

Outer Planets



Did you know that ALL Jovian Planets have rings??

- Jupiter: faint, dusty rings
- Saturn: bright, spectacular rings
 - Uranus: dark, thin rings
- Neptune: dark, thin rings & ring arcs

PLANET DATA

Planet	Period of Rotation (Earth Days)	Average Distance from sun (AU)	Period of Revolution (Earth days or years)	Number of Moons
Mercury	176 days	.39	88 days	0
Venus	243 days	.72 AU	225 days	0
Earth	1 day/24 hr	1	365.25 days	1
Mars	25 hours	1.5	694 days	2
Jupiter	10 hours	5.2	12 earth years	63+
Saturn				
Uranus				
Neptune				

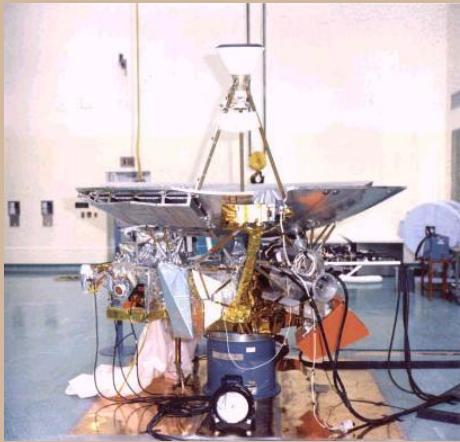
'HAVING A GAS! - HERE AT



THE GIANT PLANET

SIZE
OF
EARTH

Spacecraft to Jupiter



Fly-bys:

Pioneer 10 & 11 (1973 & 1974)

- **Voyager 1 & 2 (1979)**

- Ulysses (1992)

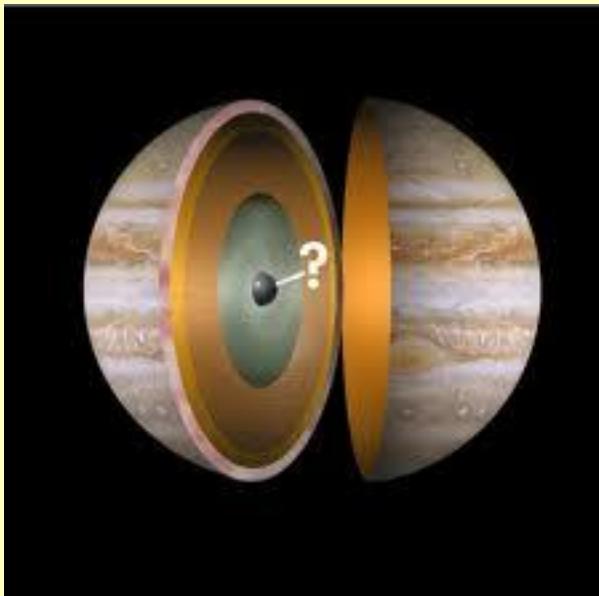
- Orbiters:

- **Cassini (2001)**, been orbiting Saturn and will continue through 2017 for its Northern Solstice in 2017

- **Galileo (Dec 1995 until Sept 2003)**

JUPITER FACTS

- Largest and most massive planet
 - Diameter: 11 Earth Diameters (86,280 miles)
 - Mass: 318 Earth masses (1.899×10^{27} kg)
 - Volume: 1,300 Earths would fit inside

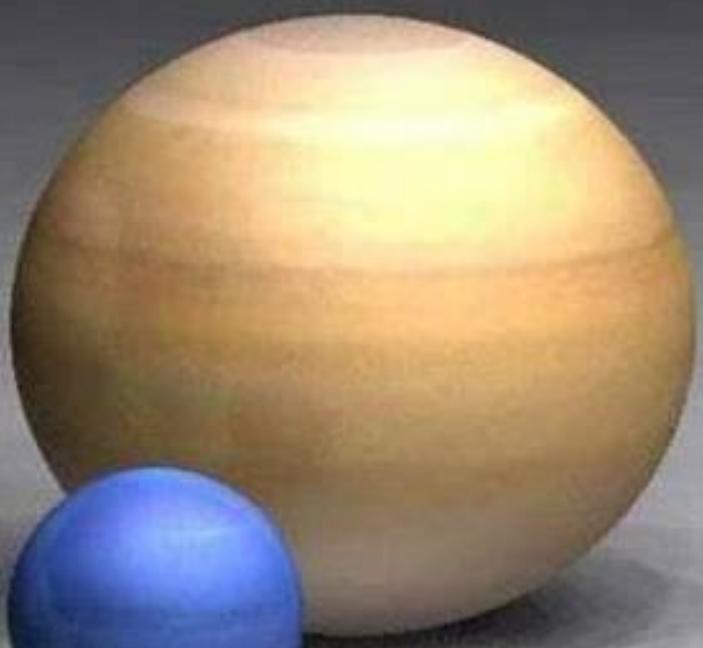


- No solid surface
- Rock & ice core

Jupiter



Saturn



Uranus



Earth →



Neptune



← Pluto

Great Red Spot (GRS)

Giant Storm
= 3 Earth
diameters.

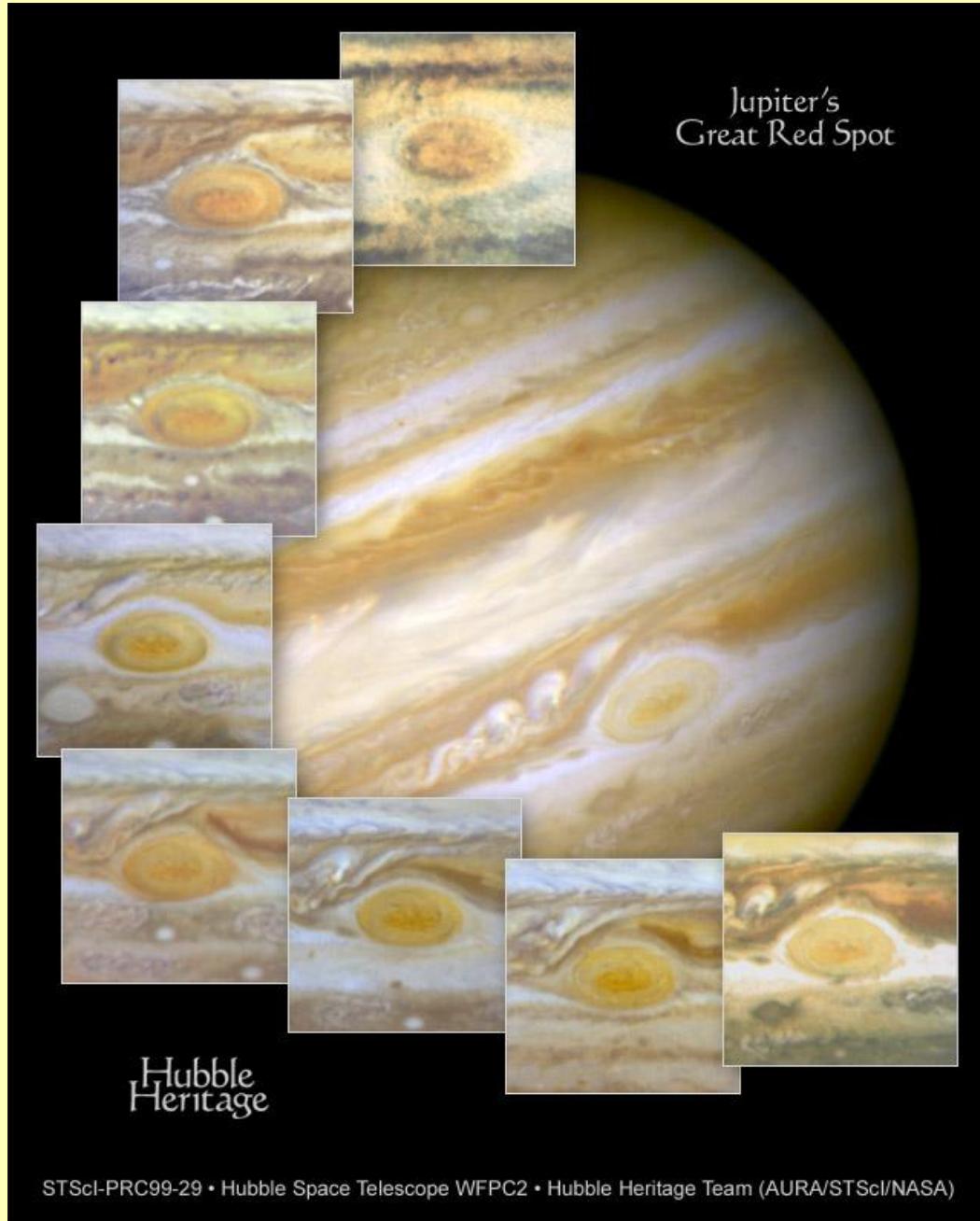
Rotates once every 6 days
Red spot is changing colors

http://www.nasa.gov/centers/goddard/images/content/387520main_92_80_1-334x312.gif

http://www.nasa.gov/centers/goddard/images/content/388625main_Jupiter_Approach.gif

