



Summary:

- Rocky planets
- Gas giants
- Internal Structure
- Atmospheres (a tiny bit)



The Planets



© Dimitrios Theodorakis GNU General Public License v3.0
<https://github.com/AstroDimitrios/Astronomy>

Recap

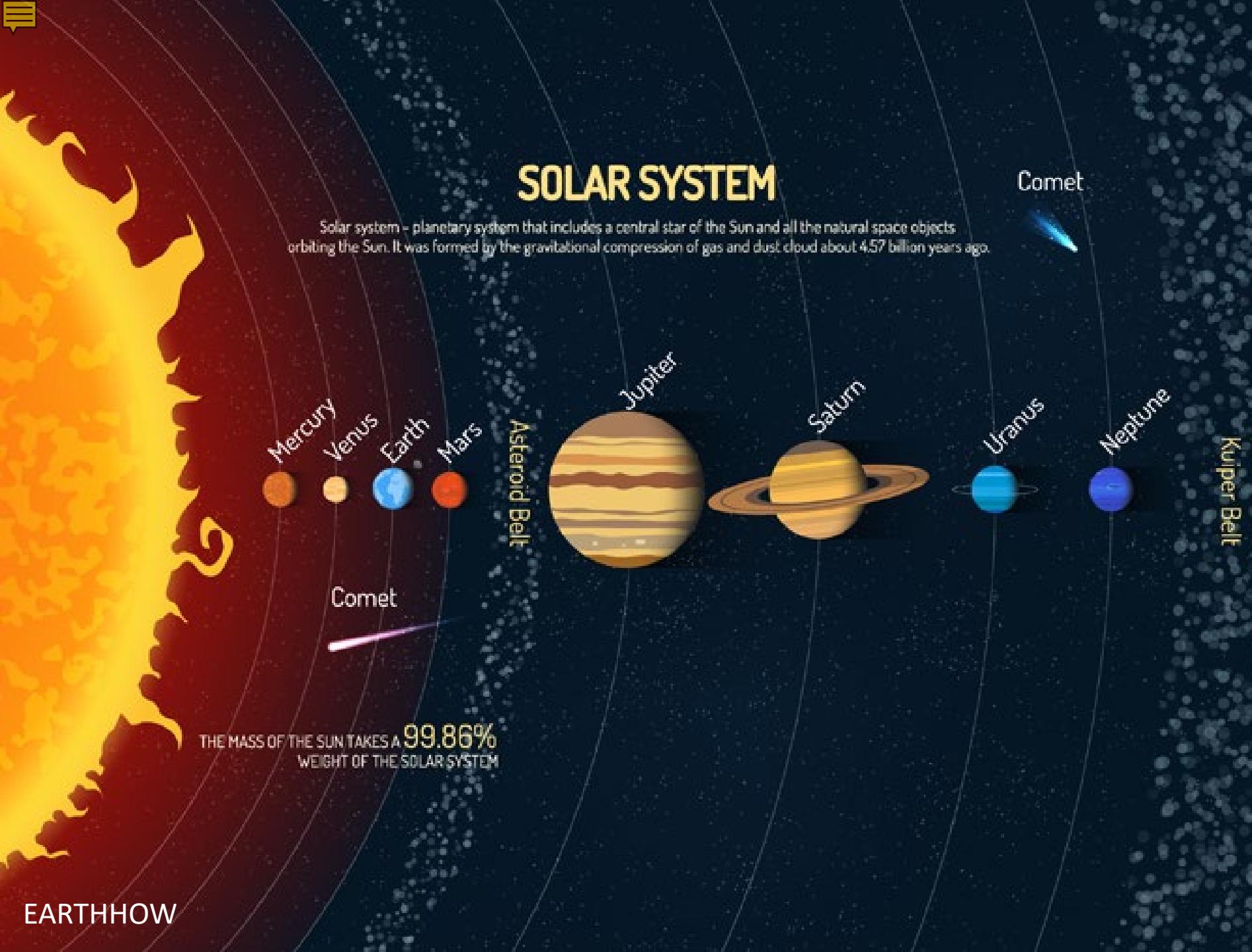


- 1. What lies in-between Mars and Jupiter?**

- 2. Where is the edge of the solar system?**

- 3. What happened when Uranus and Neptune swapped positions during the formation of the SS?**



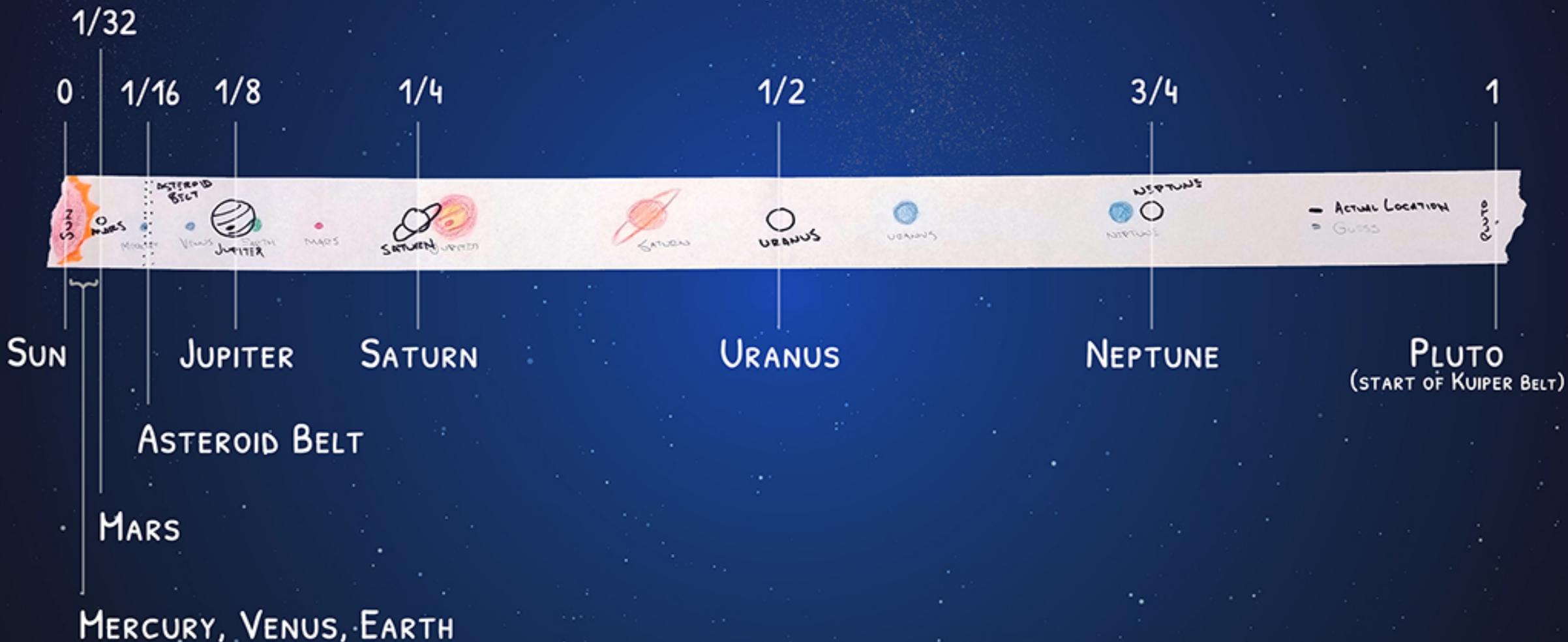


Not to Scale!



