

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
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Earth	1 day/24 hr	1	365.25 days	1
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Jupiter	10 hours	5.2	12 earth years	63+
Saturn				
Uranus				
Neptune				

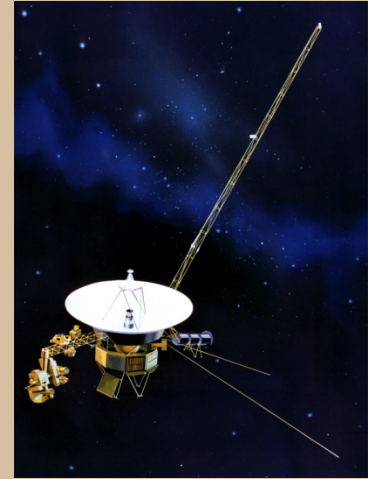
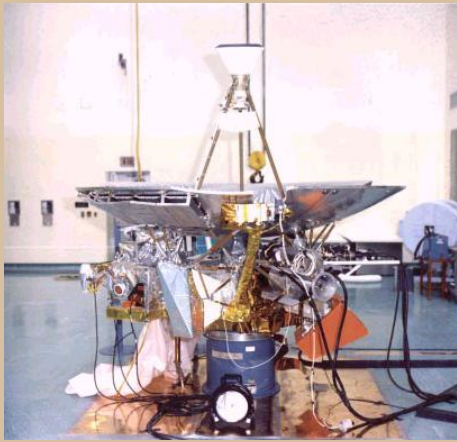
'HAVING A GAS! - HERE AT



THE GIANT PLANET

SIZE
OF
EARTH

Spacecraft to Jupiter



Fly-bys:

Pioneer 10 & 11 (1973 & 1974)

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

- **Ulysses (1992)**

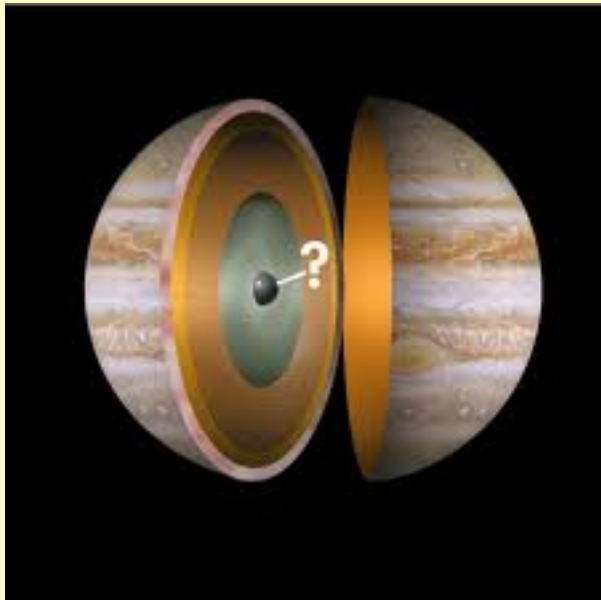
• Orbiters:

- **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

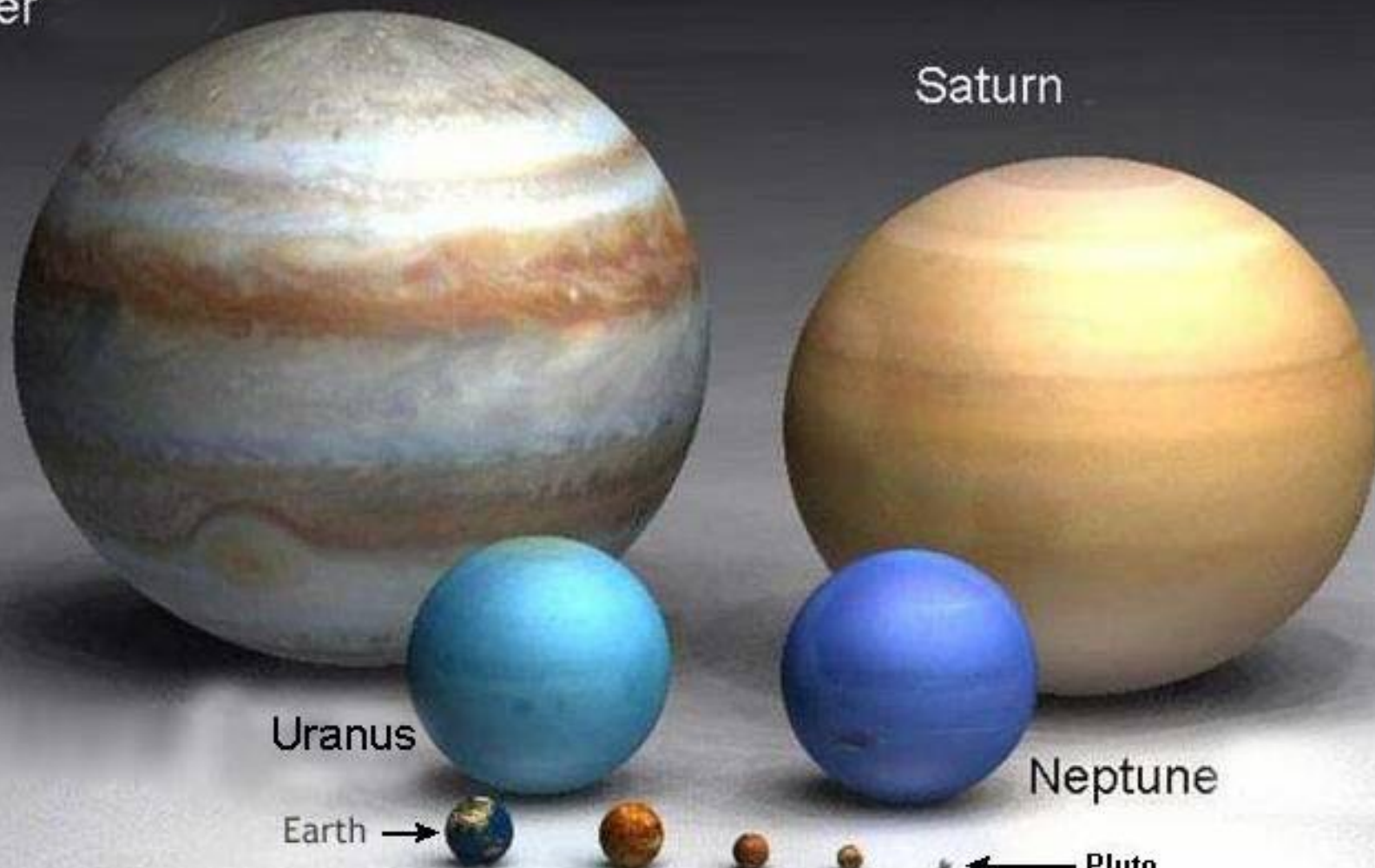
Saturn

Uranus

Neptune

Earth

Pluto



Great Red Spot (GRS)

Giant Storm
= 3 Earth
diameters.

Rotates once every 6 days

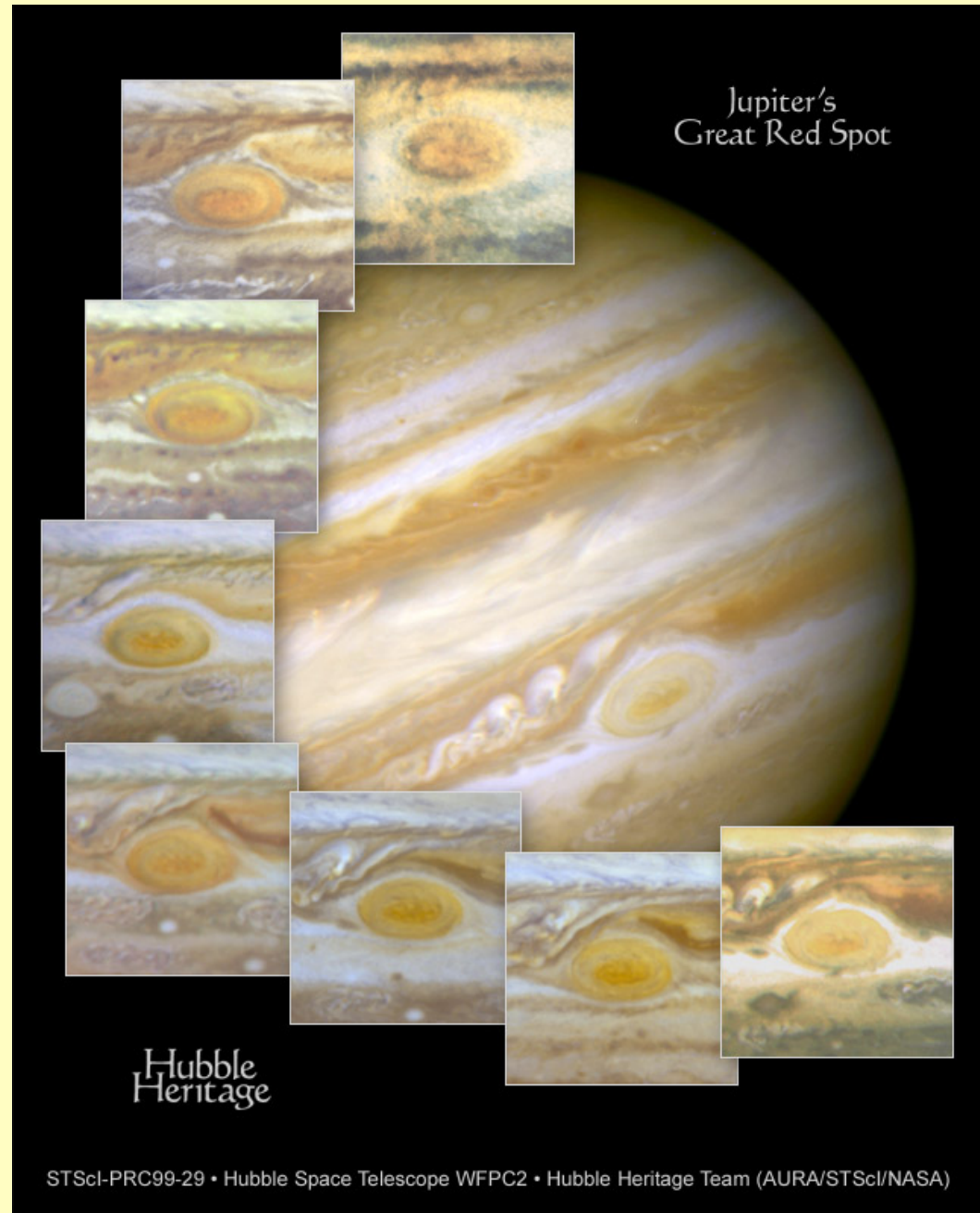
Red spot is changing colors

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

[http://www.nasa.gov/centers/goddard/images/
content/388625main_Jupiter_Approach.gif](http://www.nasa.gov/centers/goddard/images/content/388625main_Jupiter_Approach.gif)