http://www.nasa.gov/centers/goddard/mov/38896_4main_polarwinds.mov

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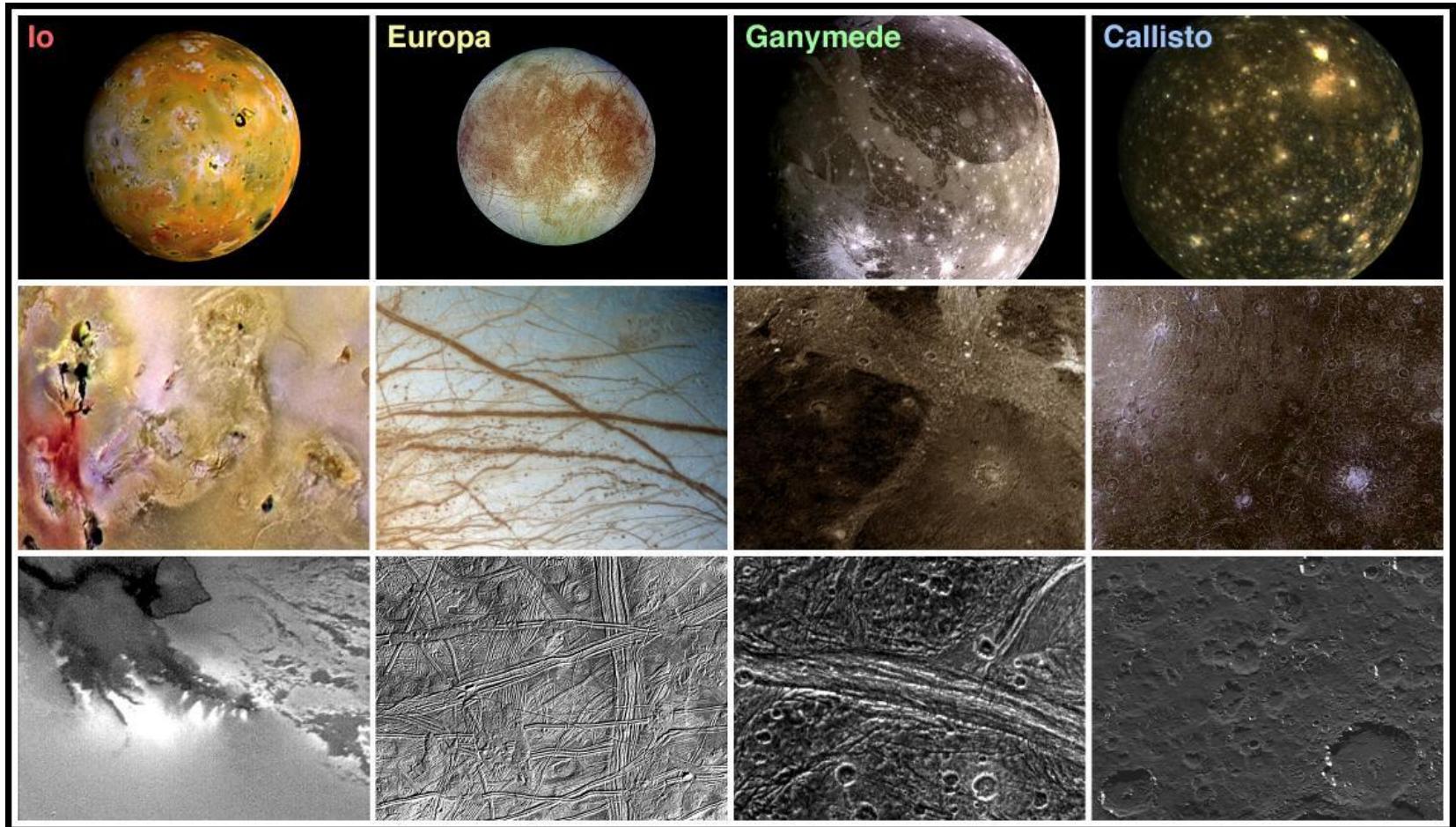


- jupiters lcloud sequence
- Jupiter's polar vortex
- comet shoemaker-levy crashes into jupiter

JUPITER'S MOONS

- Has the most moons of all planets 63+
- Io, Europa, Ganymede, Callisto
Jupiter's 4 largest moons are the most amazing moons ever discovered

The Galilean Satellites



Io

Europa

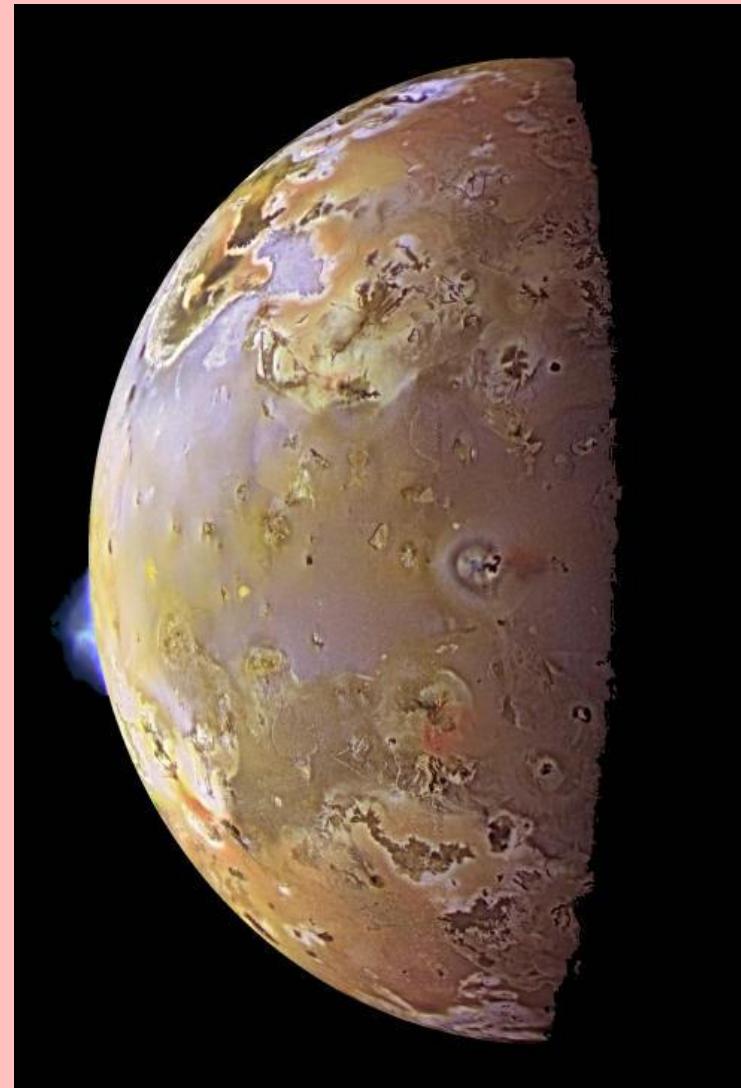
Ganymede

Callisto

* Each has a unique surface and a unique geologic history.

Io: Most Volcanically Active Body in the Solar System

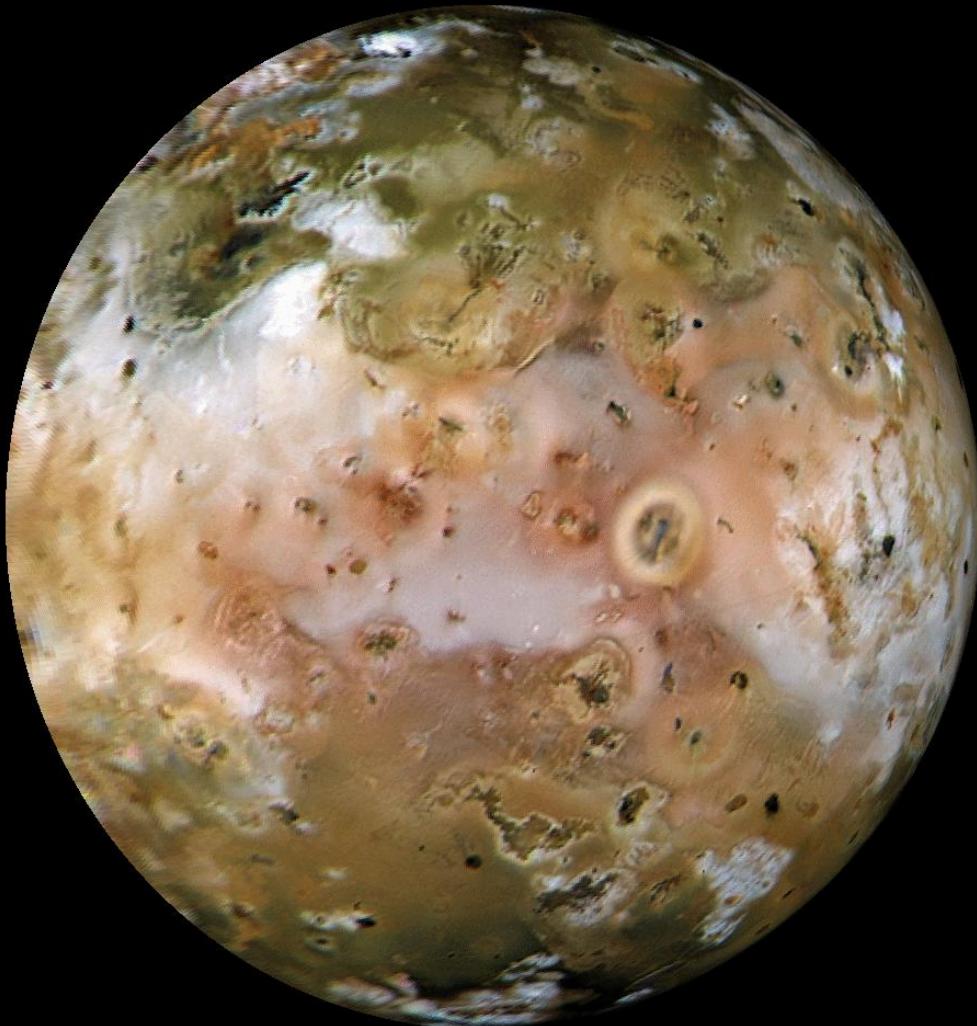
- Hot, Molten Interior
- LOTS OF SULFUR
- Continuously resurfaced by lava flows