Jet Propulsion Laboratory
California Institute of Technology

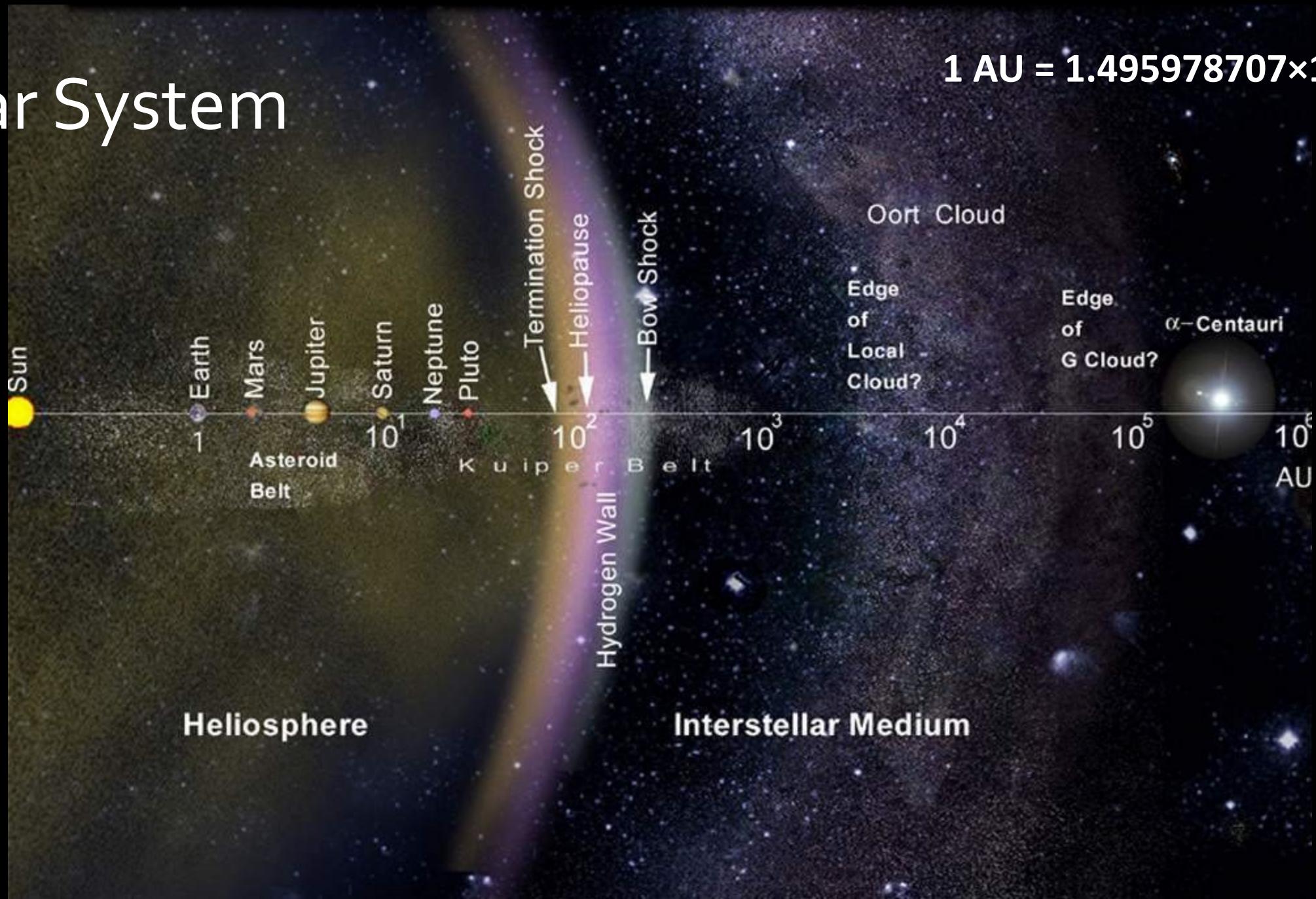
SOLAR SYSTEM SCROLL
JPL.NASA.GOV/EDU





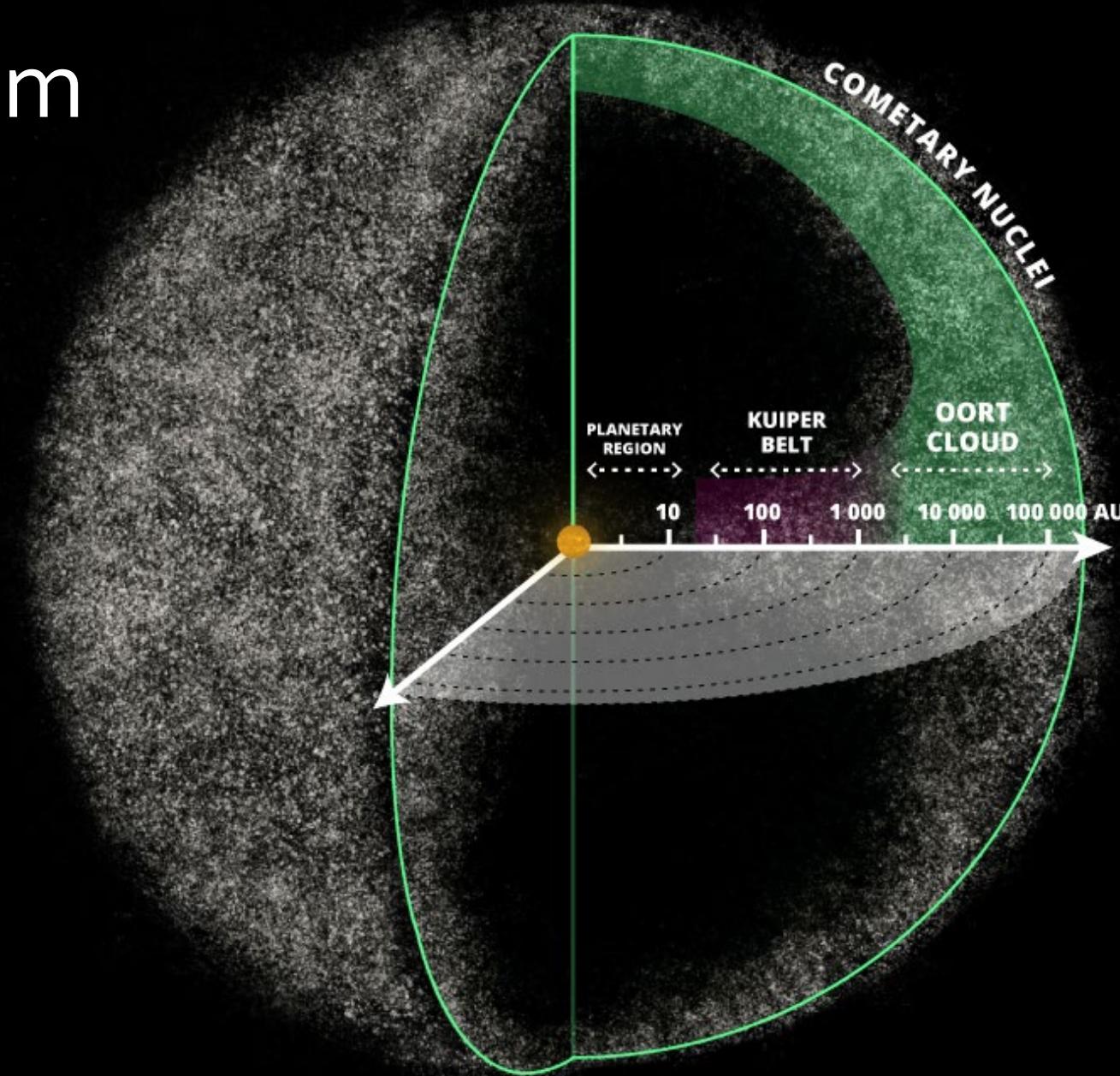
Solar System

$$1 \text{ AU} = 1.495978707 \times 10^{11} \text{ m}$$

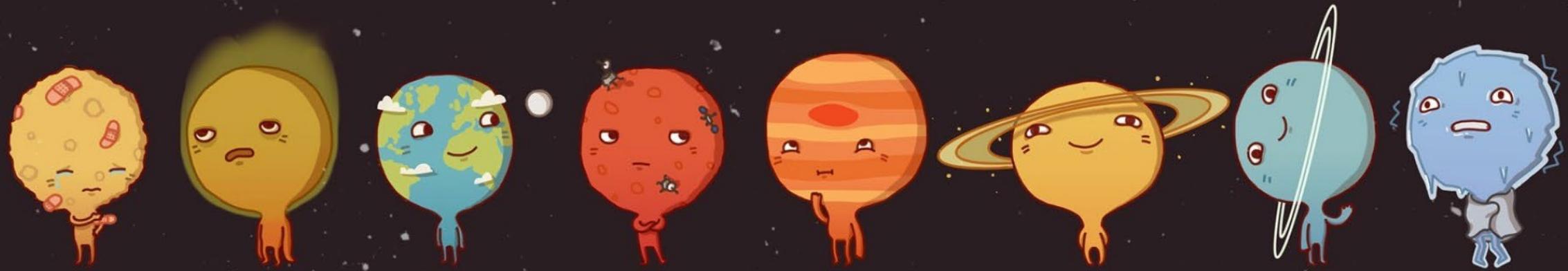




Solar System



There are 8 planets!