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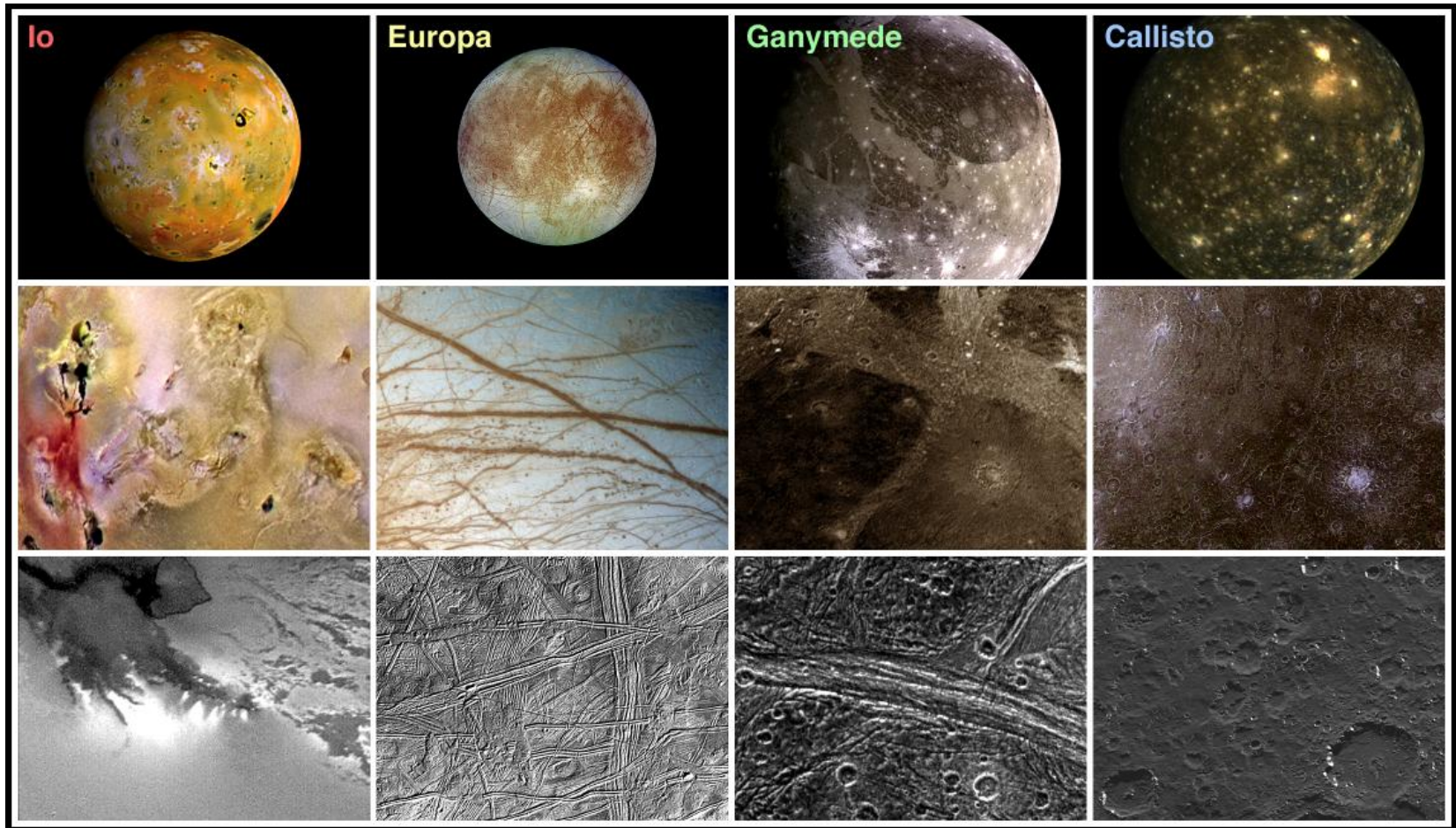


- jupiters lcloud sequence
- Jupiter's polar vortex
- comet shoemaker-levy crashes into jupiter

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

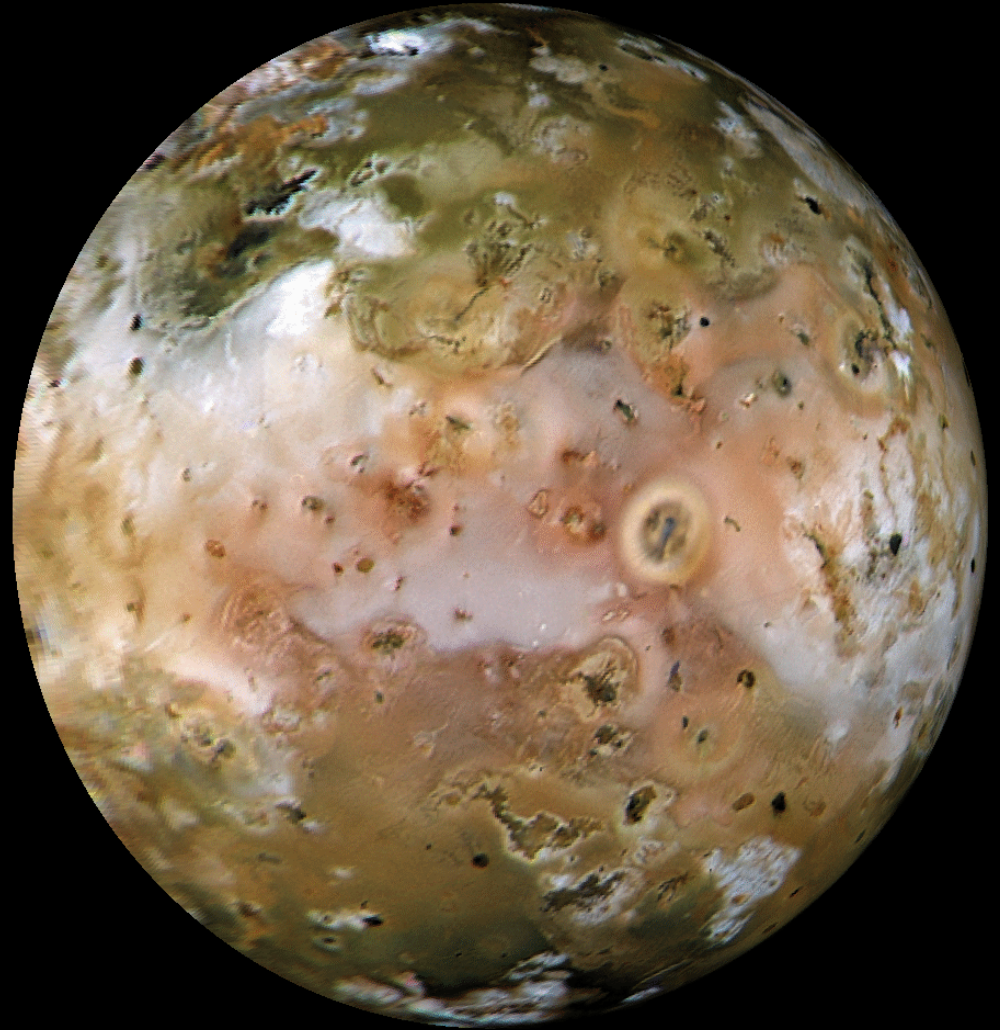
- **Hot, Molten Interior**
- **LOTS OF SULFUR**
- **Continuously resurfaced by lava flows**



Global View

http://www.nasa.gov/centers/goddard/m388623main_Io-rotates.mpg

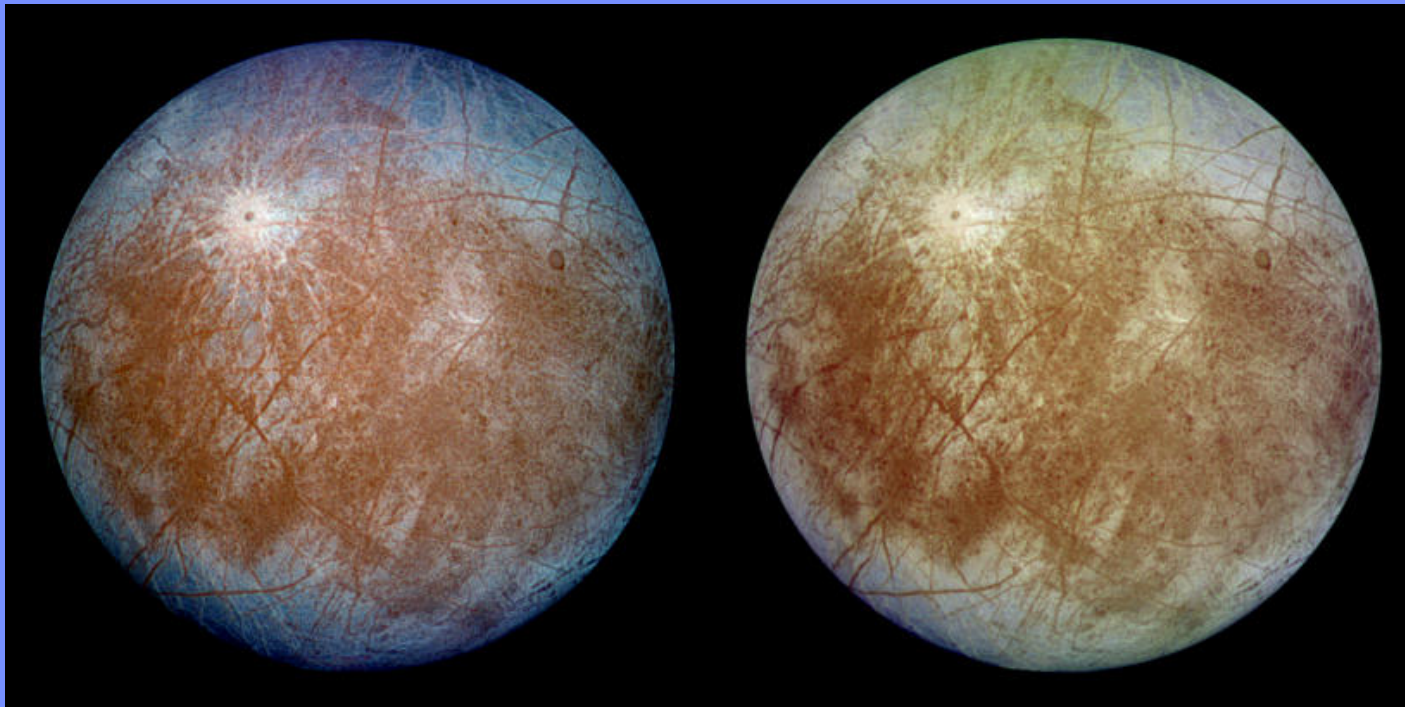
[Io rotates](#)



