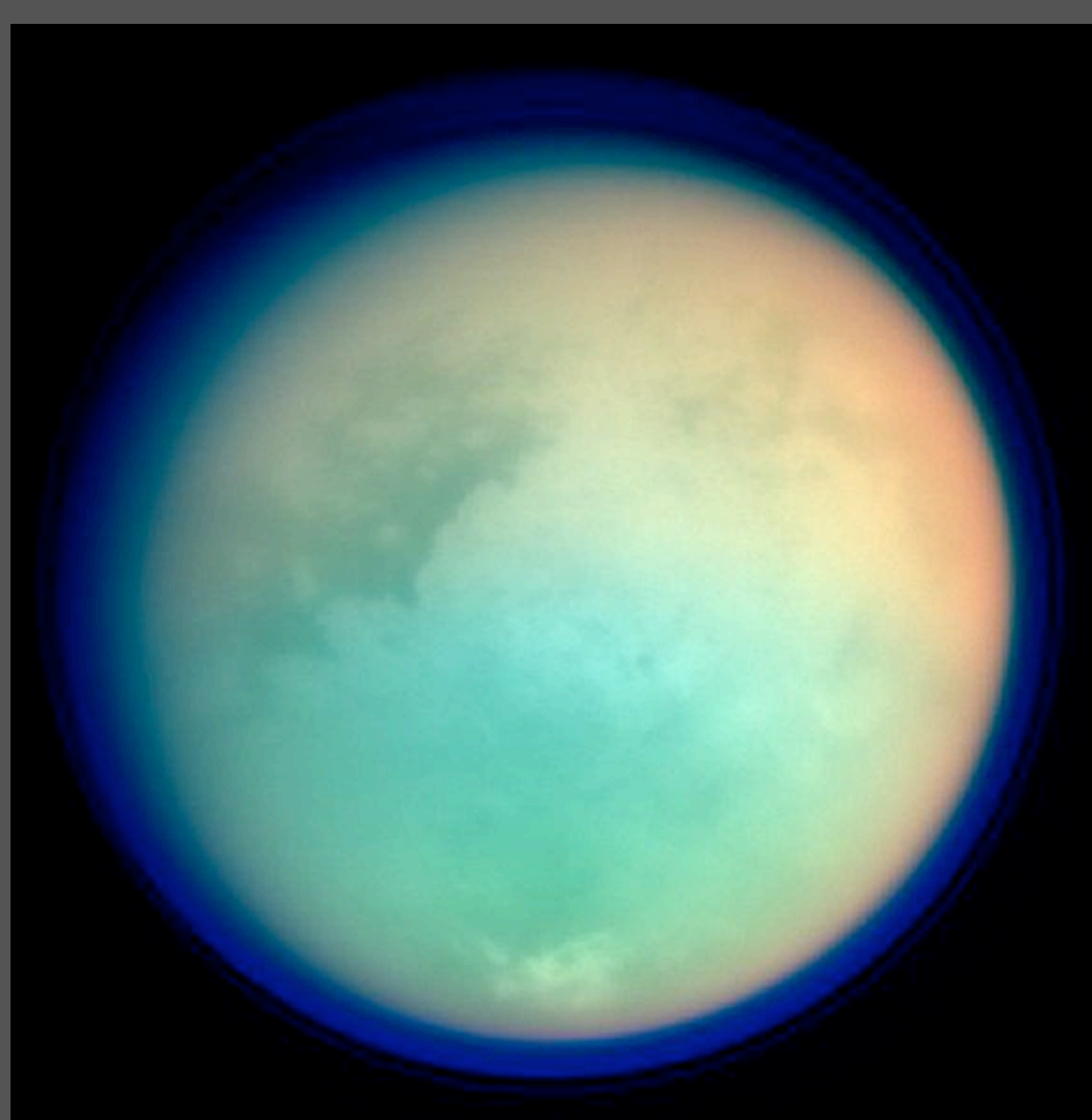
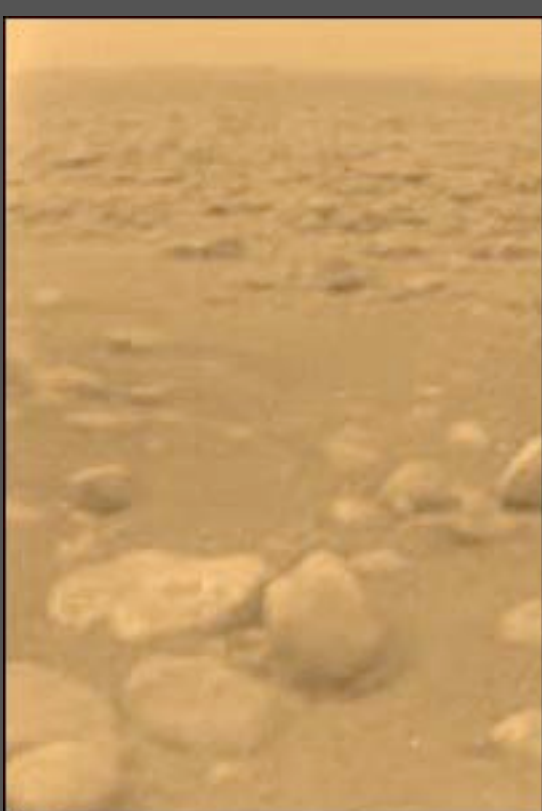
Saturn Ring-Plane Crossing

Hubble Space Telescope • Wide Field Planetary Camera 2

Titan

Titan is the second largest moon in the solar system with radius of 2575 km. Titan is the only satellite which has atmosphere. Its atmosphere is made of nitrogen and methane. Titan's high density (1.9 g/cm^3) implies 50-50 composition of ice and rock.





Enceladus. Radius 250km.
Relatively smooth surface indicates recent geological activity. Grooves (tens of kilometers long) imply that the crust was deformed by internal heat. A hot interior can heat and melt surface ice.