Mercury

Venus

Earth

Mars

Jupiter

Saturn

Uranus

Neptune

My

Vicious

Earthworm

Might

Just

Swallow

Us

Now





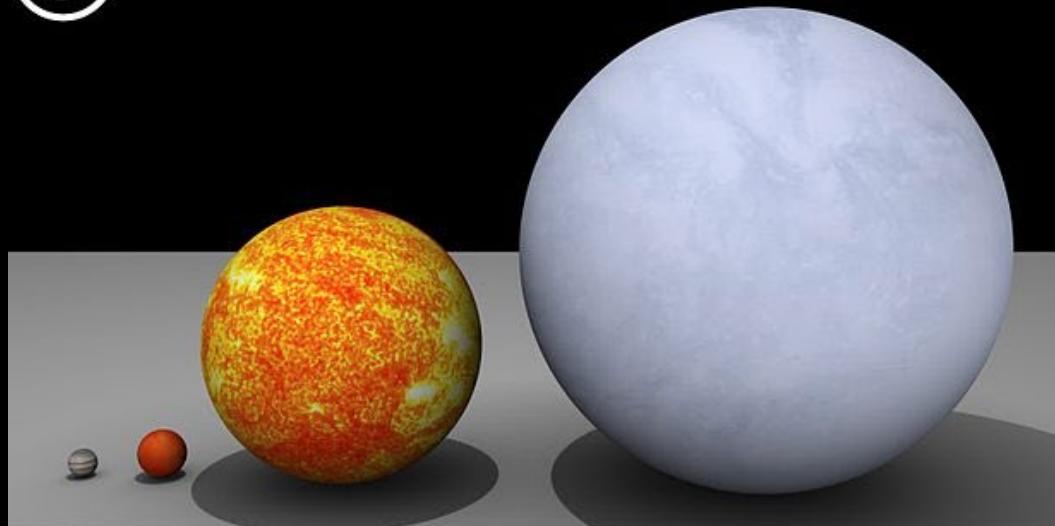
① Mercury < Mars < Venus < Earth



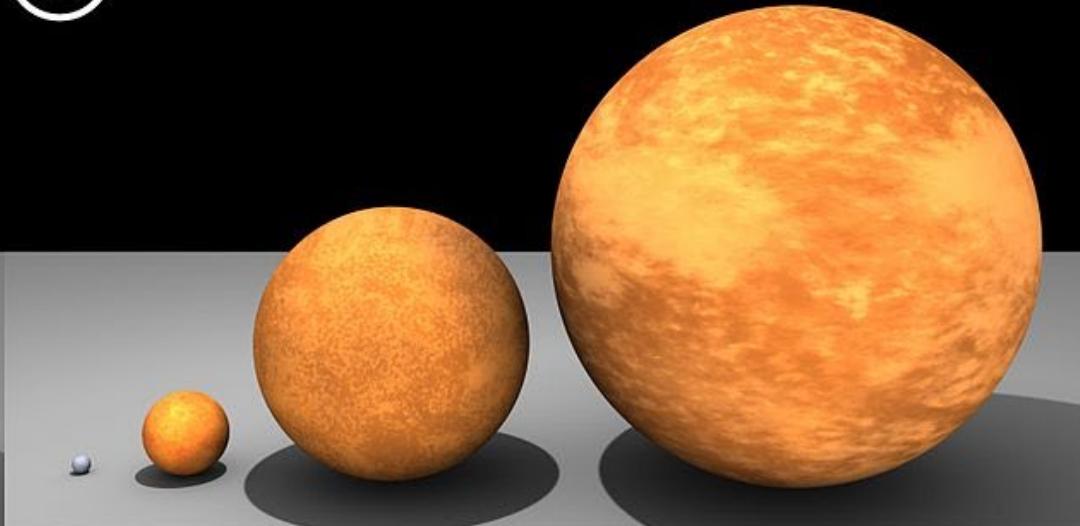
② Earth < Neptune < Uranus < Saturn < Jupiter



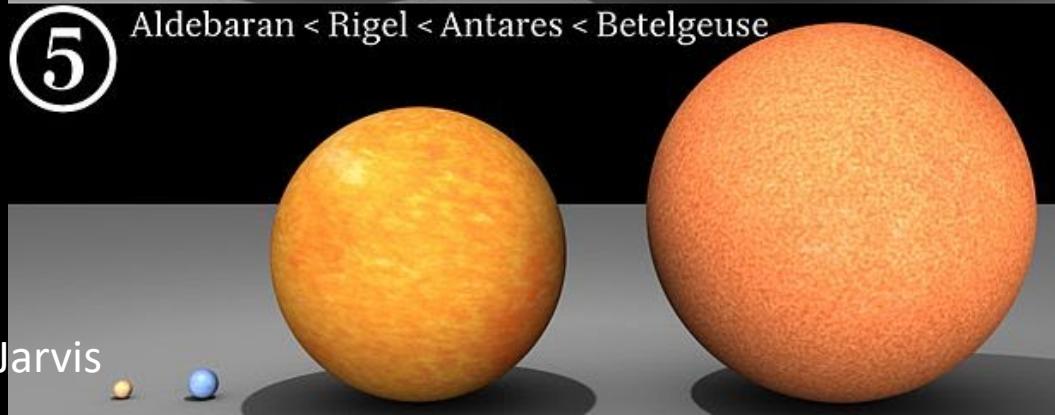
③ Jupiter < Wolf 359 < Sun < Sirius



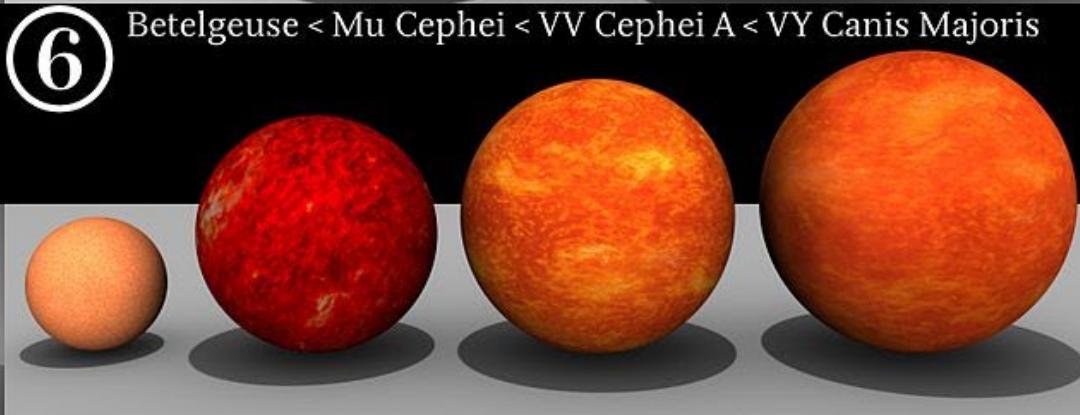
④ Sirius < Pollux < Arcturus < Aldebaran