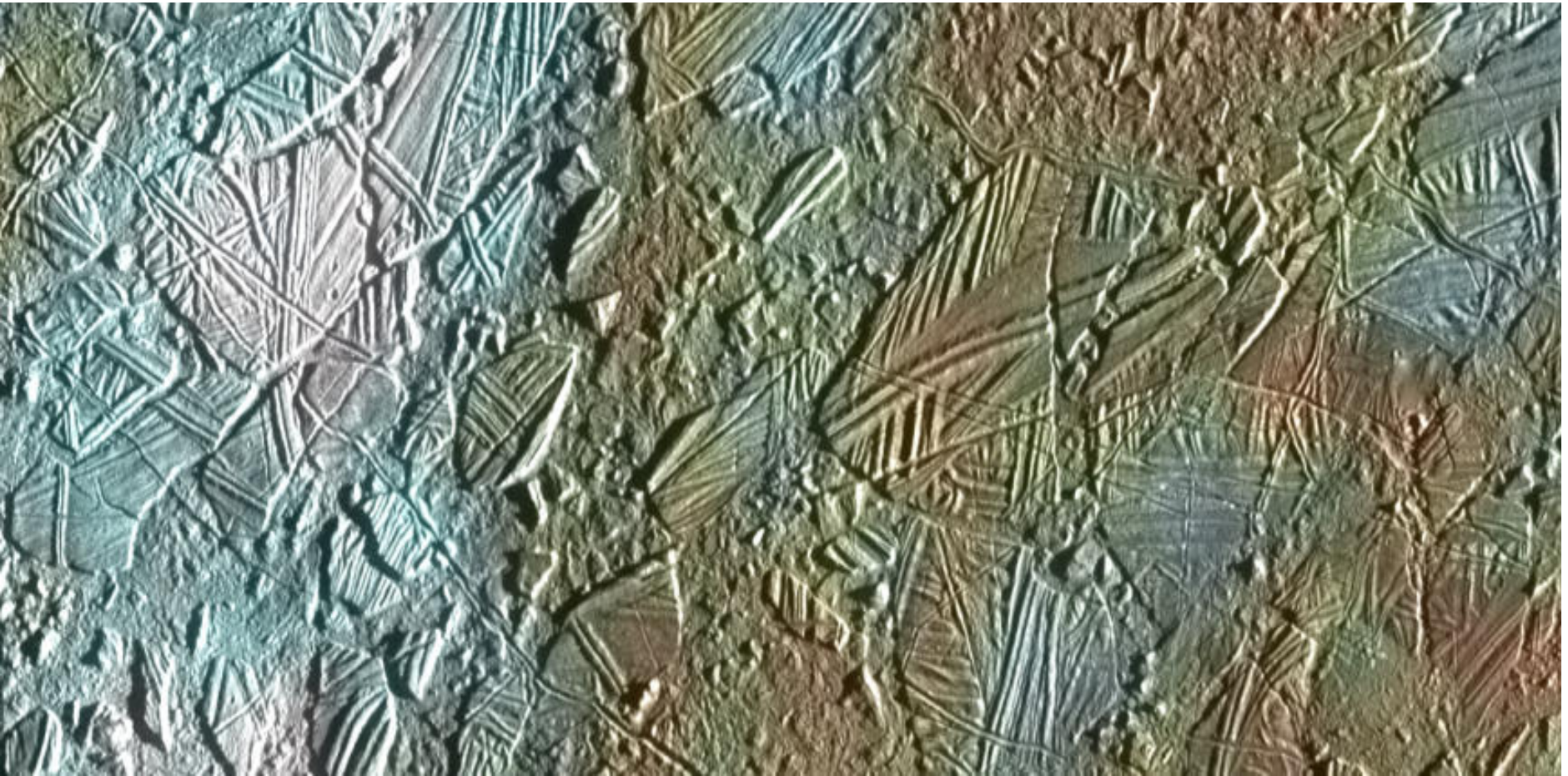
Europa

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

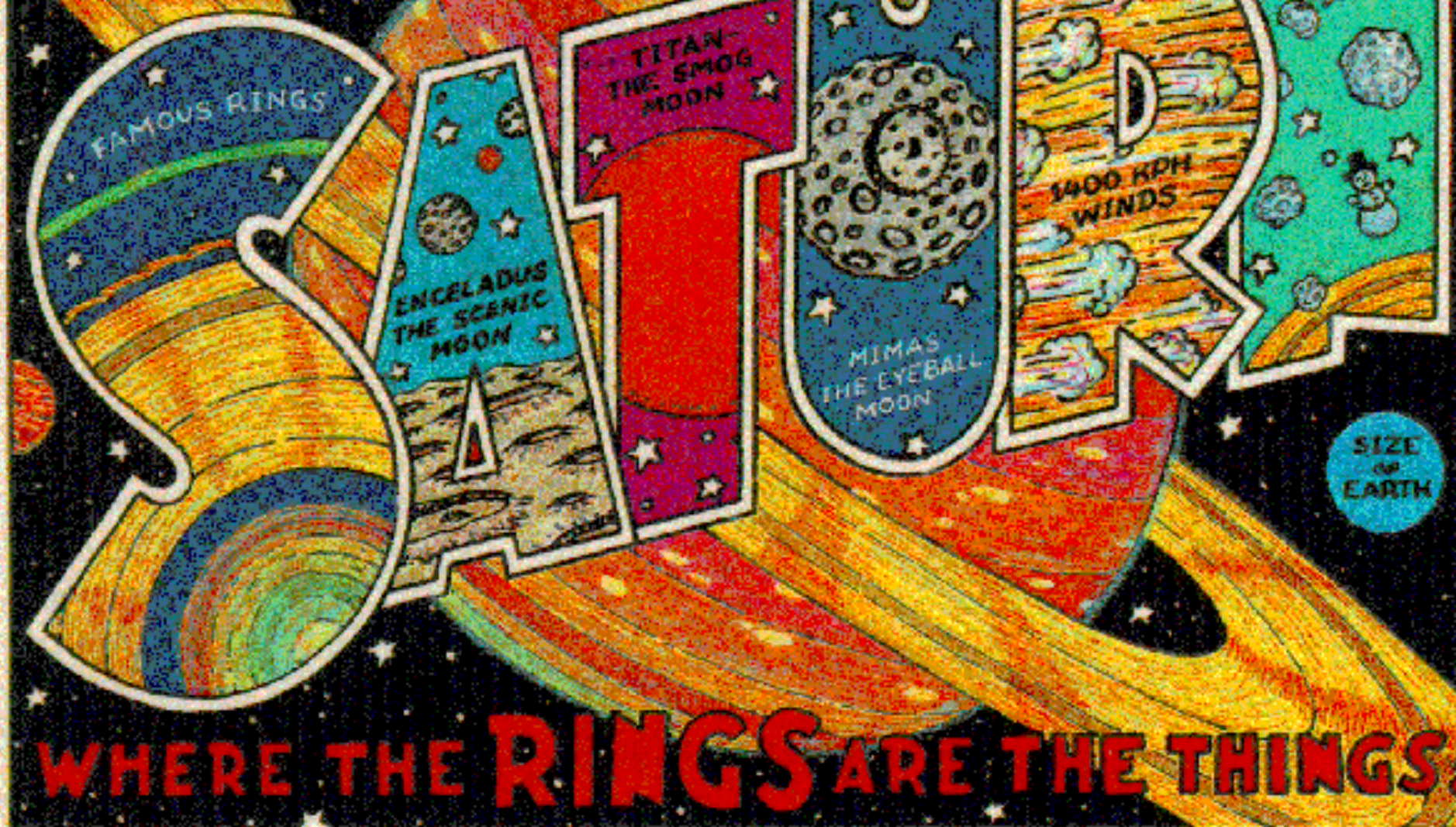
Geologically dead.....

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

callisto rotating in space



GREETINGS from



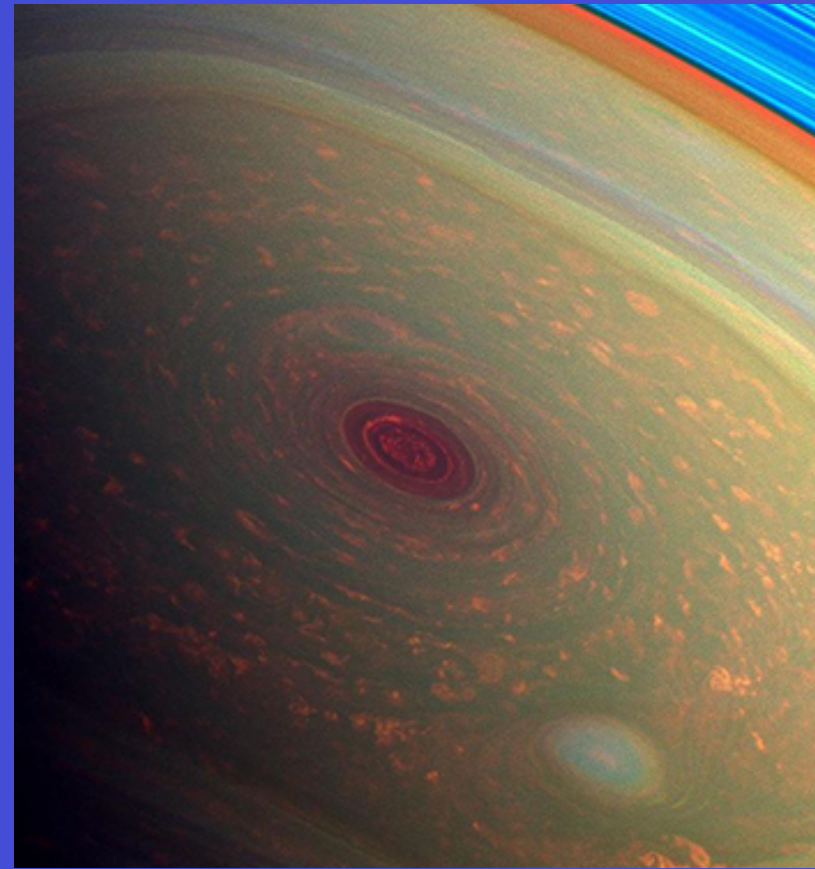
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Uranus				
Neptune				