Global View

http://www.nasa.gov/centers/goddard/mpf/88623main_Io-rotates.mpg

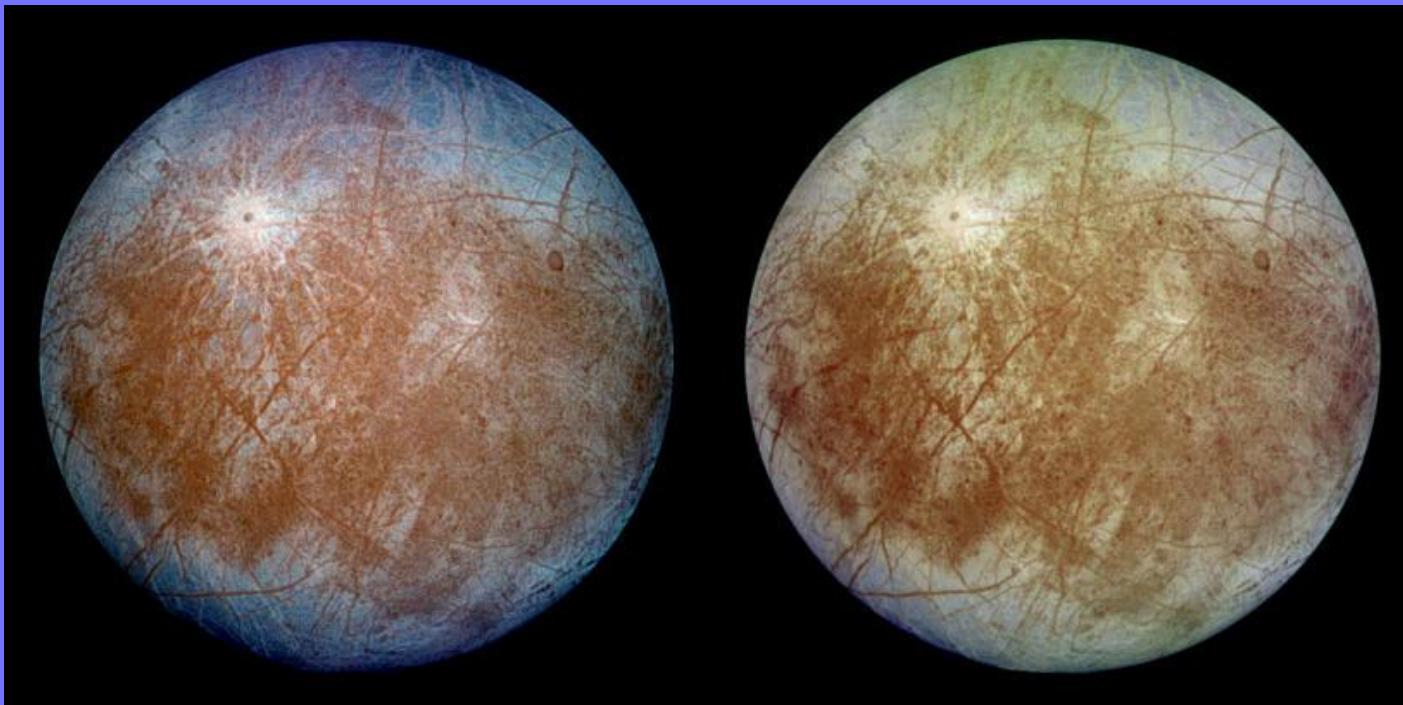
Io rotates



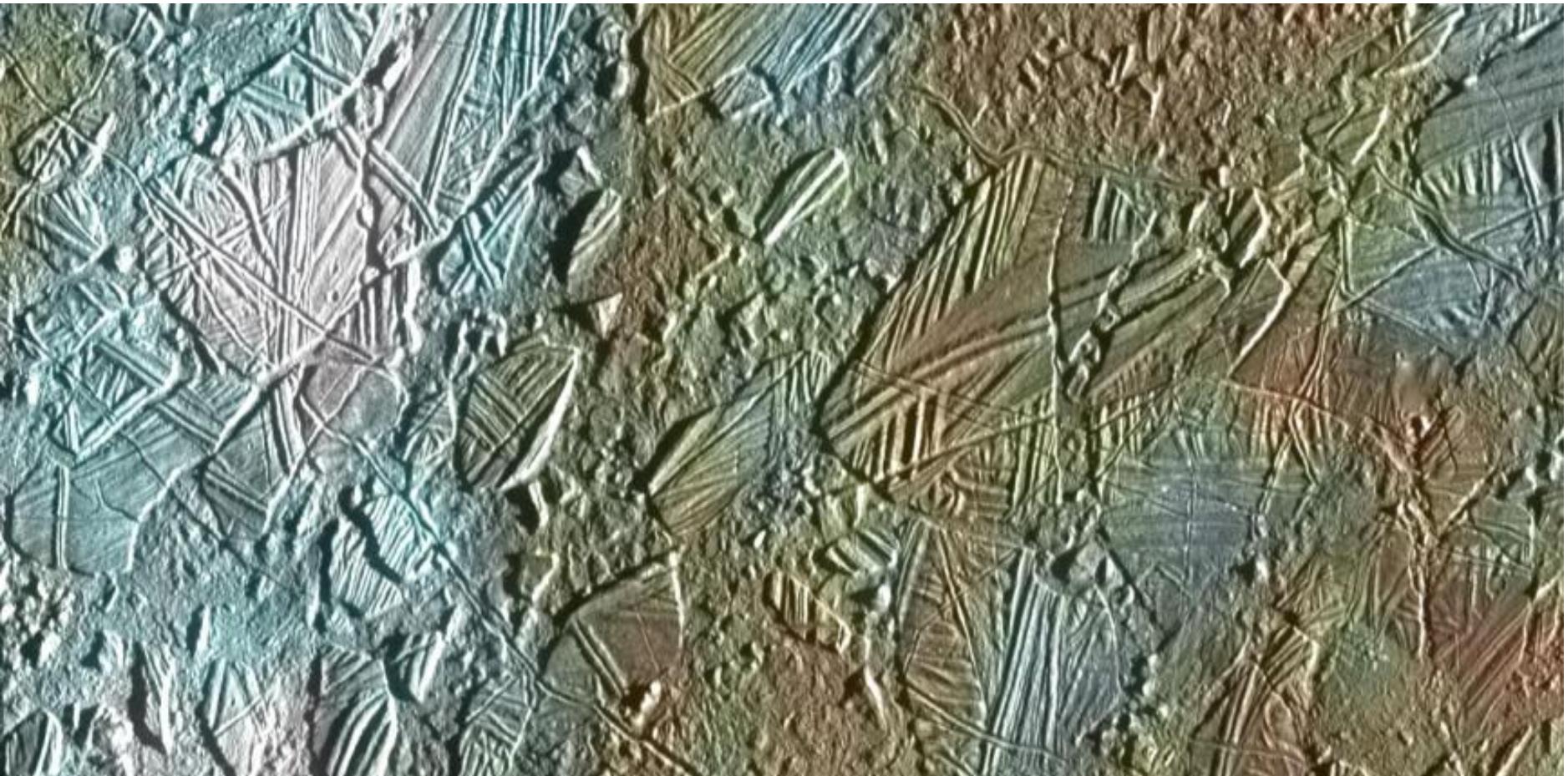
Europa

Surface composition - water ice

- Scientists believe there is a liquid water ocean,
60 miles deep, under the surface.
 - Ice penetrating Ocean mission 2037



**Ice flows and rafts are scattered and rotated...
the result of tidal forces on Europa.**



Ganymede

The solar system's largest satellite...larger than Mercury.

The “Grooved” terrain results from vertical plate tectonics.... from “shrinking”

[Ganymede video](#)



Callisto

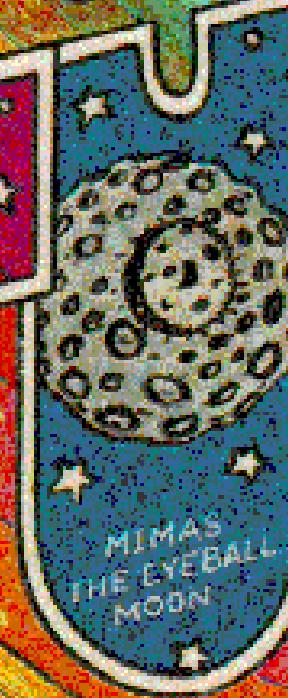
Geologically dead.....

Callisto is the most heavily cratered object in the solar system.

callisto rotating in space



GREETINGS from



SIZE
OF
EARTH

WHERE THE RINGS ARE THE THINGS!