⑤ Aldebaran < Rigel < Antares < Betelgeuse

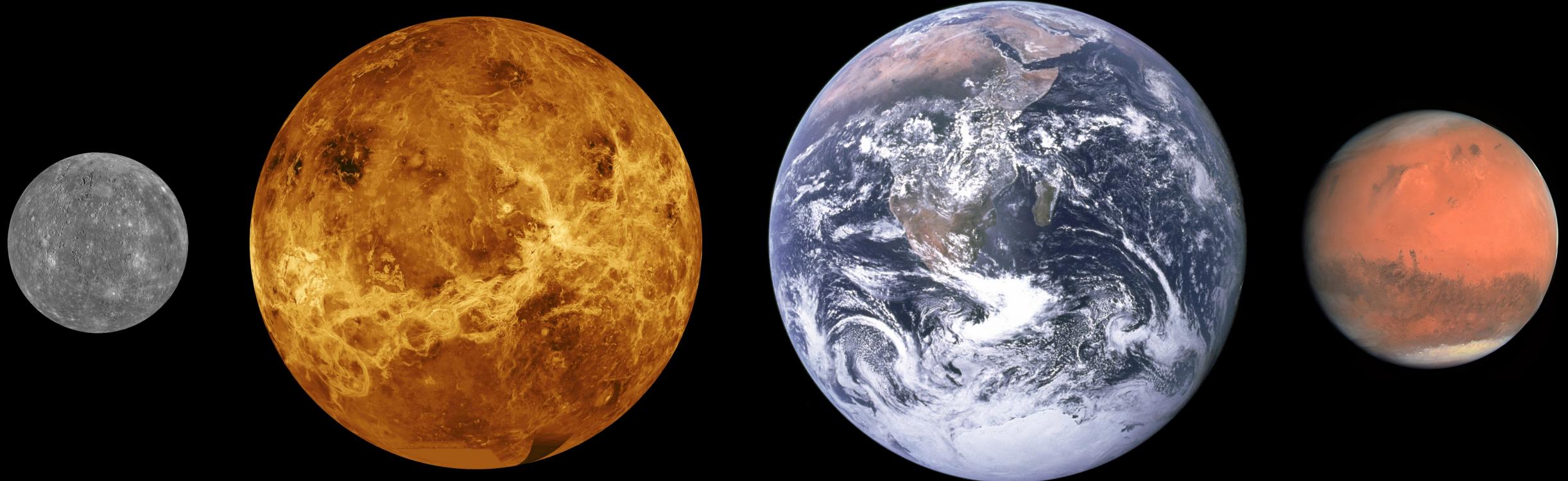


⑥ Betelgeuse < Mu Cephei < VV Cephei A < VY Canis Majoris



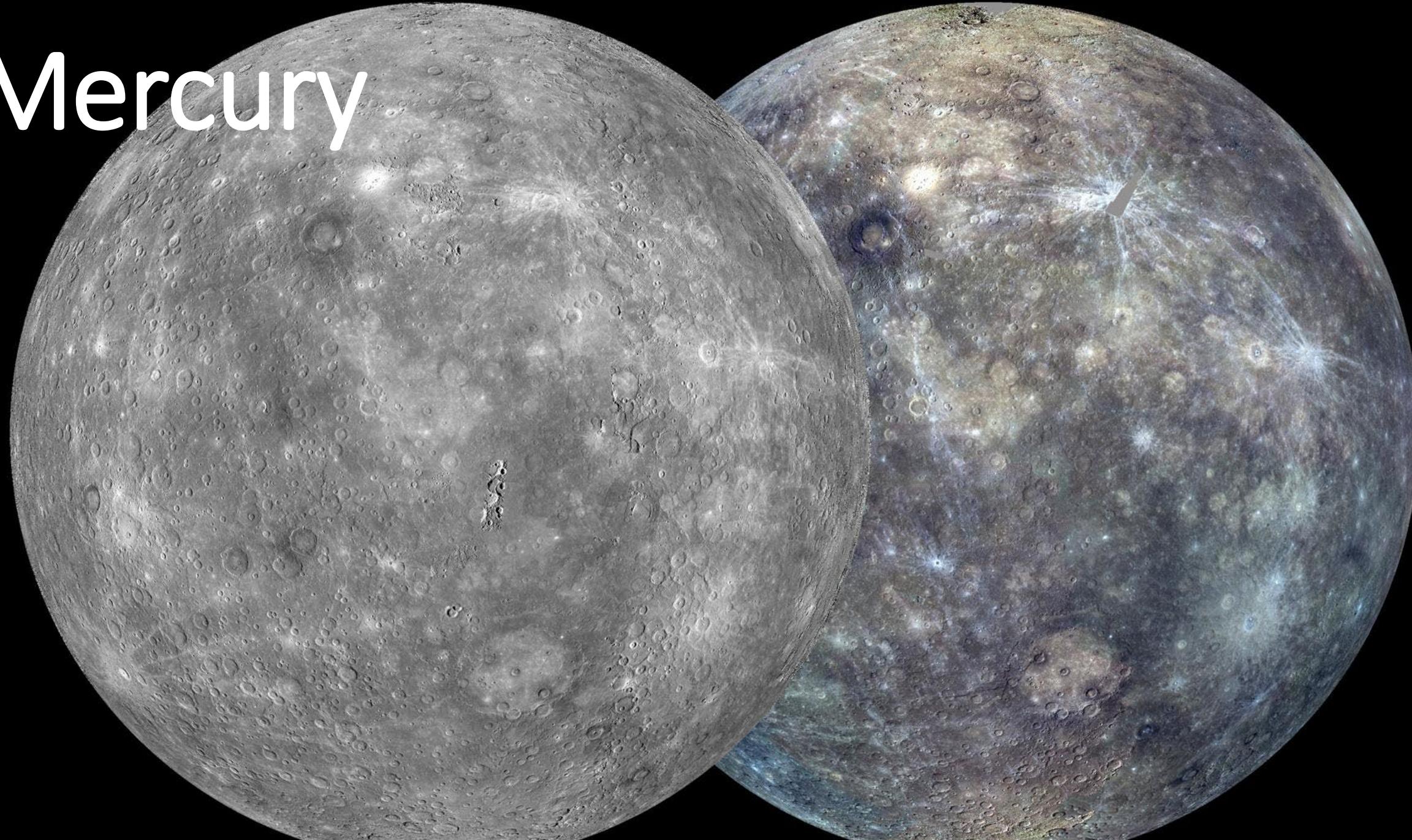


The Rocky Planets



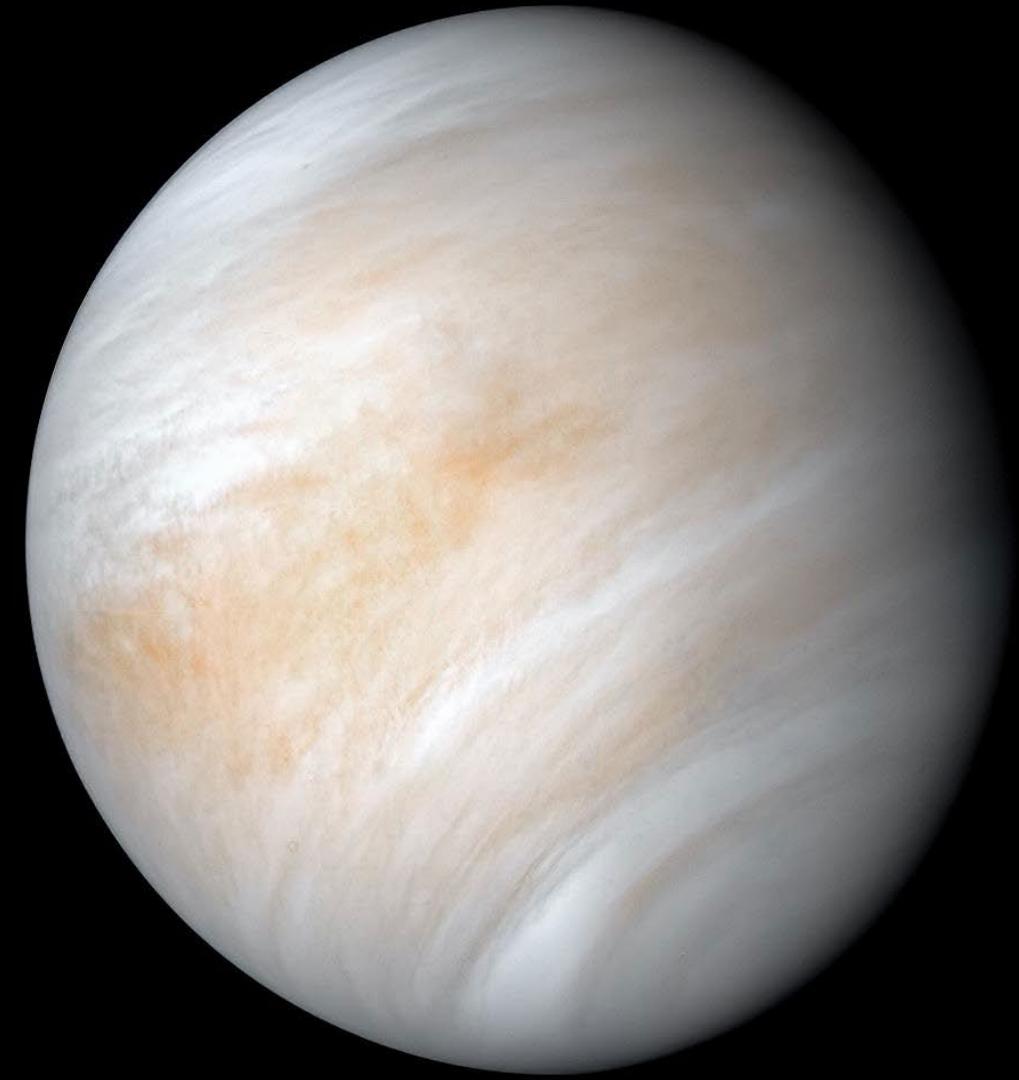


Mercury





Venus





Venus





Earth





NASA



NASA



NASA / JPL-Caltech / ARIA / EOS Product

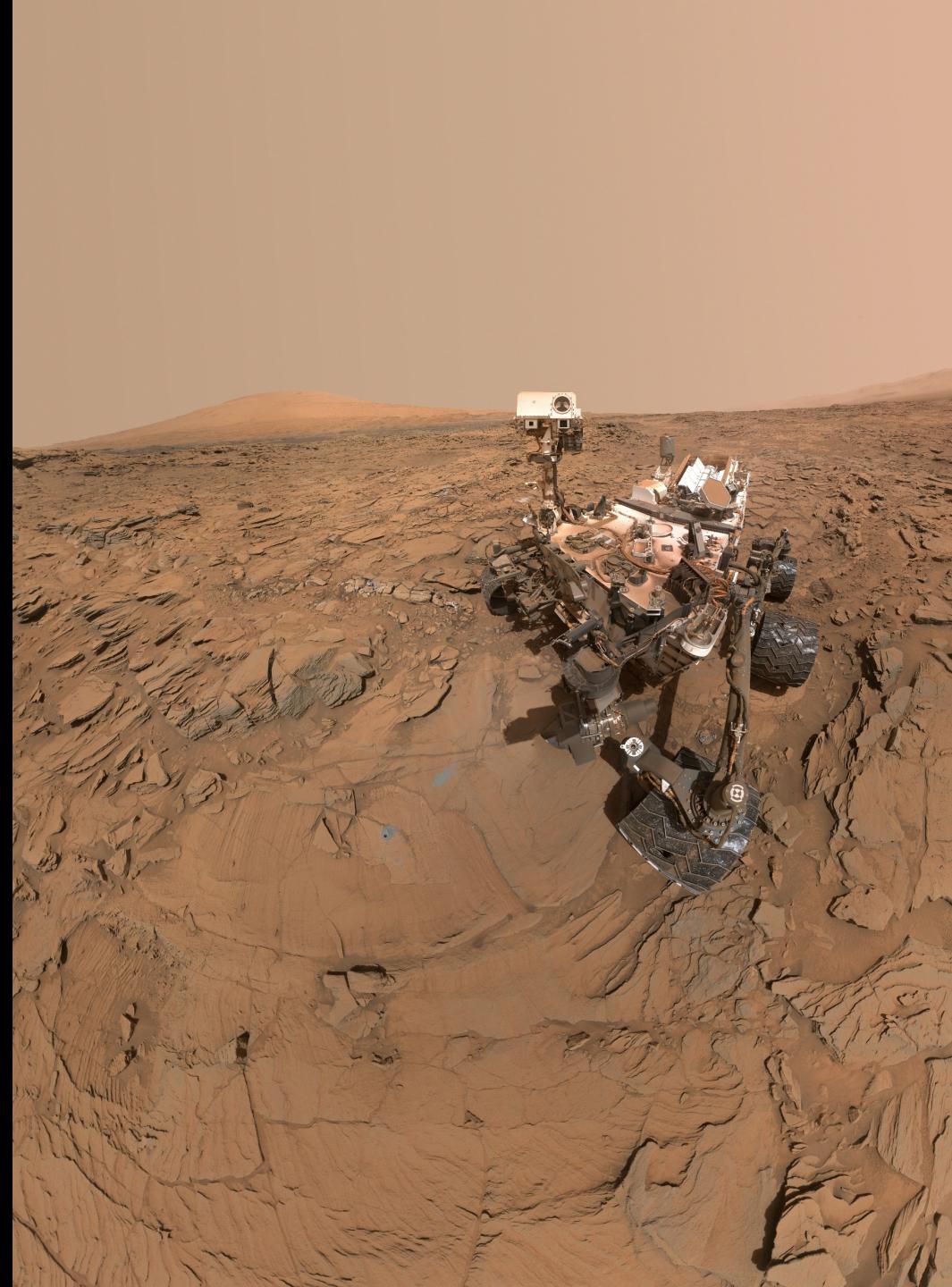
Contains modified Copernicus Sentinel data (2019)
European Space Agency, Google Earth