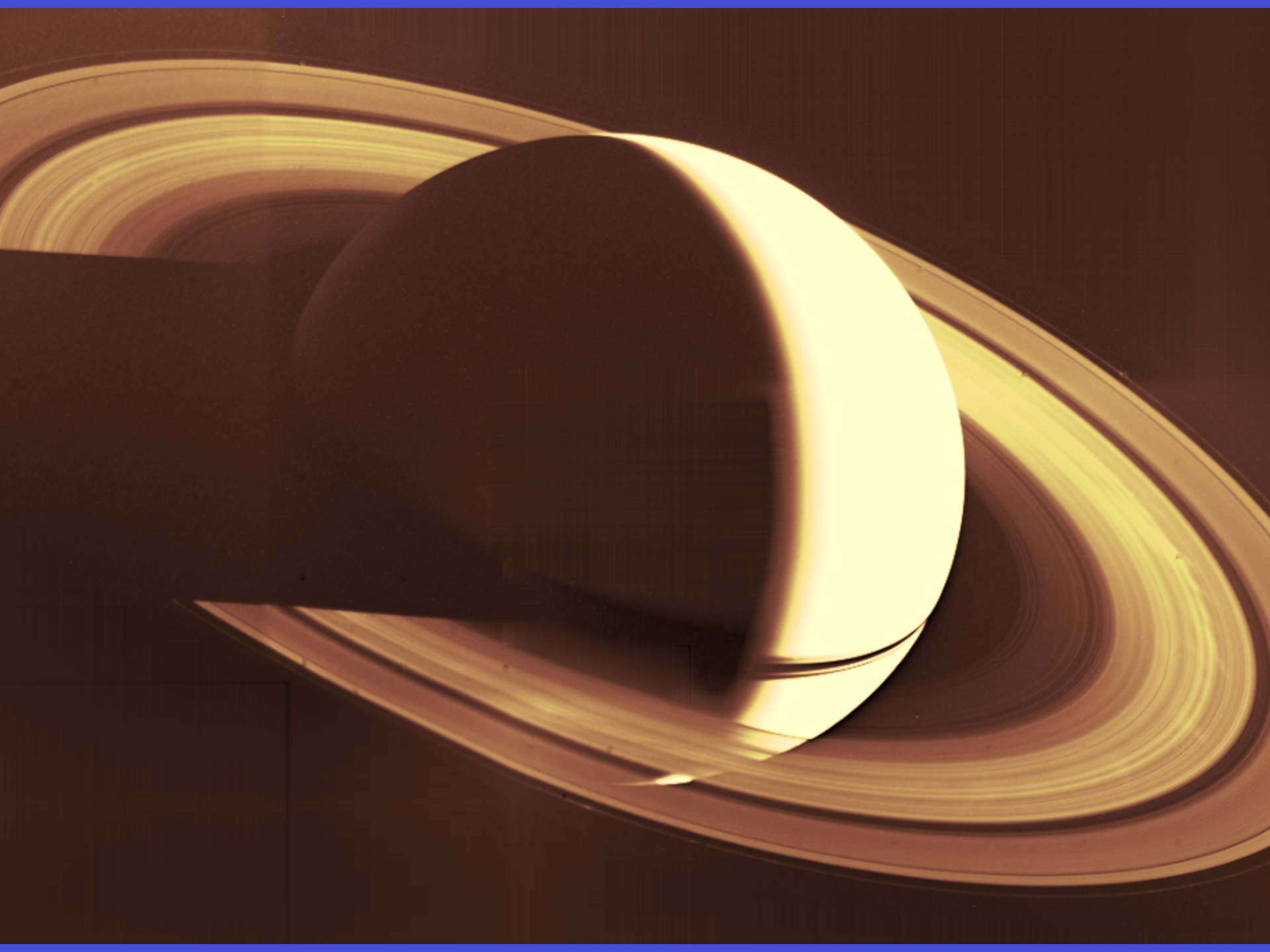
Second largest planet

Facts of Saturn

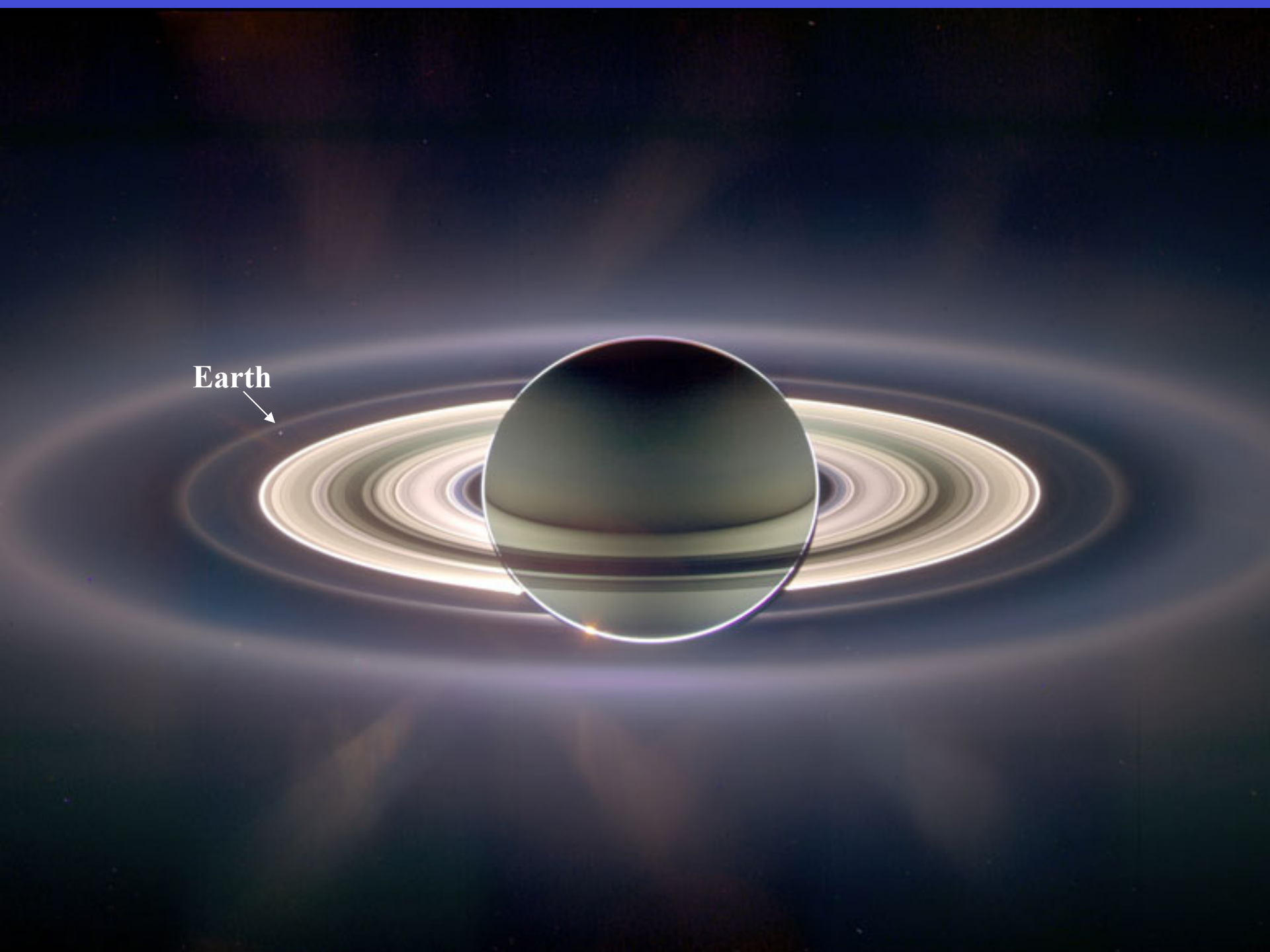
- Density: 0.7 g/cm^3 ...it would float in water :lowest density
- Orbited by Cassini – starting April 2017, Cassini will begin its final descent into the planet - and still sending us footage as it plunges

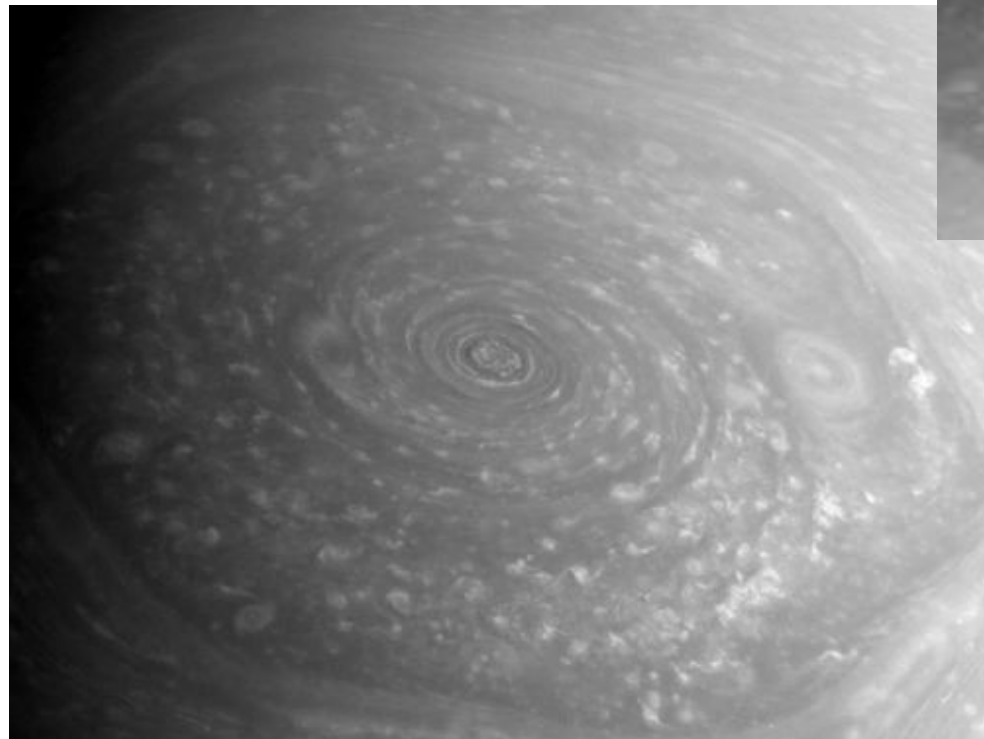
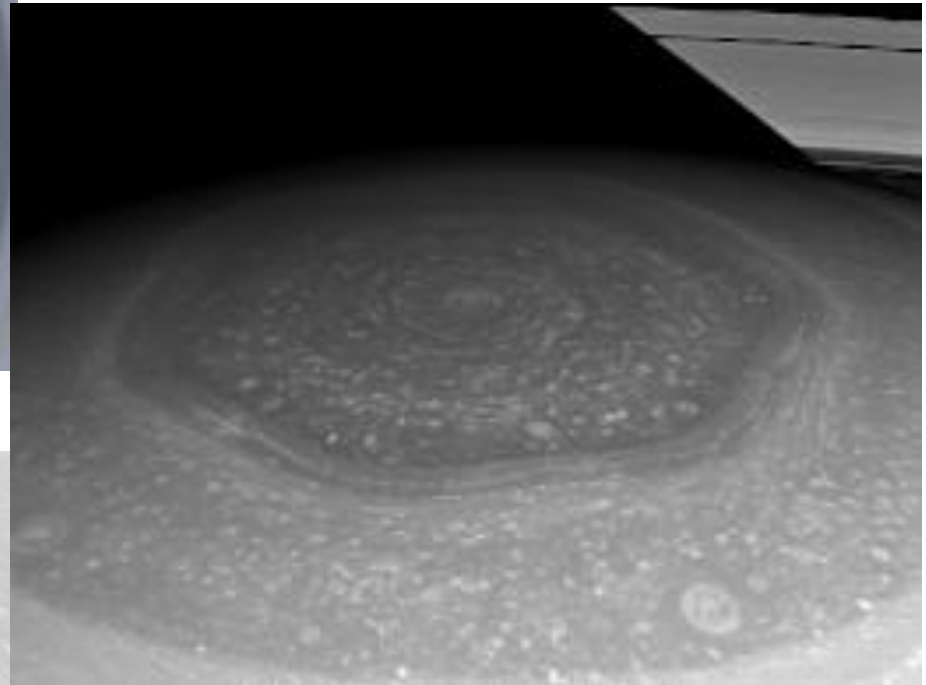