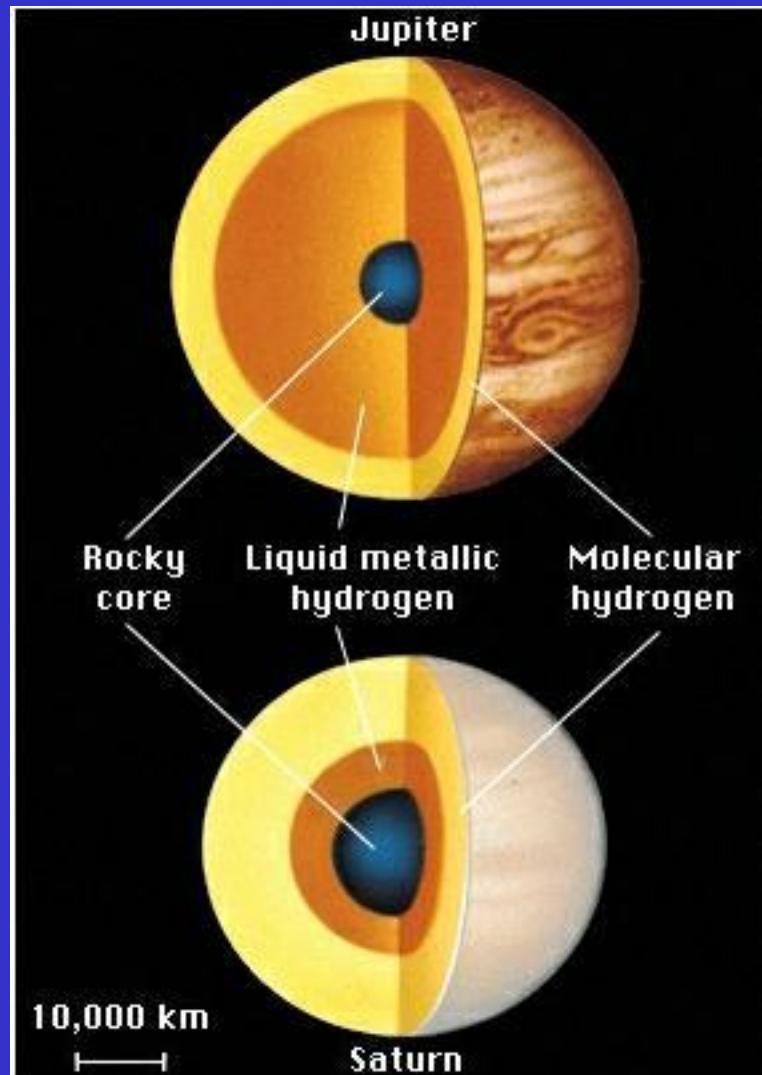
PLANET FACTS

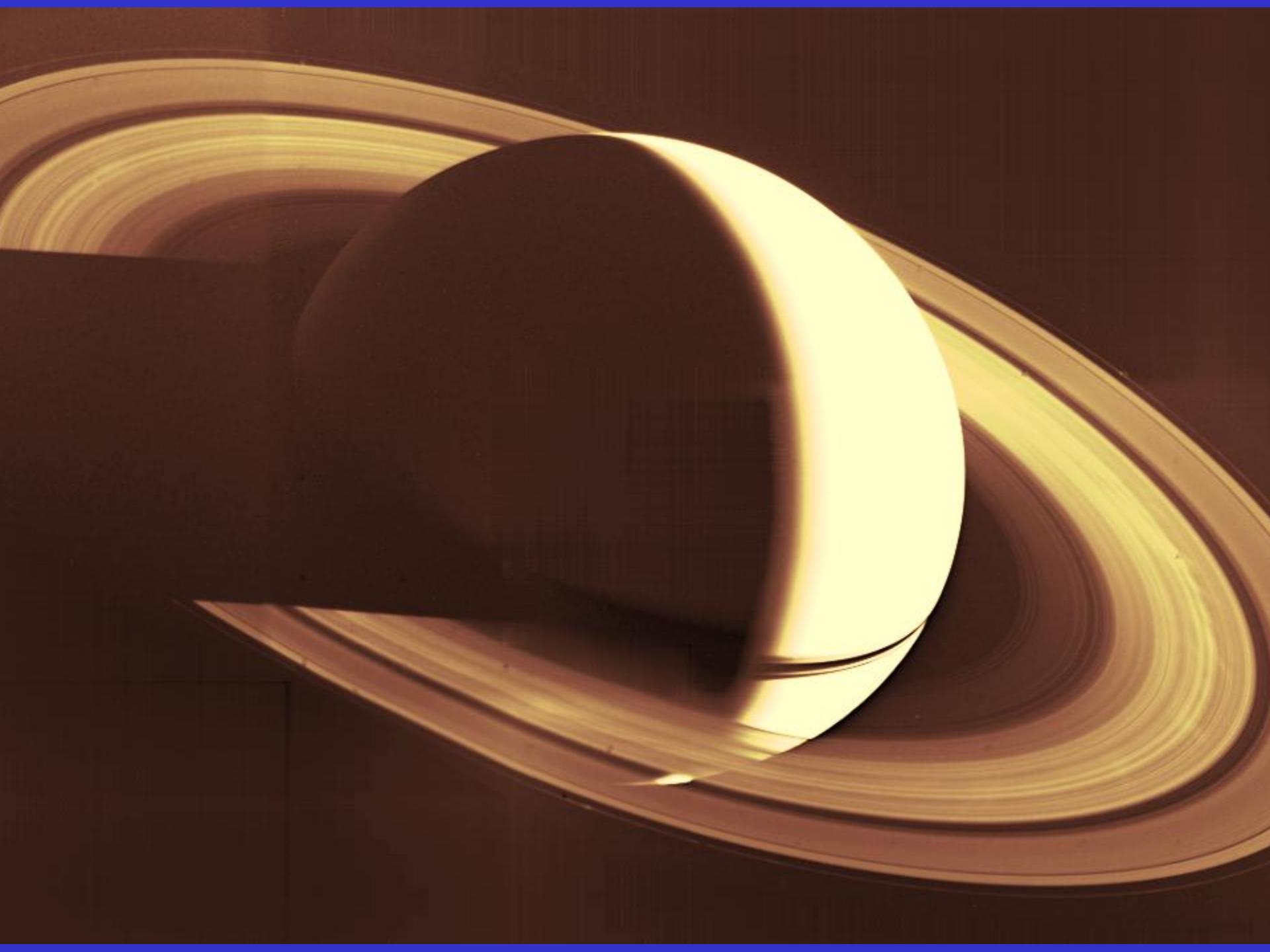
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Uranus				
Neptune				

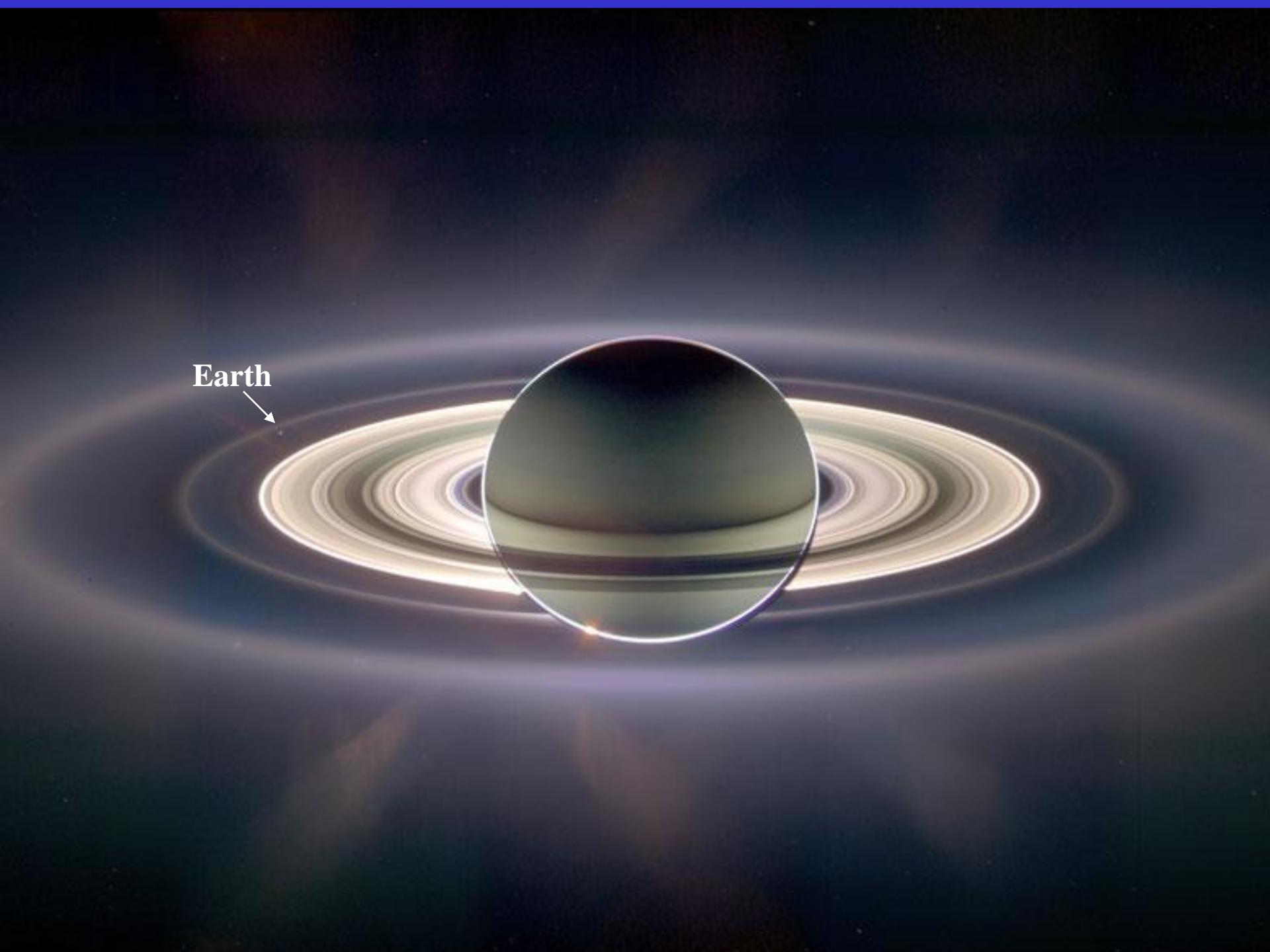
Facts of Saturn

Second largest planet

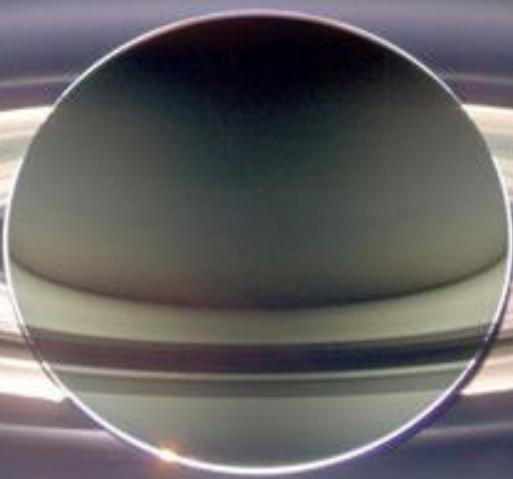
- Density: 0.7 g/cm^3 ...it would float in water
 - **(lowest density of all the planets)**
- Satellites: 57 (as of 2013)
- Temperature (@ cloud top) -292 F