Mars





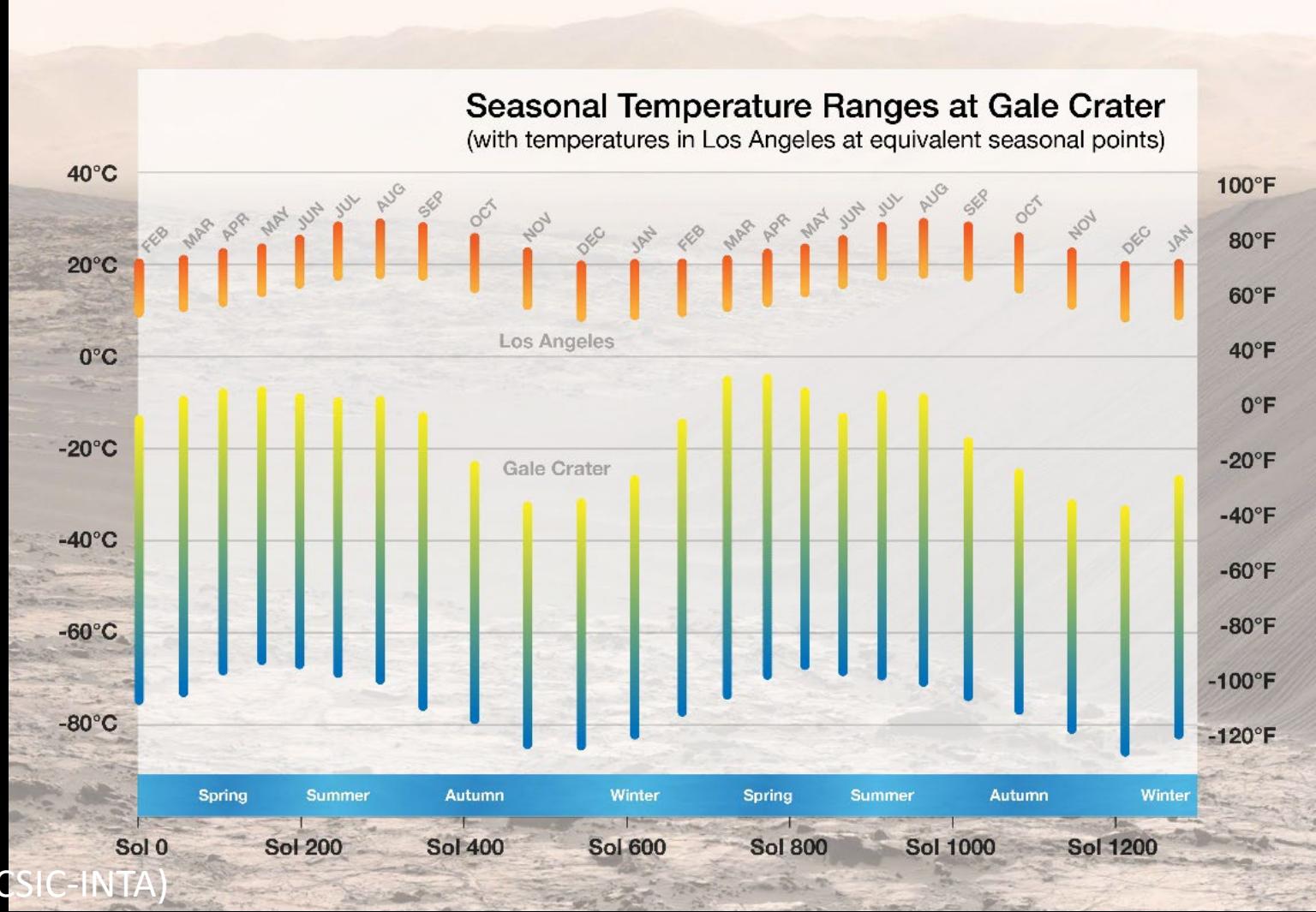
NASA/JPL-Caltech/MSSS

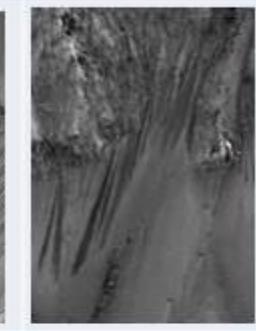
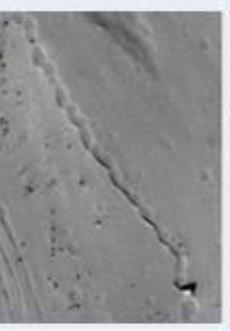