57 Moons

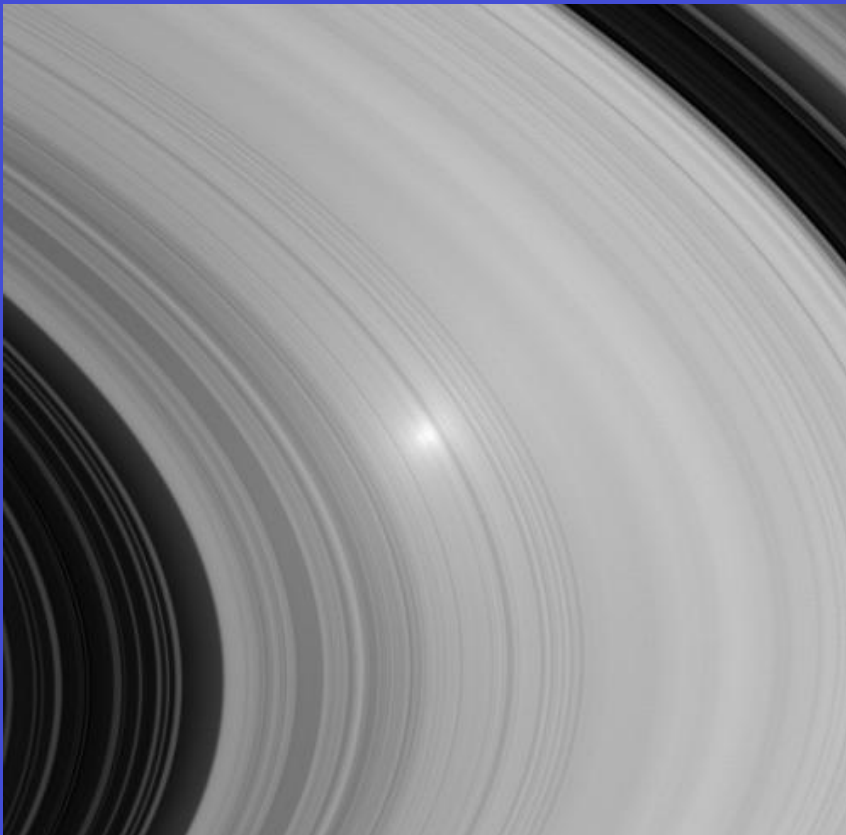


Earth





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



- fly through space

Rings

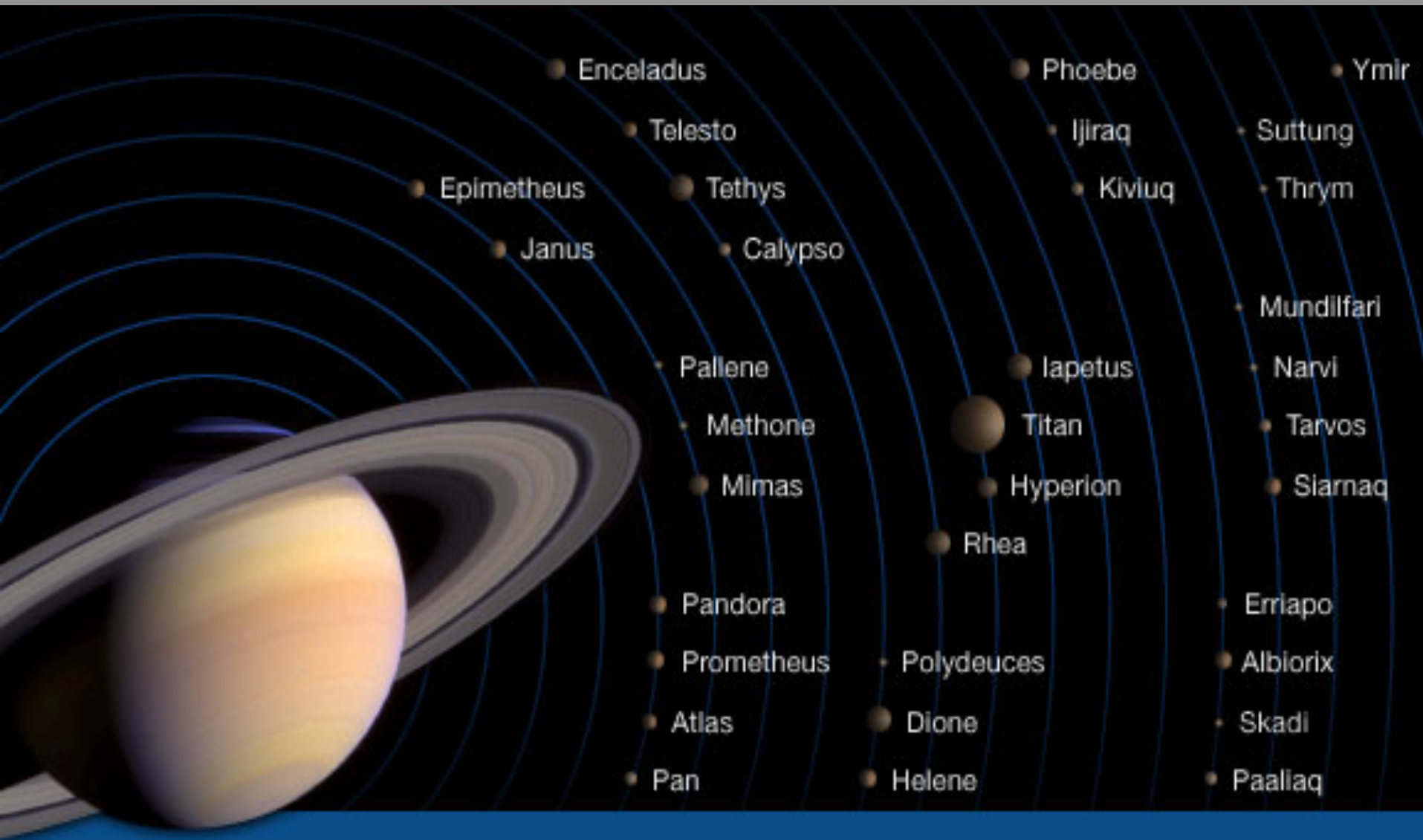
Made of ice and rock

Biggest rings of any planet

Saturn

Long video of saturn

The Saturn System: 57 Known Satellites



DOWN IS UP ON



THE SIDEWAYS PLANET

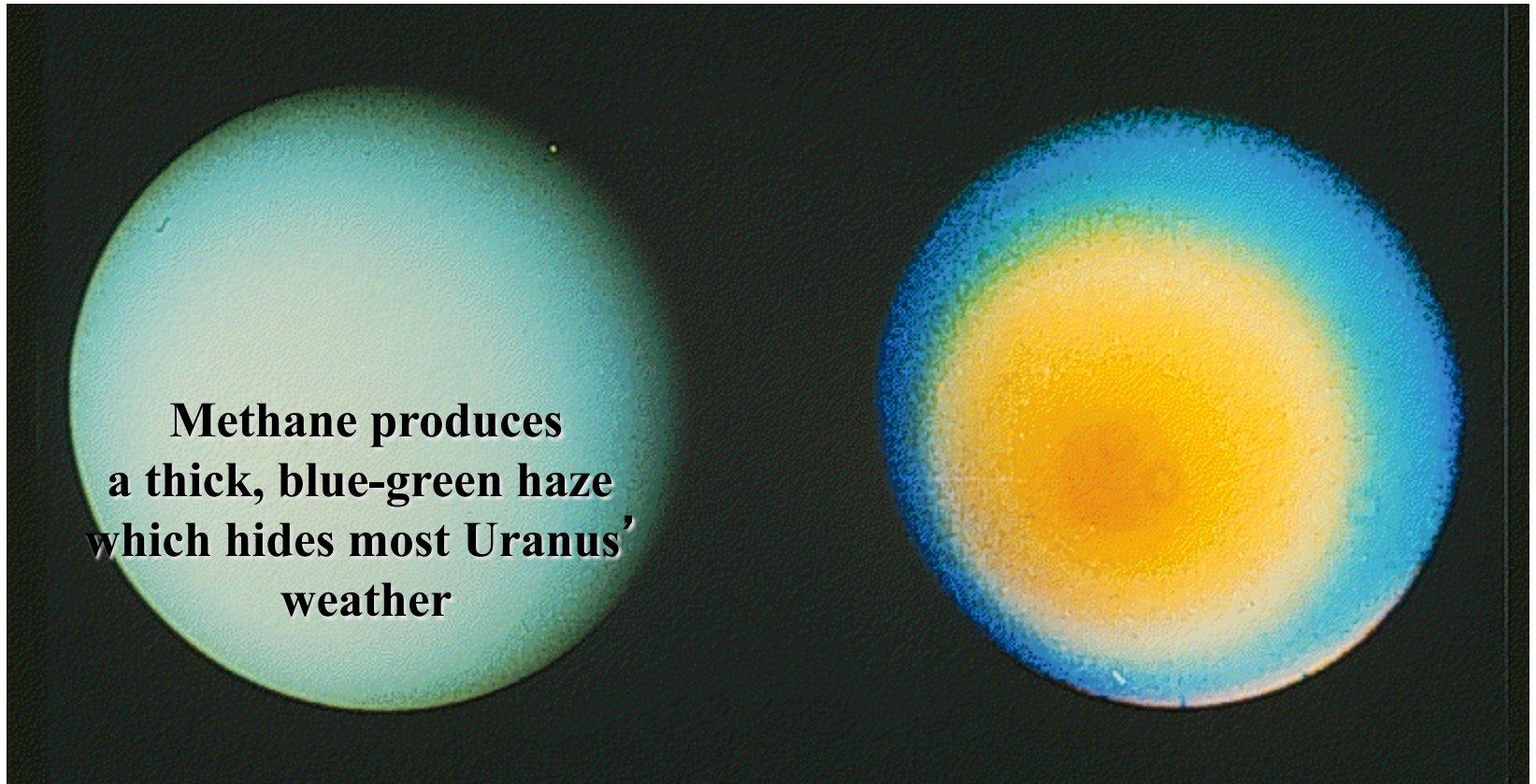
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Neptune				