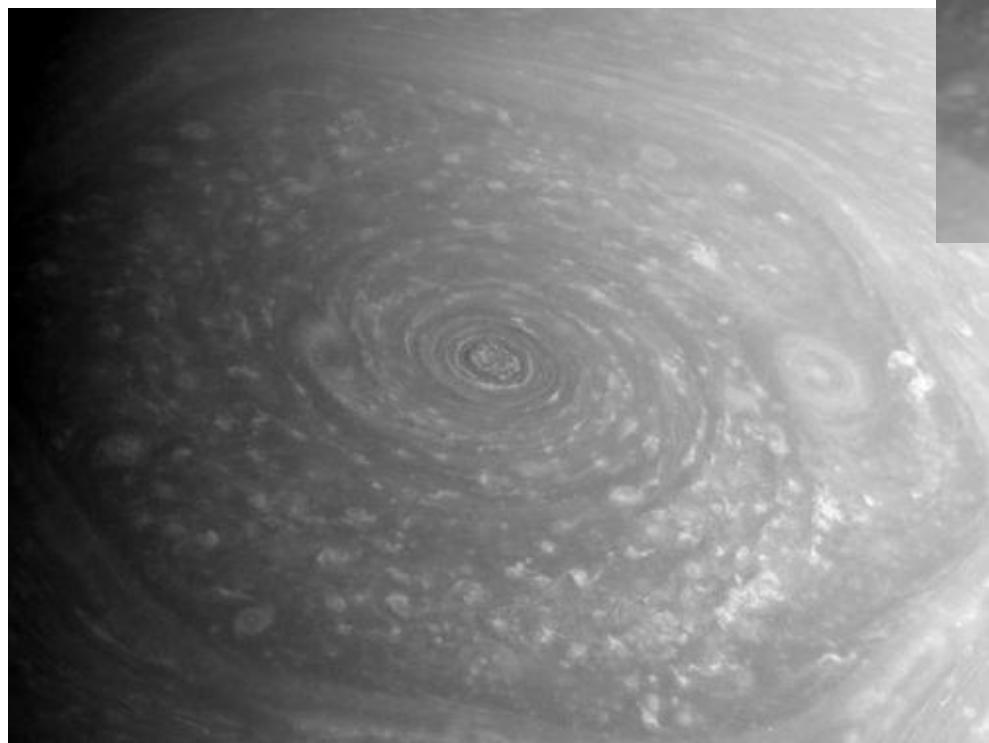
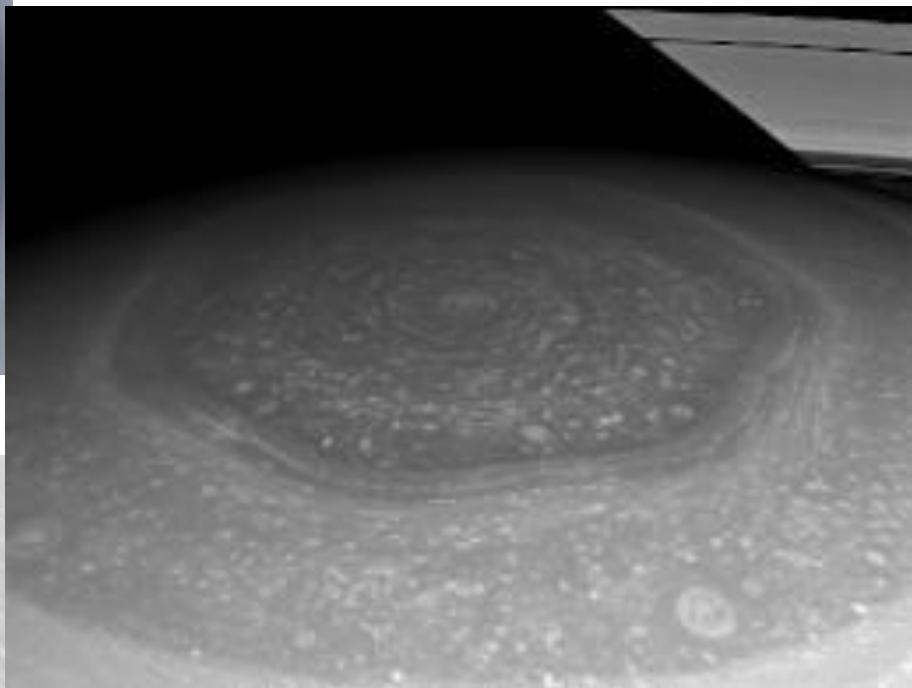