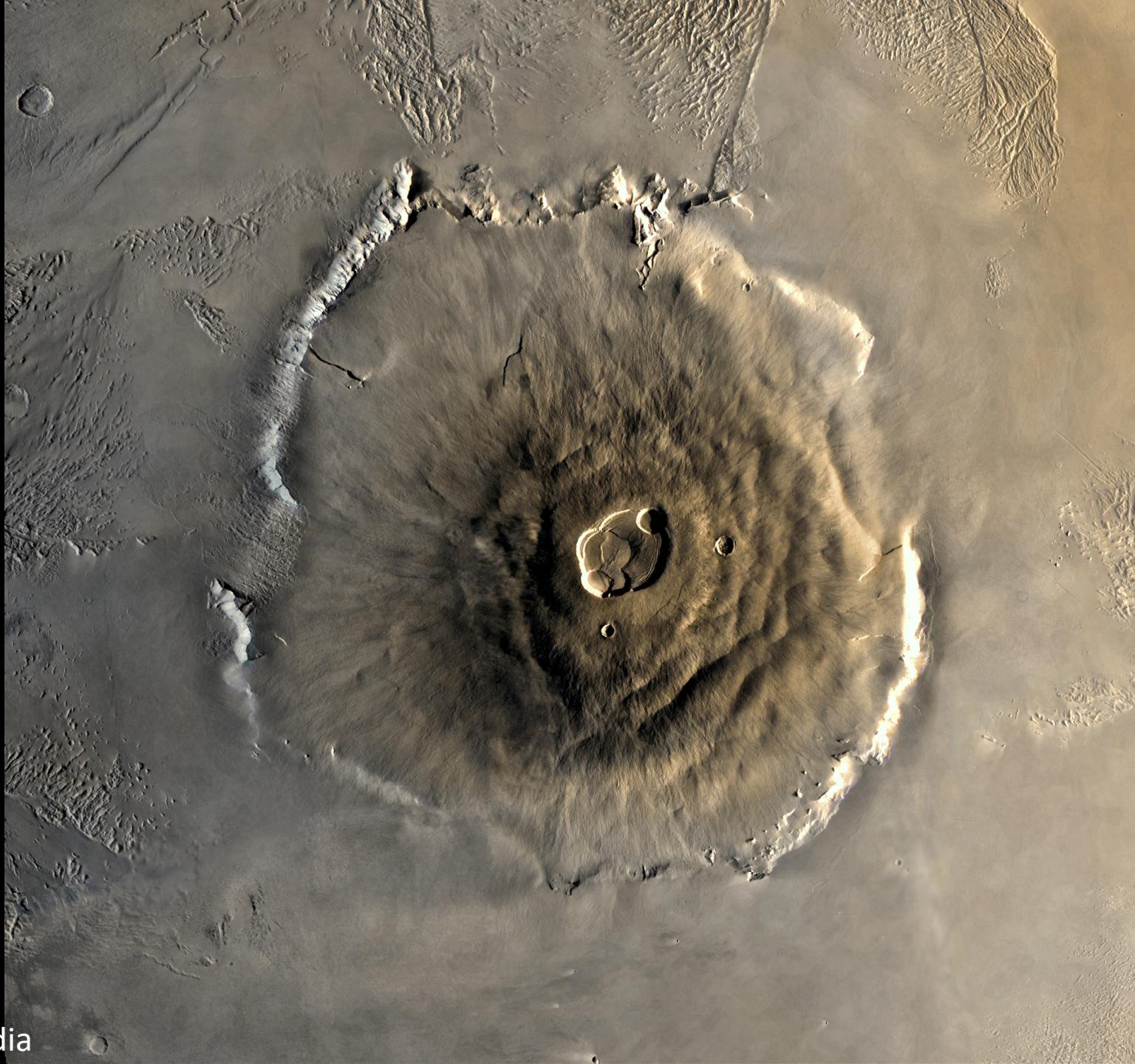


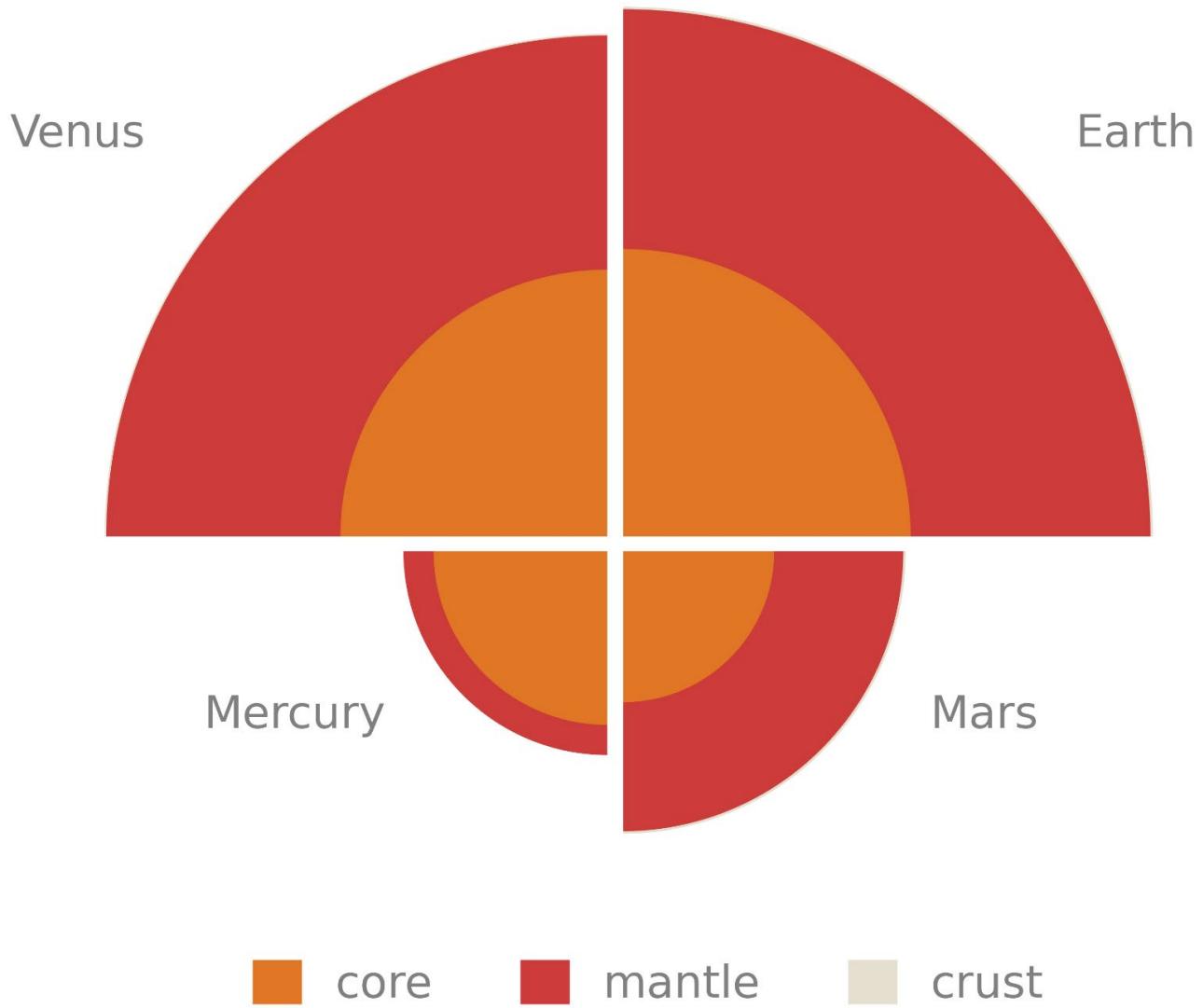
WHAT'S MARS REALLY LIKE?

Seasonal Cycles at Gale Crater
as measured by NASA's Mars rover Curiosity



	I. Landslides	II. (Alcove-Channel-Apron) Gullies	III. Slope Streaks	IV. Linear gullies	V. Recurring Slope Lineae (RSL)	VI. Boulder tracks	VII. Dark (frost/flow) streaks
Typical width x length in meters (yards)	1,000 x 5,000	200 x 1000	20 x 500	5 x 1000	2 x 100	2 x 100	2 x 50
(typical size decreases)							→
Example							
General shape/ characteristics	Alcove due to ridge failure Debris apron, can be long or chunky	Triangular alcove Often has a v-shaped channel Triangular deposit/apron Digitate ends	Apex/initiation point (e.g., impact crater) May contain ridges or ripples, bifurcating downslope Digitate ends	Small alcove or converging troughs Can be sinuous, often have levees Abrupt end or terminal pit(s)	Starts in rocky material Narrow, follows topography	Track, may be segmented or continuous Terminal boulder, of same width	Can extend from dark spots, bright haloes Mostly linear, sometimes braided Digitate ends
Where found	Large, steep, slopes	Moderate to steep slopes	Bright, dusty steep slopes	sandy, pole-facing slopes	Steep, rocky, slopes in dark regions	steep, rocky areas	frost-covered dune slopes
When active?	All seasons	Late winter-early spring	All seasons	Early spring	Only season with warmest temperatures	All seasons	Winter-early spring