Uranus' twin planet = Neptune

Chemical Composition of Uranus' Atmosphere



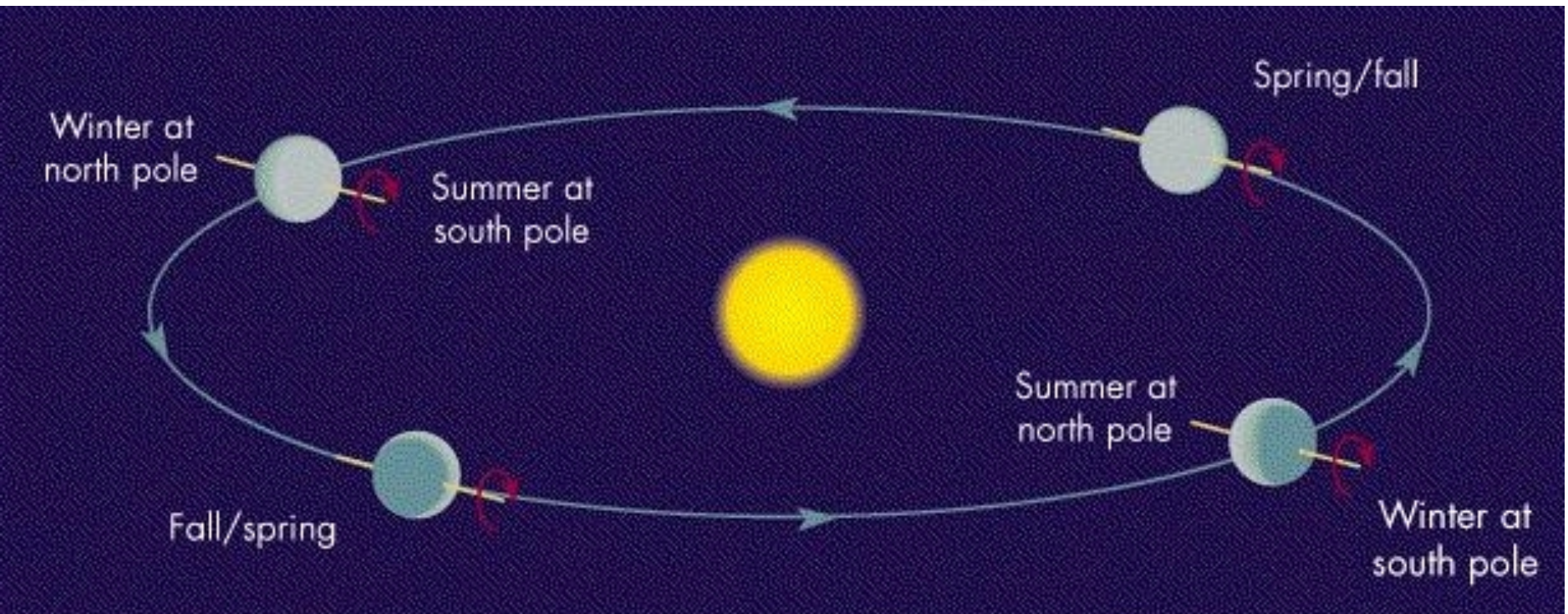
**Methane produces
a thick, blue-green haze
which hides most Uranus'
weather**

**A photochemical haze (smog)
collects at the polar regions**

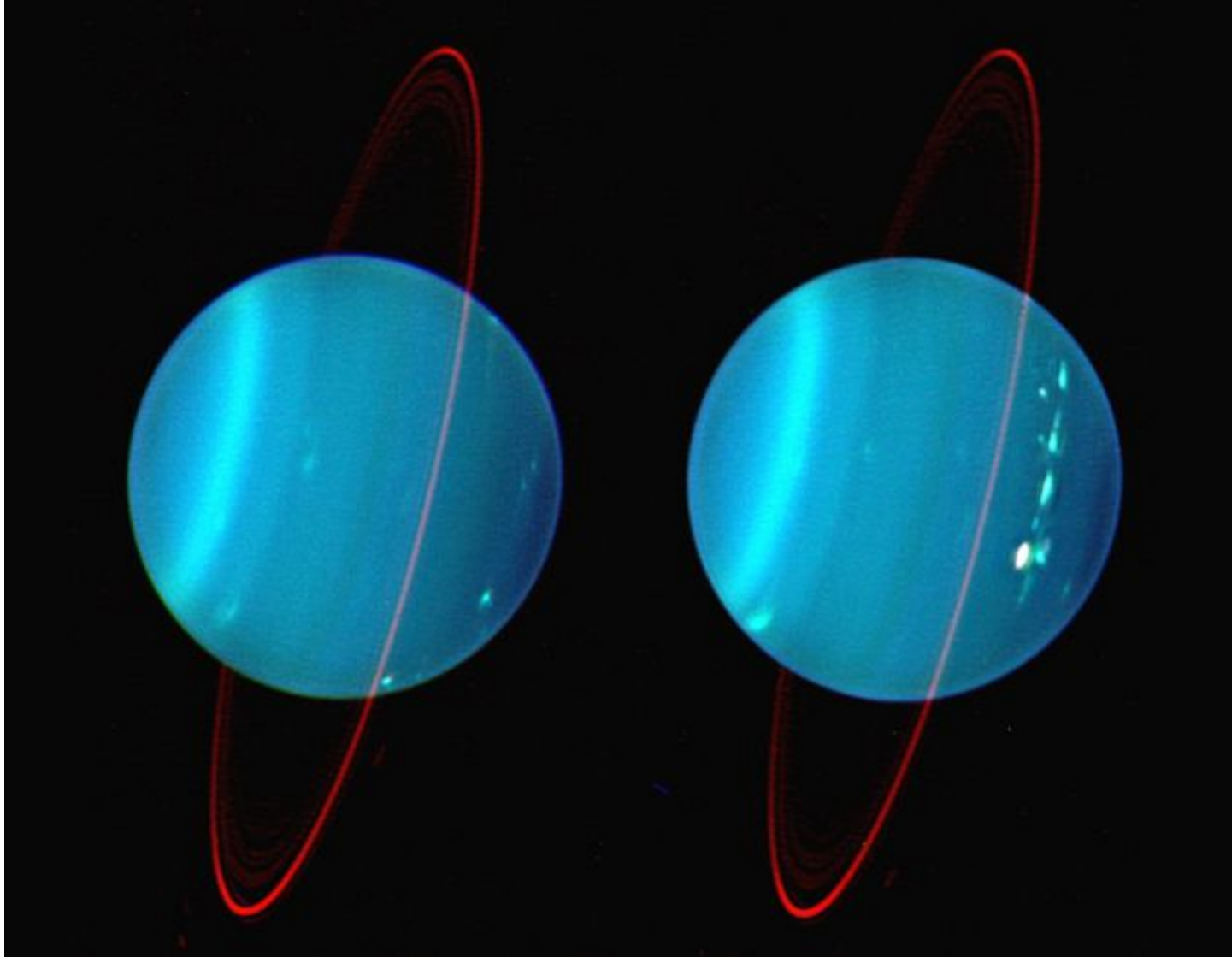


Uranus... is traditionally
known as the
“Featureless Disc”.....
space school

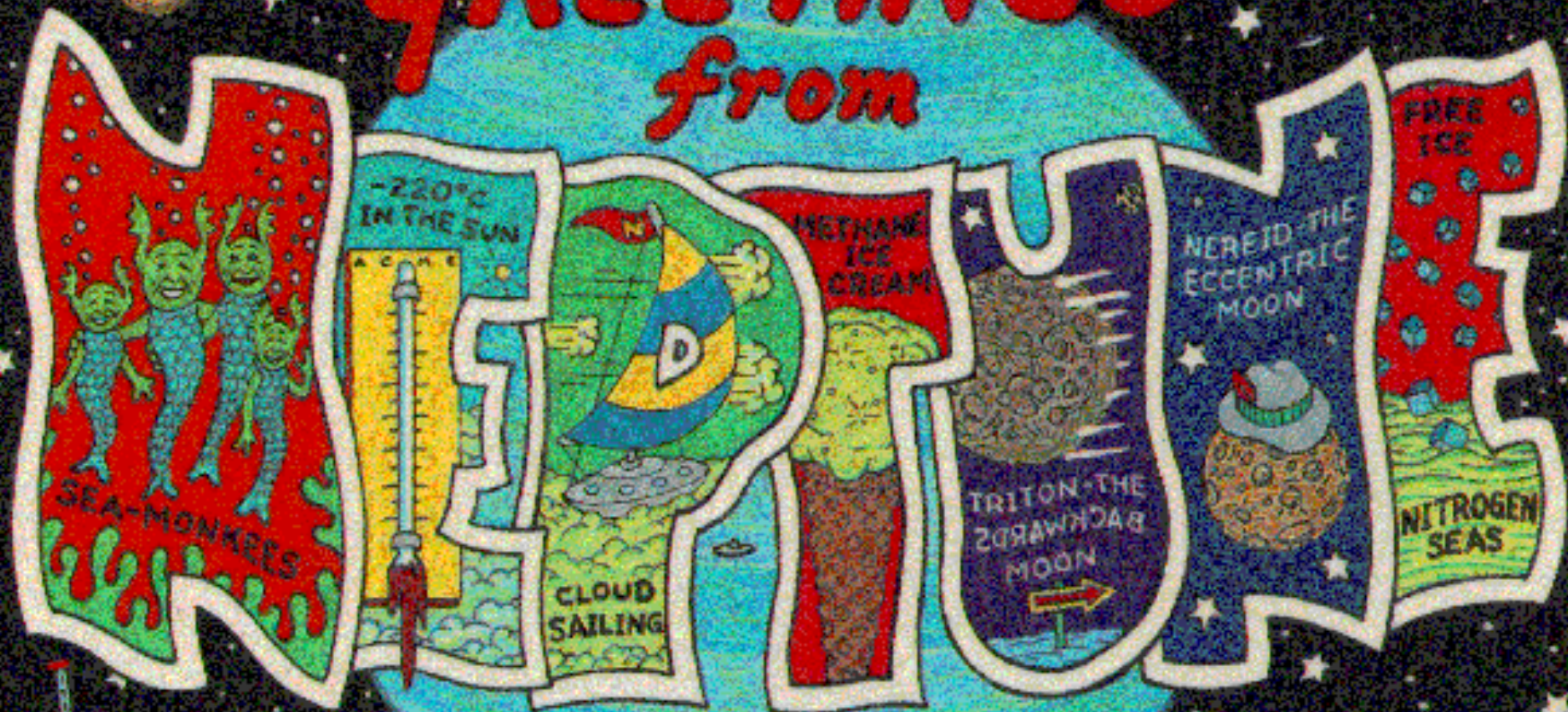
An axial tilt 98° creates “extreme” seasons (rotates on its side)