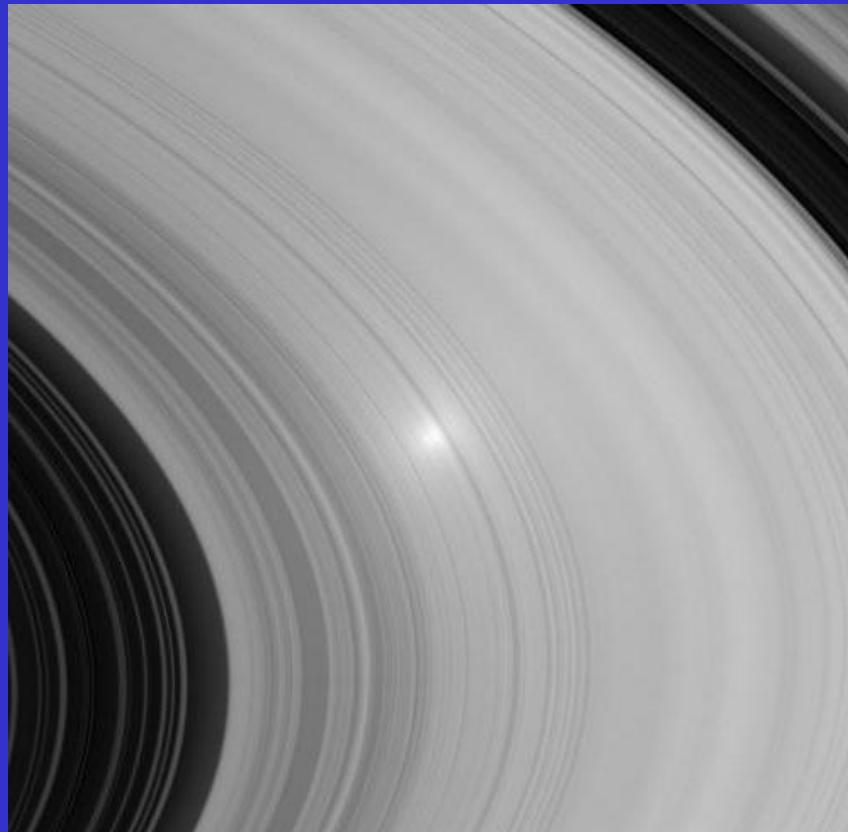


Earth





A View of the Sun as Seen Through the Rings of Saturn



- fly through space

Rings

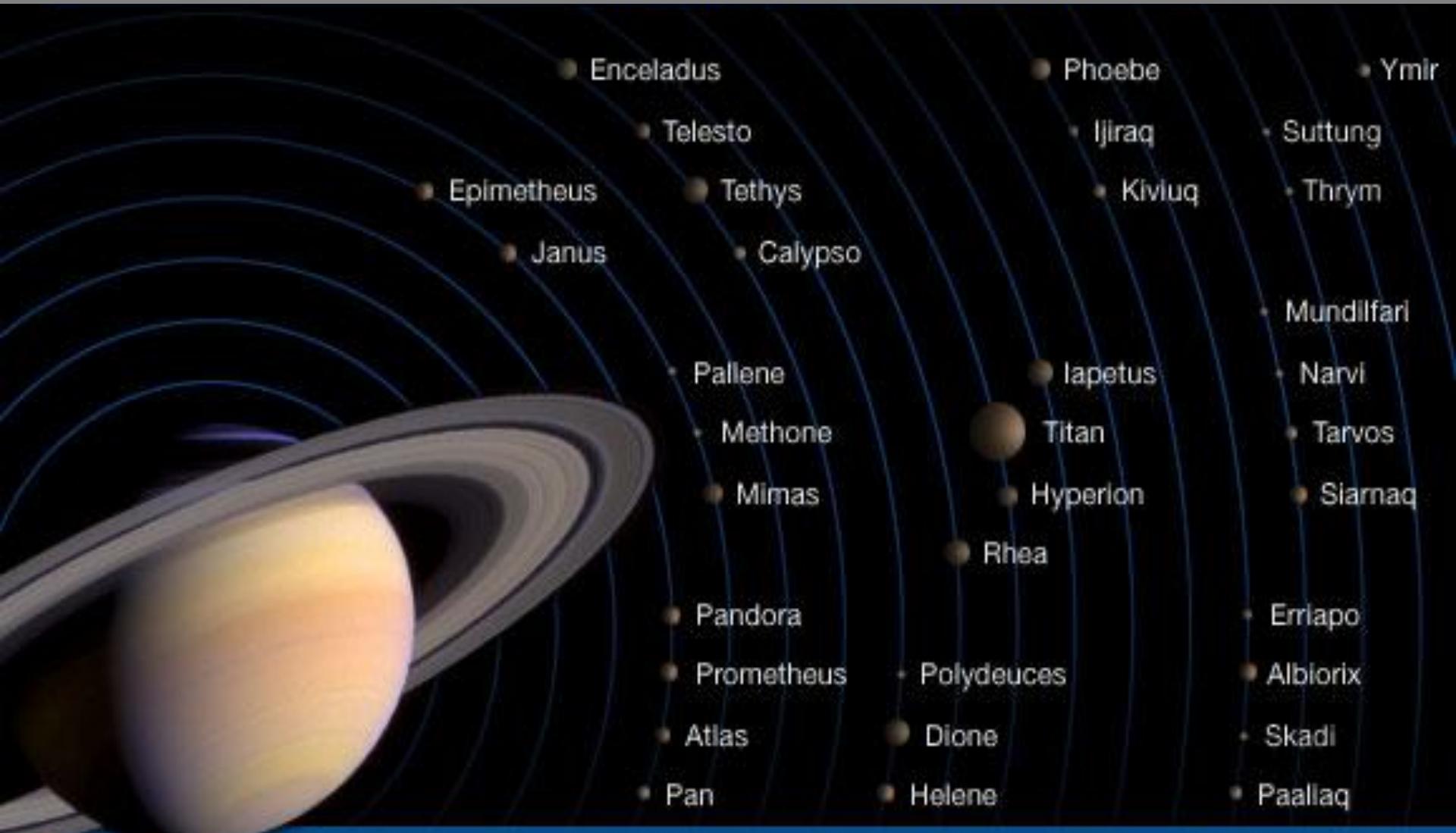
Made of ice and rock

Biggest rings of any planet

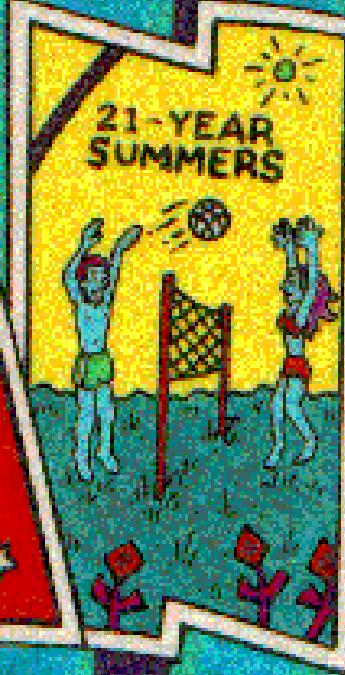
Saturn

Long video of saturn

The Saturn System: 57 Known Satellites



DOWN IS UP ON



THE SIDEWAYS PLANET

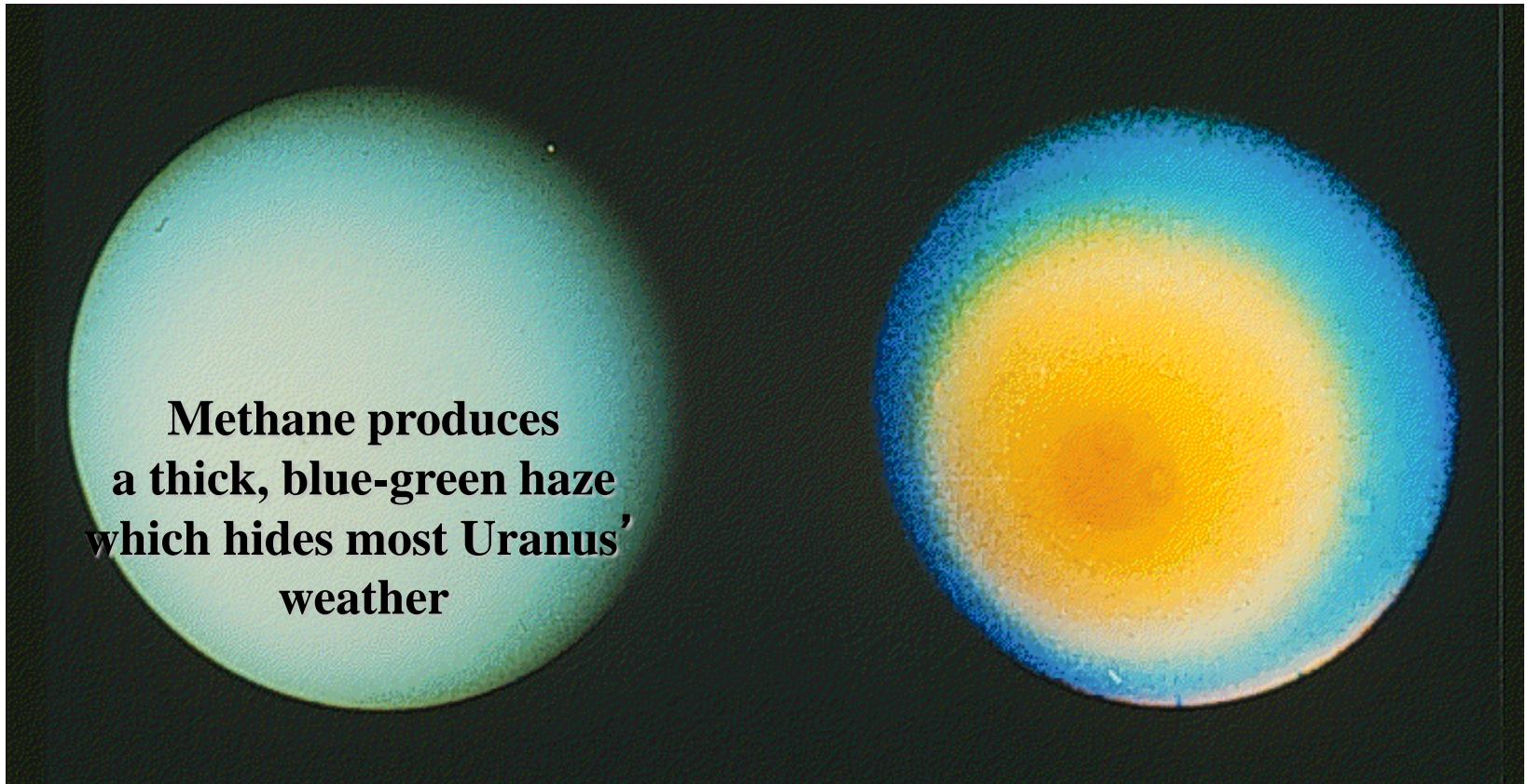
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Neptune				

Uranus' twin planet = Neptune

Chemical Composition of Uranus' Atmosphere



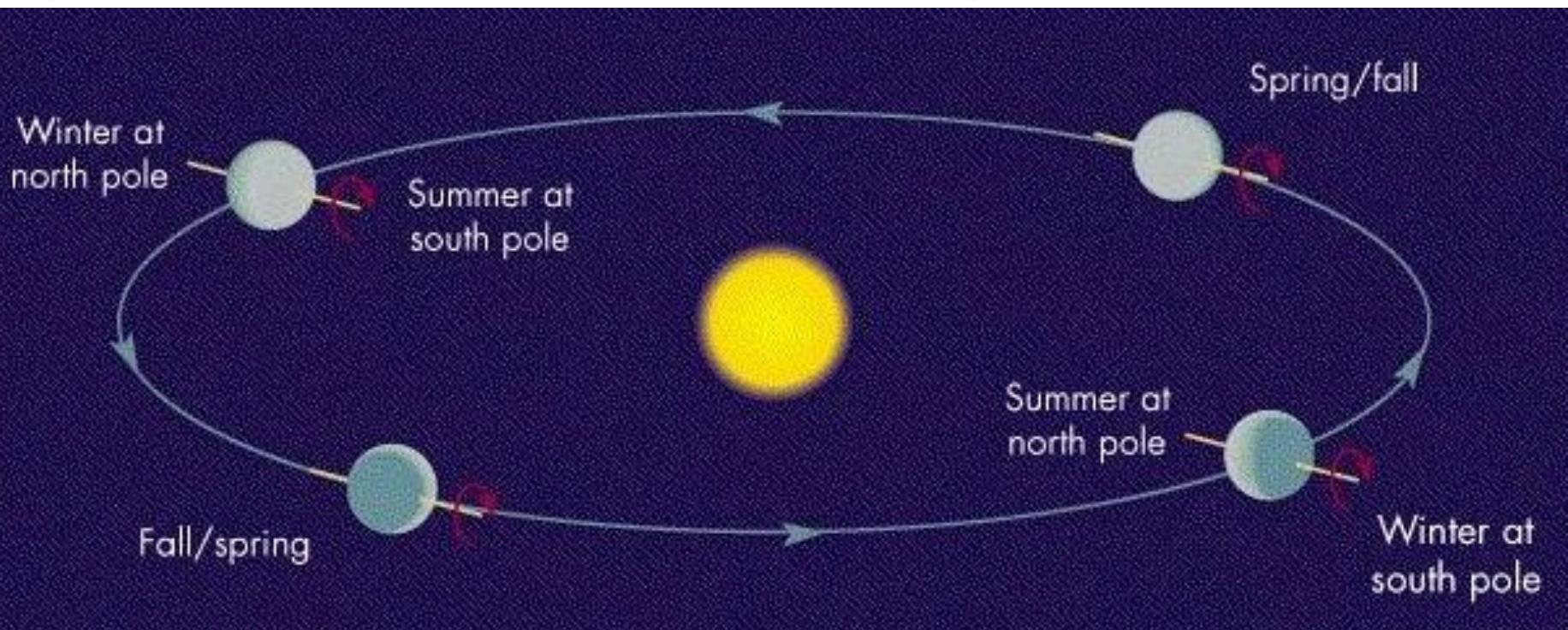
Methane produces
a thick, blue-green haze
which hides most Uranus'
weather