Quick Quiz

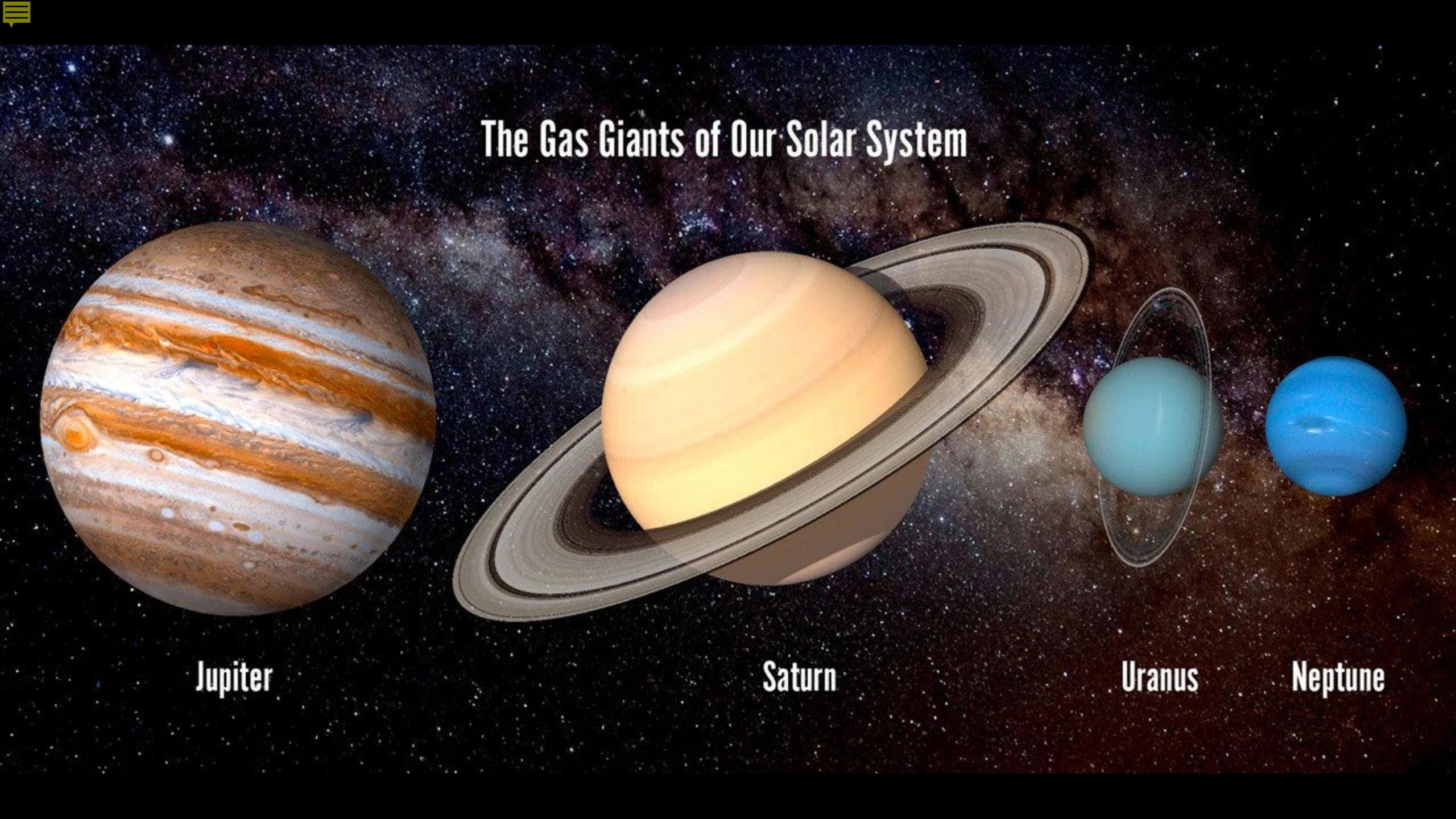


- 1. Why are the first four planets called the 'Rocky' planets?**

- 2. Mercury's surface is covered in what?**

- 3. What landforms provide evidence for water on Mars?**





The Gas Giants of Our Solar System

Jupiter

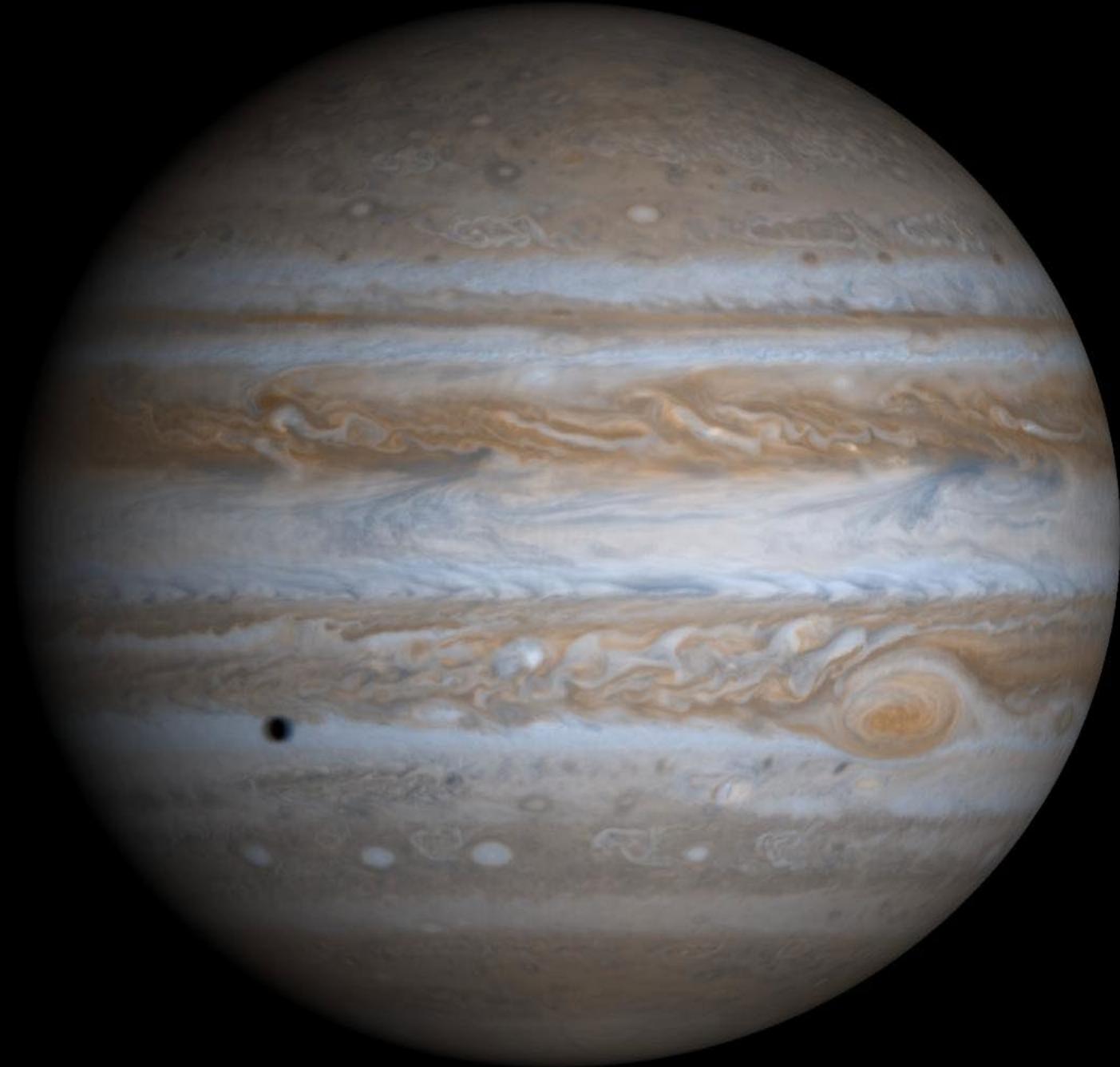
Saturn

Uranus

Neptune

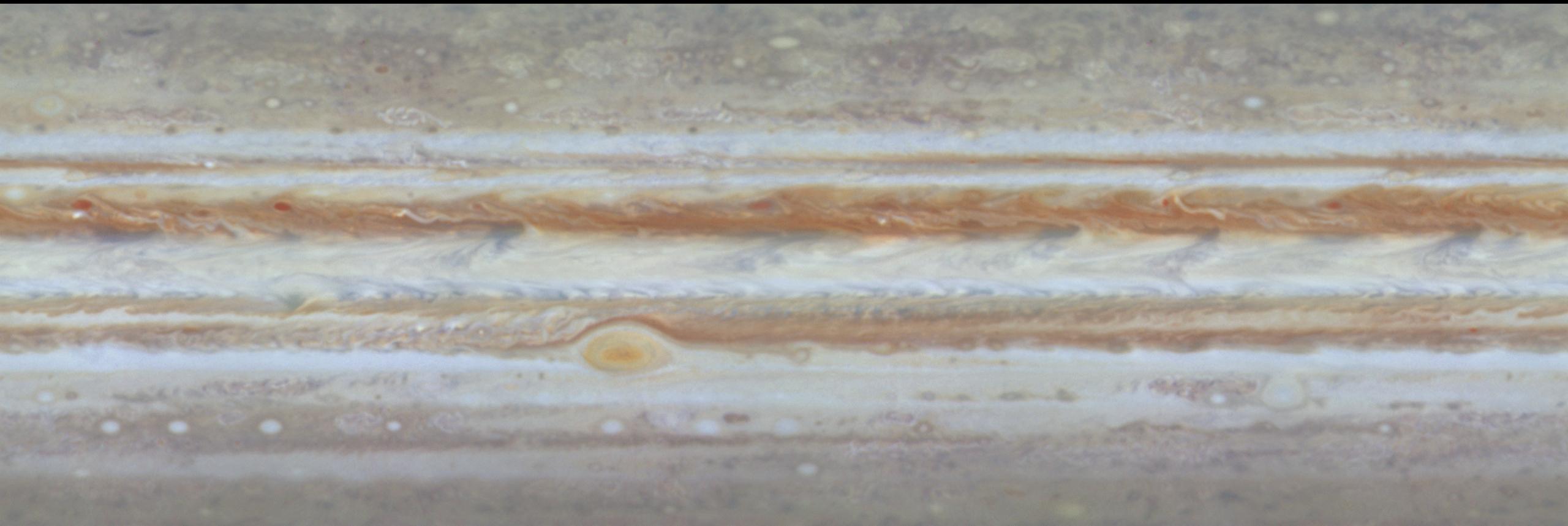


Jupiter



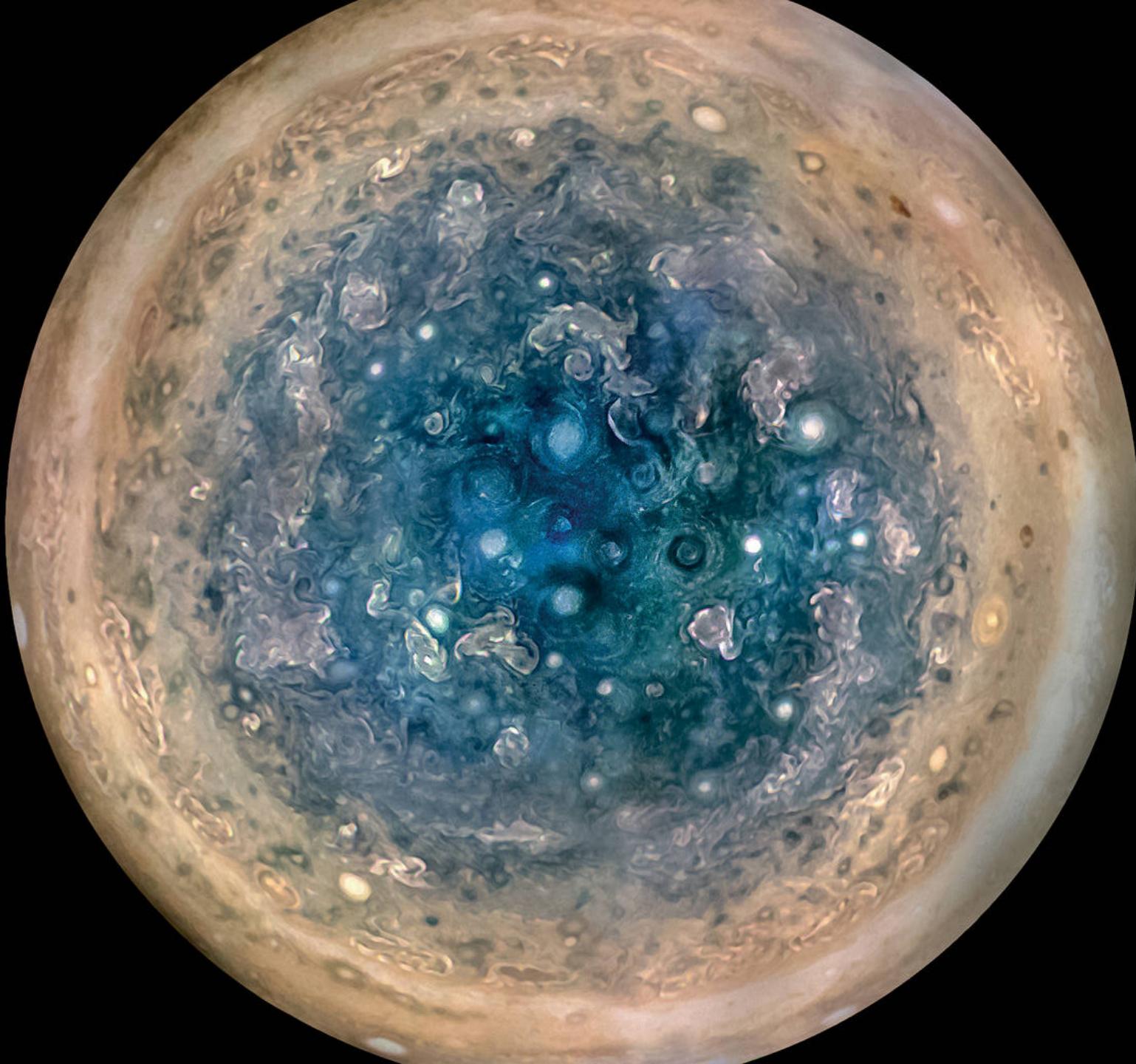