HST view of Uranus' ring system



GREETINGS
from



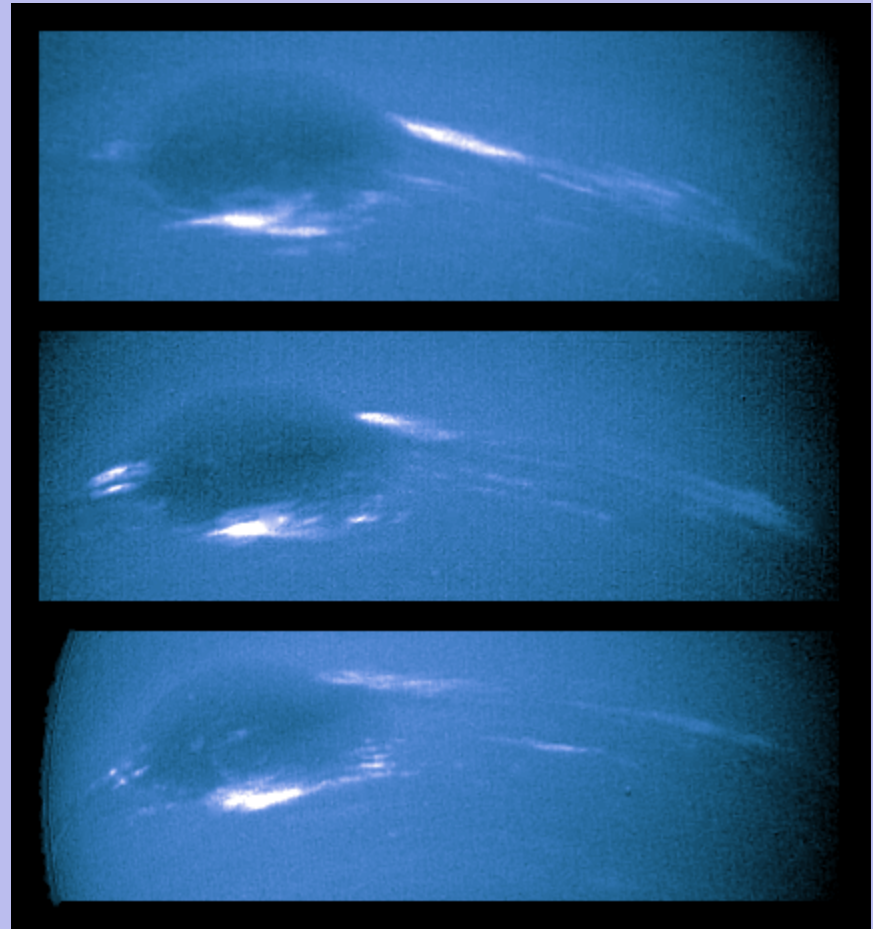
THE LAST GAS PLANET

SIZE
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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

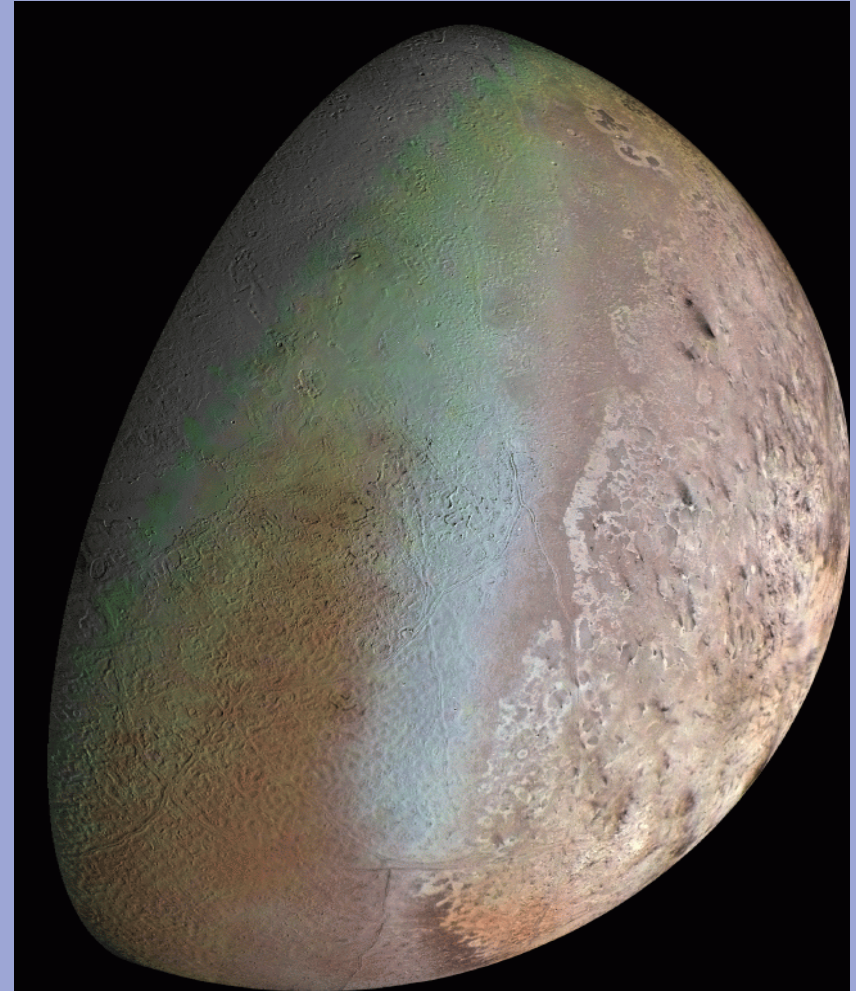
neptune facts and
photospace school

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](#)