A photochemical haze (smog)
collects at the polar regions

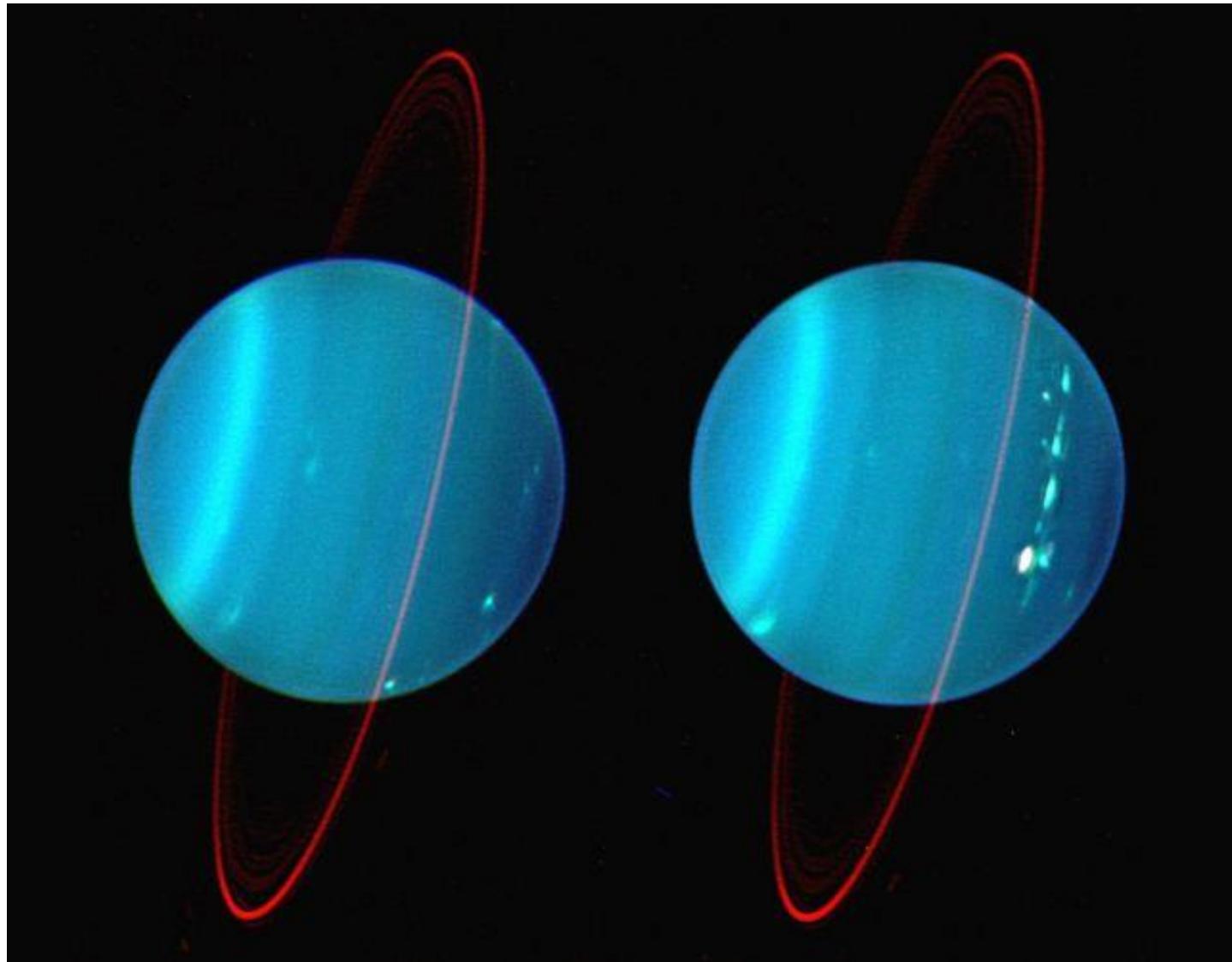


Uranus... is traditionally
known as the
“Featureless Disc”.....
space school

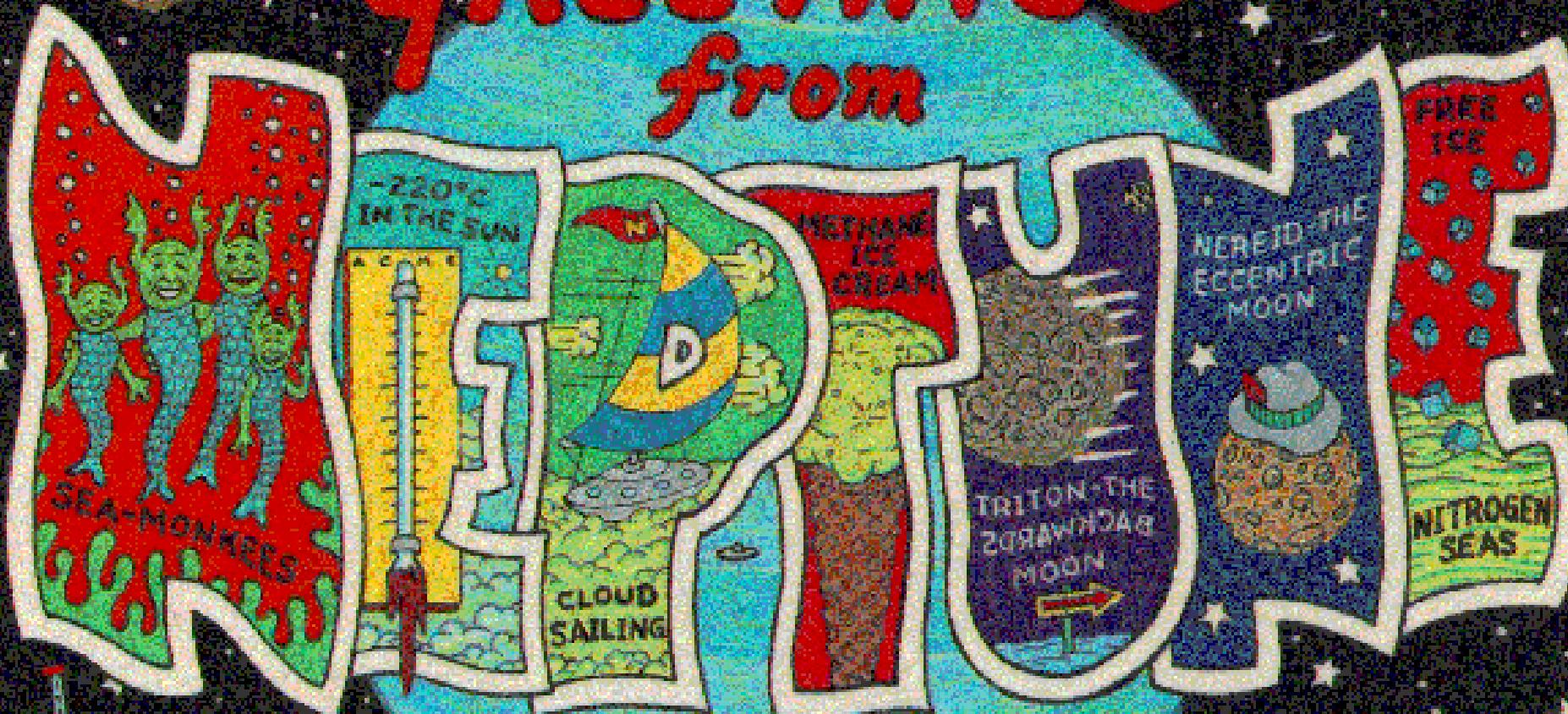
An axial tilt 98° creates “extreme” seasons (rotates on its side)



HST view of Uranus' ring system



GREETINGS *from*



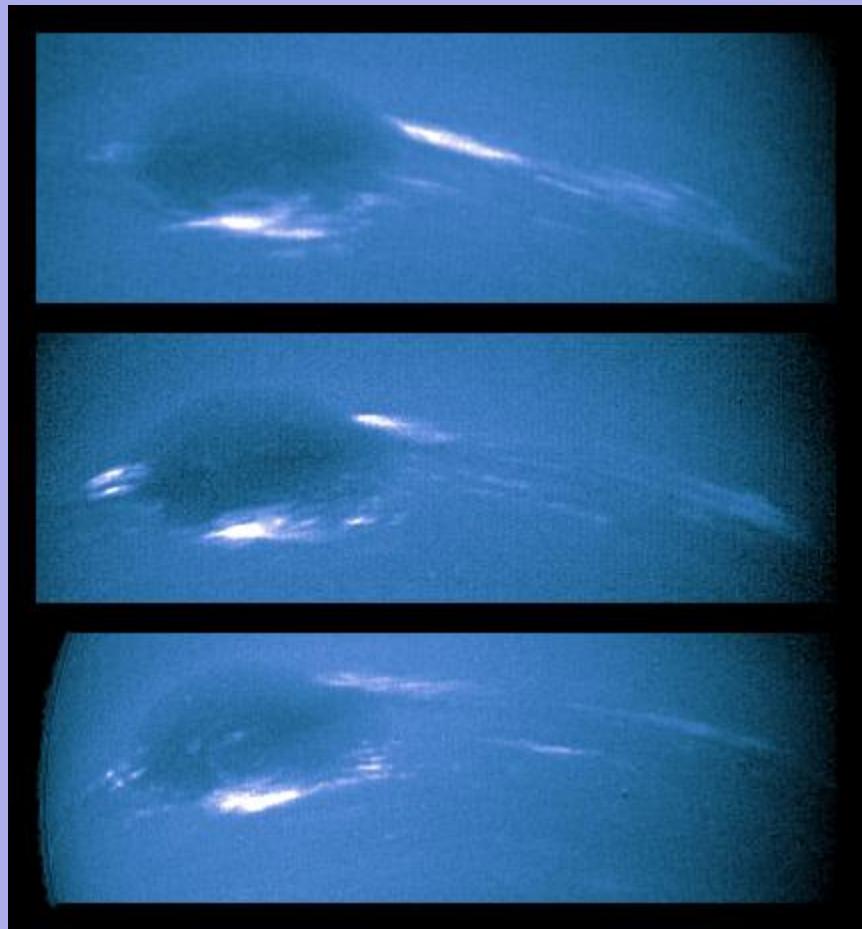
THE LAST GAS PLANET

SIZE
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Mars	25 hours	1.5	984 days	2
Jupiter	10 hours	5.2	12 years	63+
Saturn	11 hours	9.6	29 years	57
Uranus	17 hours	19.2	84 years	27+
Neptune	16 hours	30	164 yrs	13+

Surface of Neptune

- Windy
- **1,300mph winds**

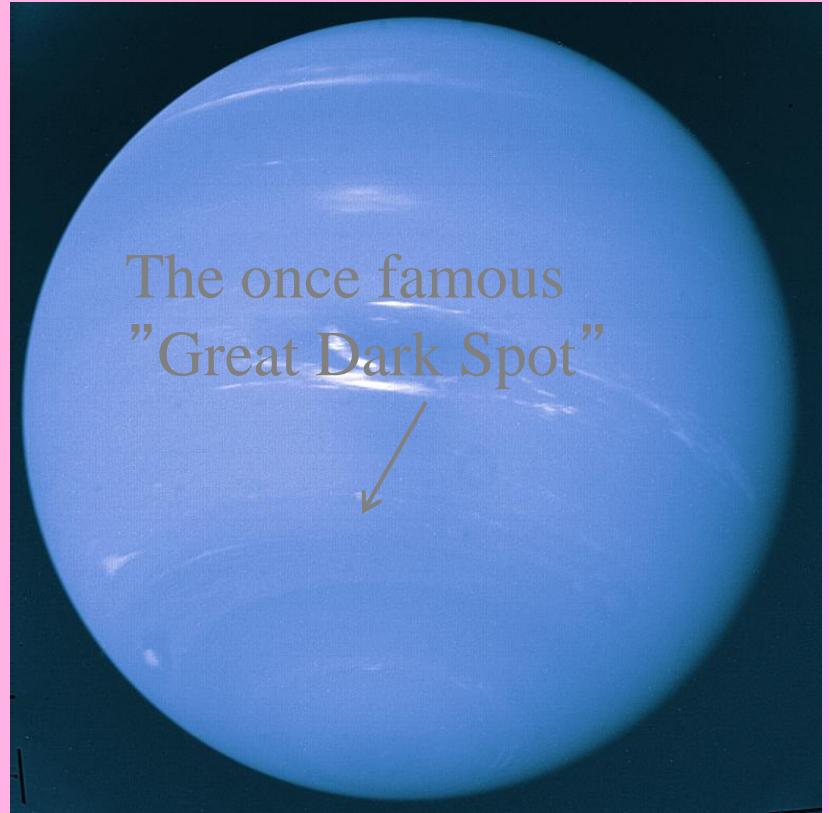


atmosphere

Blue color is
produced by
Methane CH₄

neptune facts and
photsspace school

neptune sounds



Triton: The Cantaloupe Moon

- Surface Temperature -400 F
 - 100 mph winds
- Nitrogen geysers – plumes ejected to an altitude of 6 miles.
 - Retrograde orbit...captured
- Will move within the Roche limit in less than one million years
 - triton - neptunes moon
 - neptune and triton