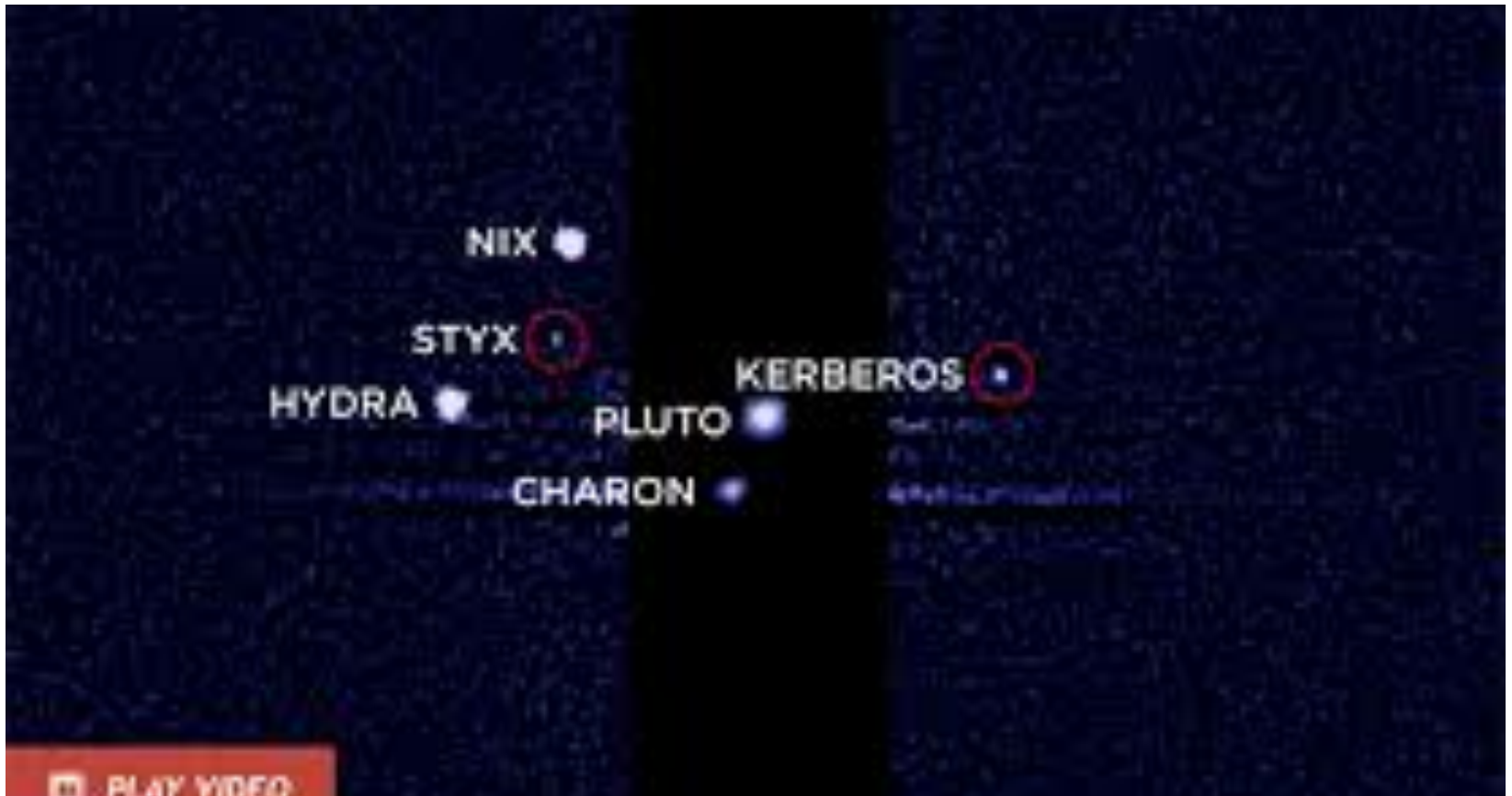


Dwarf Planets

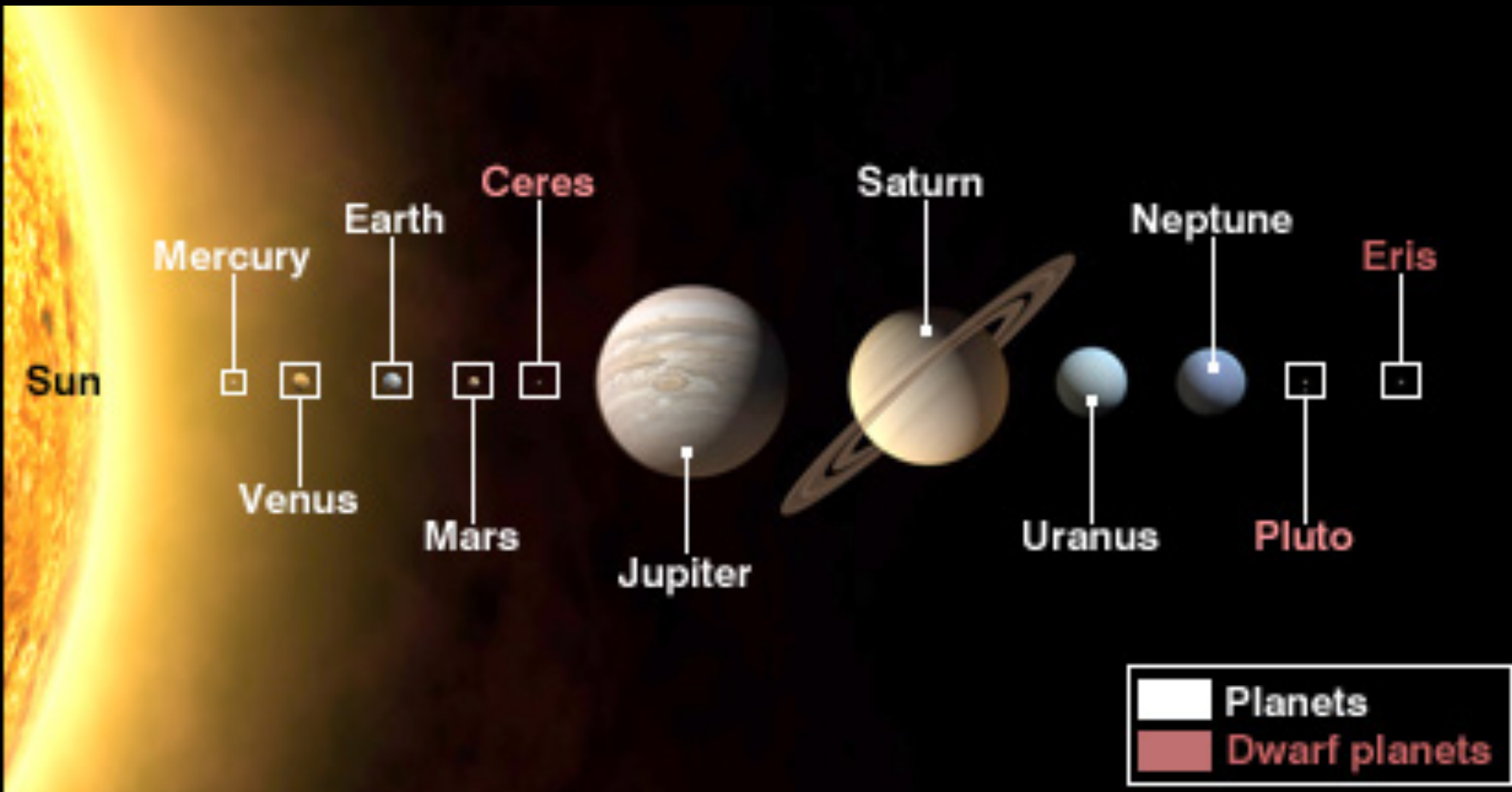


Pluto, Eris and Ceres, Makemake, and
Haumea

Latest news on Pluto and plutoids.



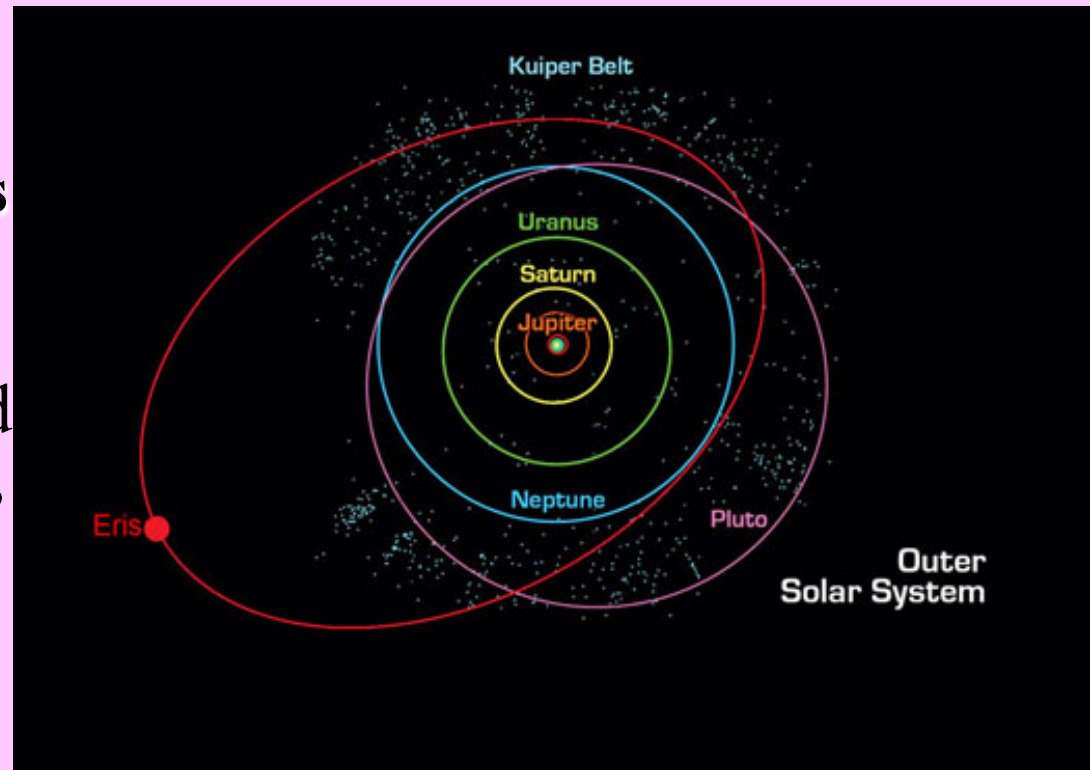
The New Solar System

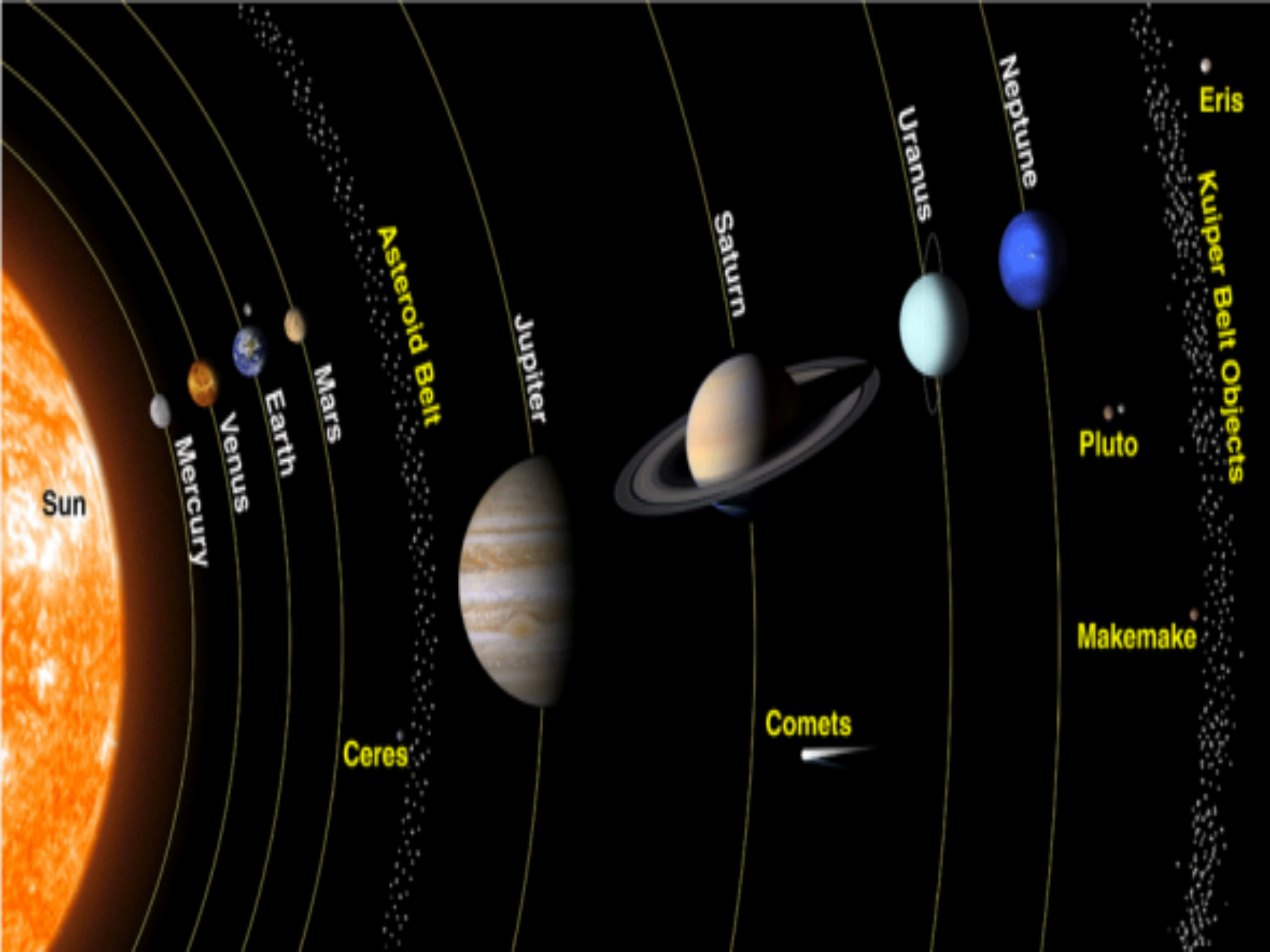


Dwarf Planets

- 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?





The End