Dwarf Planets

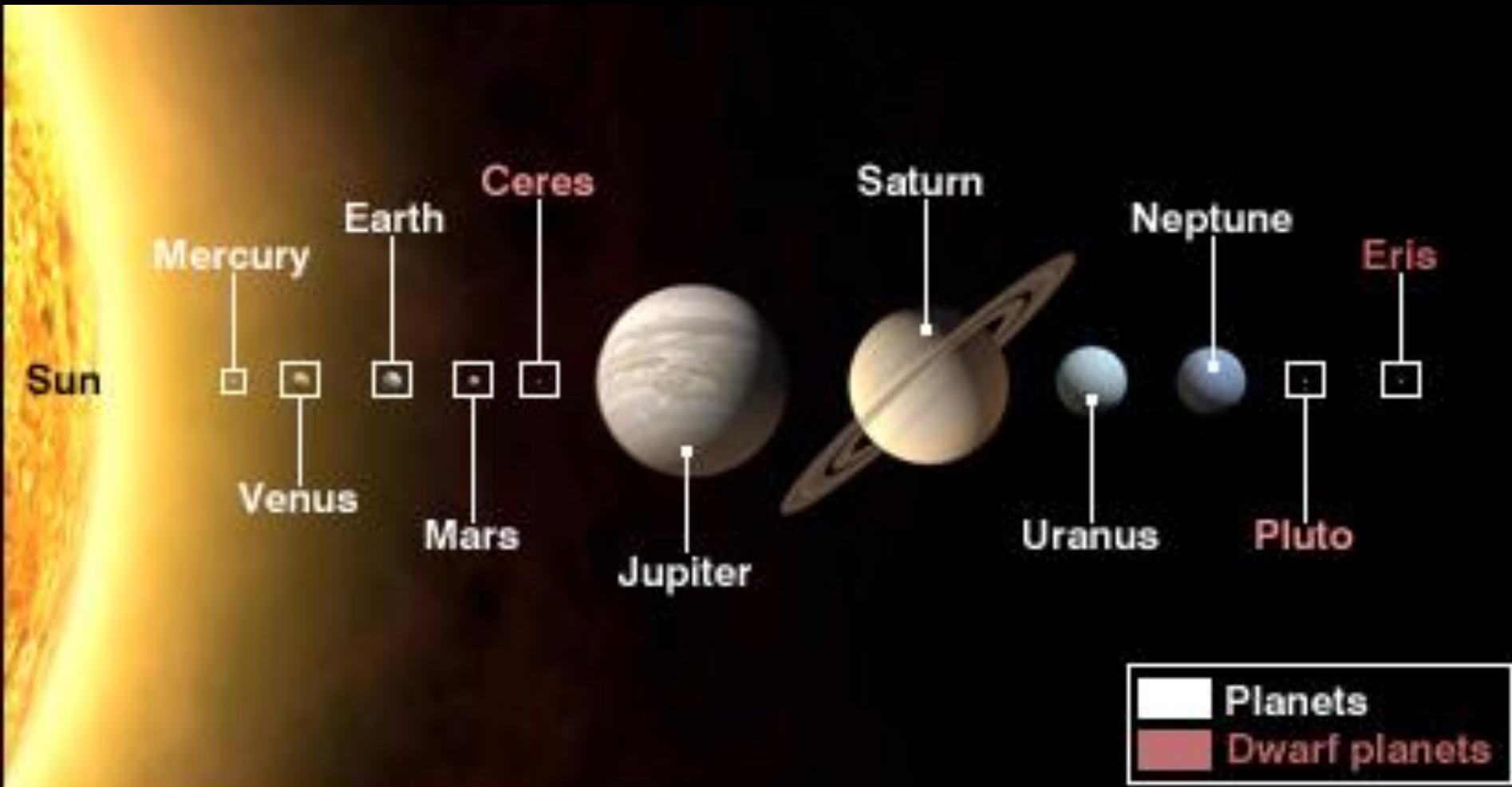


Pluto, Eris and Ceres, Makemake, and
Haumea

Latest news on Pluto and plutoids.

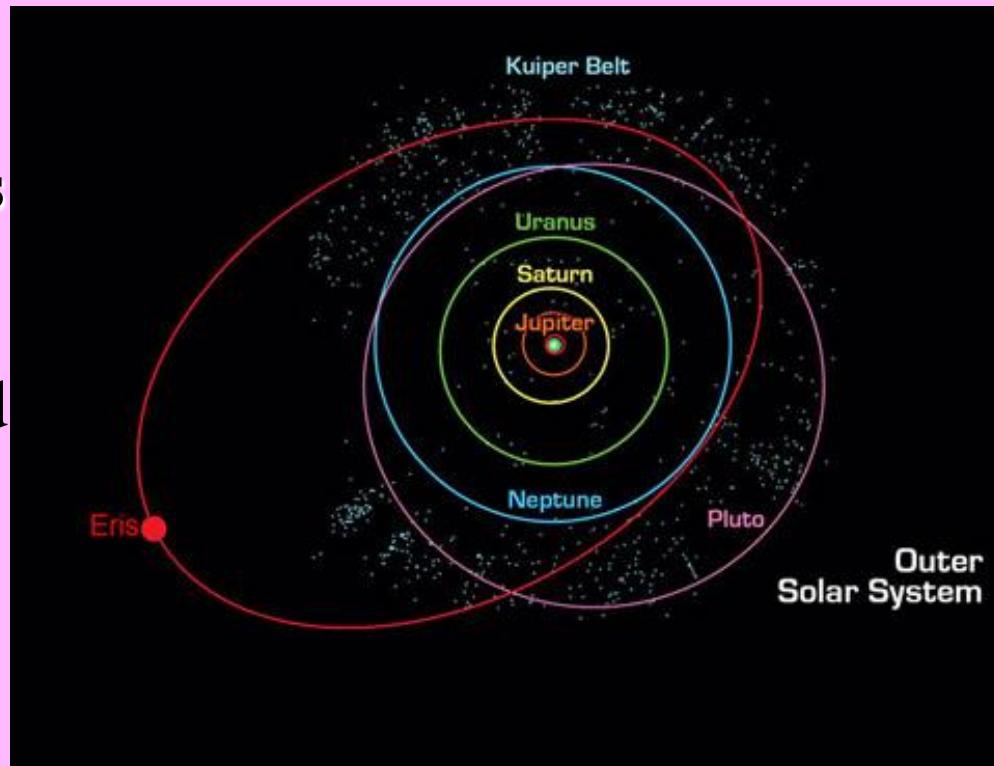


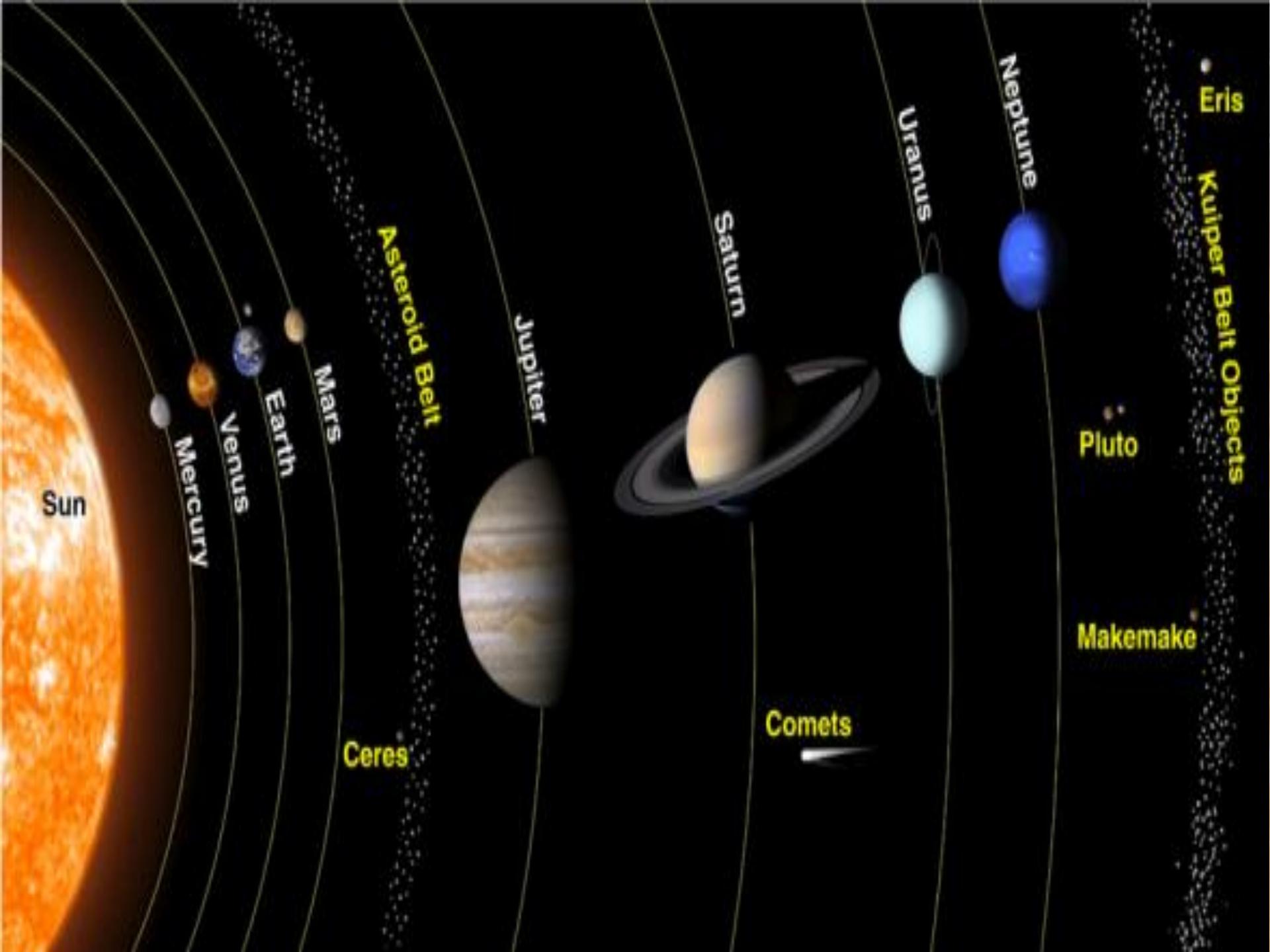
The New Solar System



Dwarf Planets

- Orbit the Sun.
- Have sufficient mass to assume a round shape.
- Have not cleared the neighborhood around its orbit.
 - Are not satellites.
- The first five recognized dwarf planets are Ceres, Pluto, Eris, Makemake, and Haumea
- whats a TNO? pluto why is it a dwarf planet?
 - elementay rap on plut lol
 - what planet is it?





Sun

Ceres

Mercury

Venus

Earth

Mars

Asteroid Belt

Jupiter

Saturn

Uranus

Neptune

Pluto

Makemake

Comets

Kuiper Belt Objects

Eris

The End