Jupiter





Jupiter



NASA/JPL-Caltech/SwRI/MSSS/
Betsy Asher Hall/Gervasio Robles



Jupiter's Moons

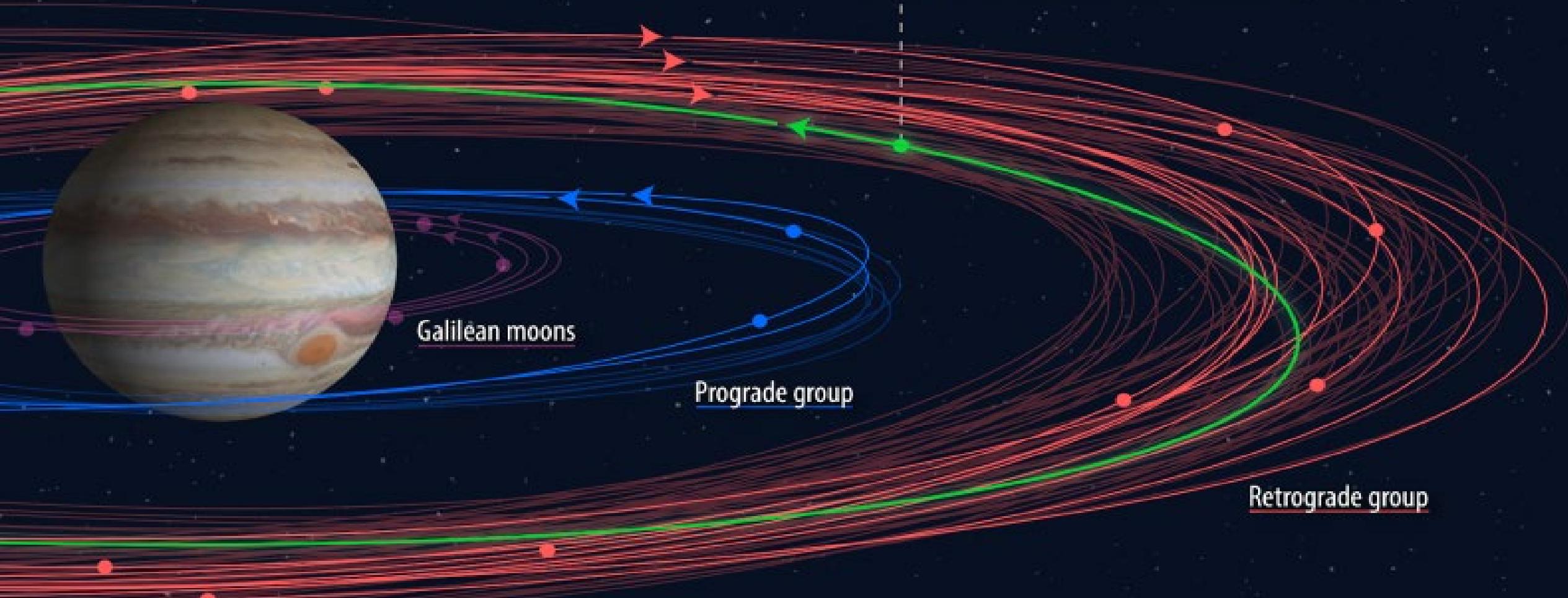




Outer Moons of Jupiter

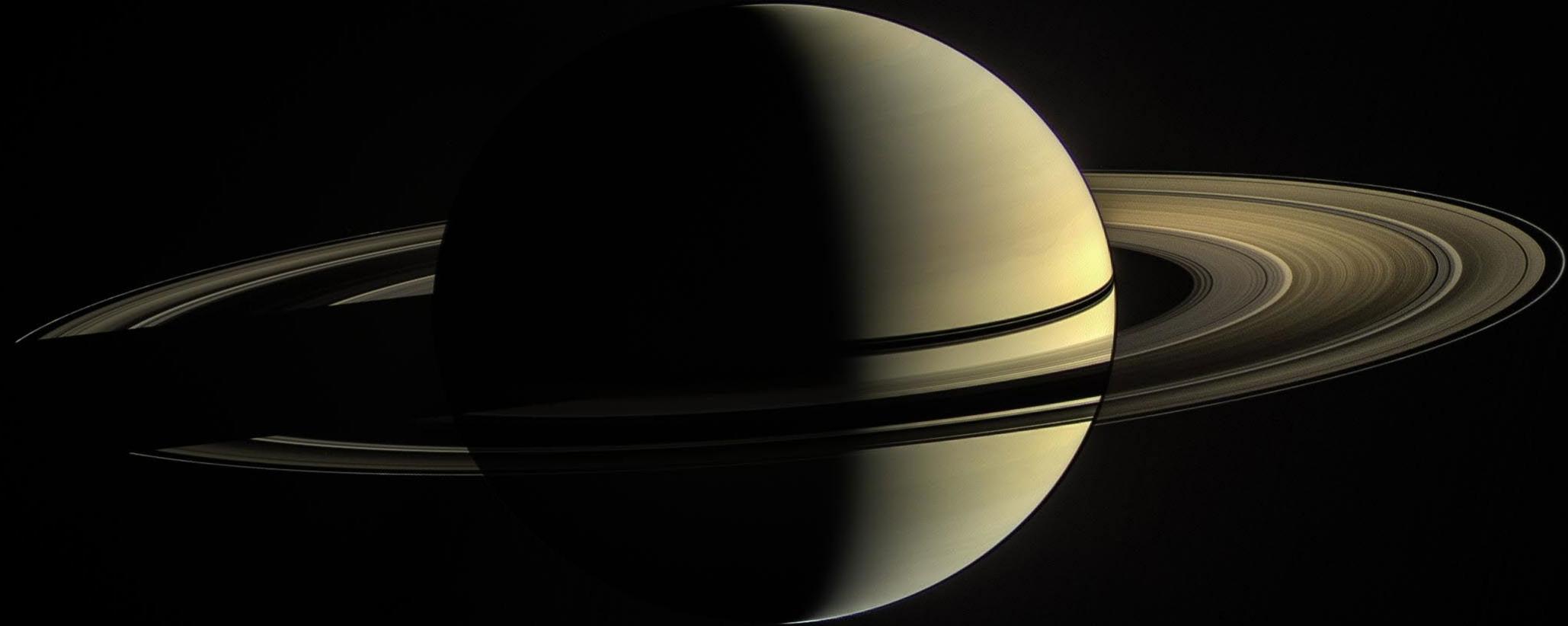
Newly discovered moons shown in bold

Unlike the group of inner prograde moons, new prograde **Valetudo** has an orbit that crosses the retrogrades.



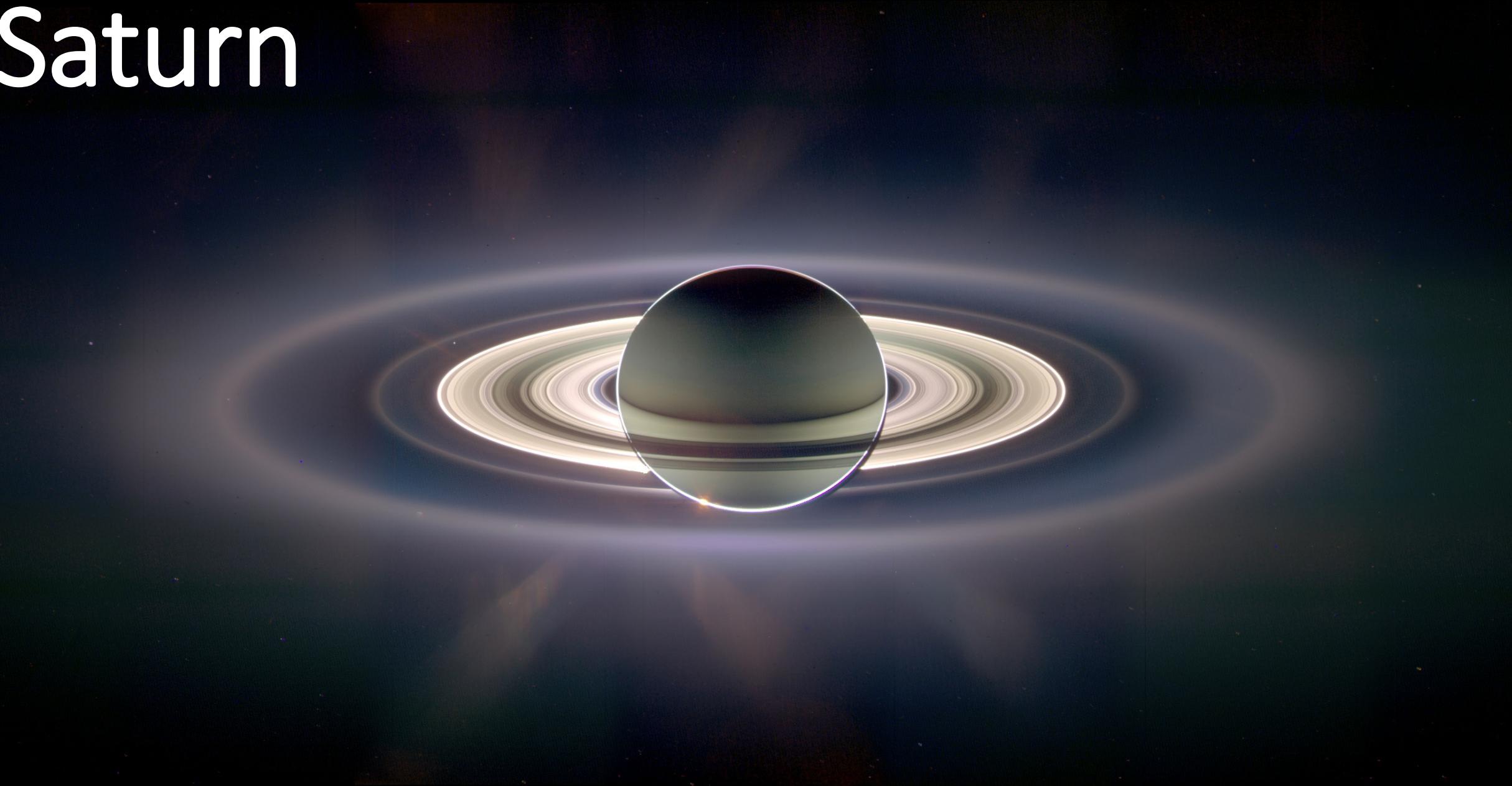


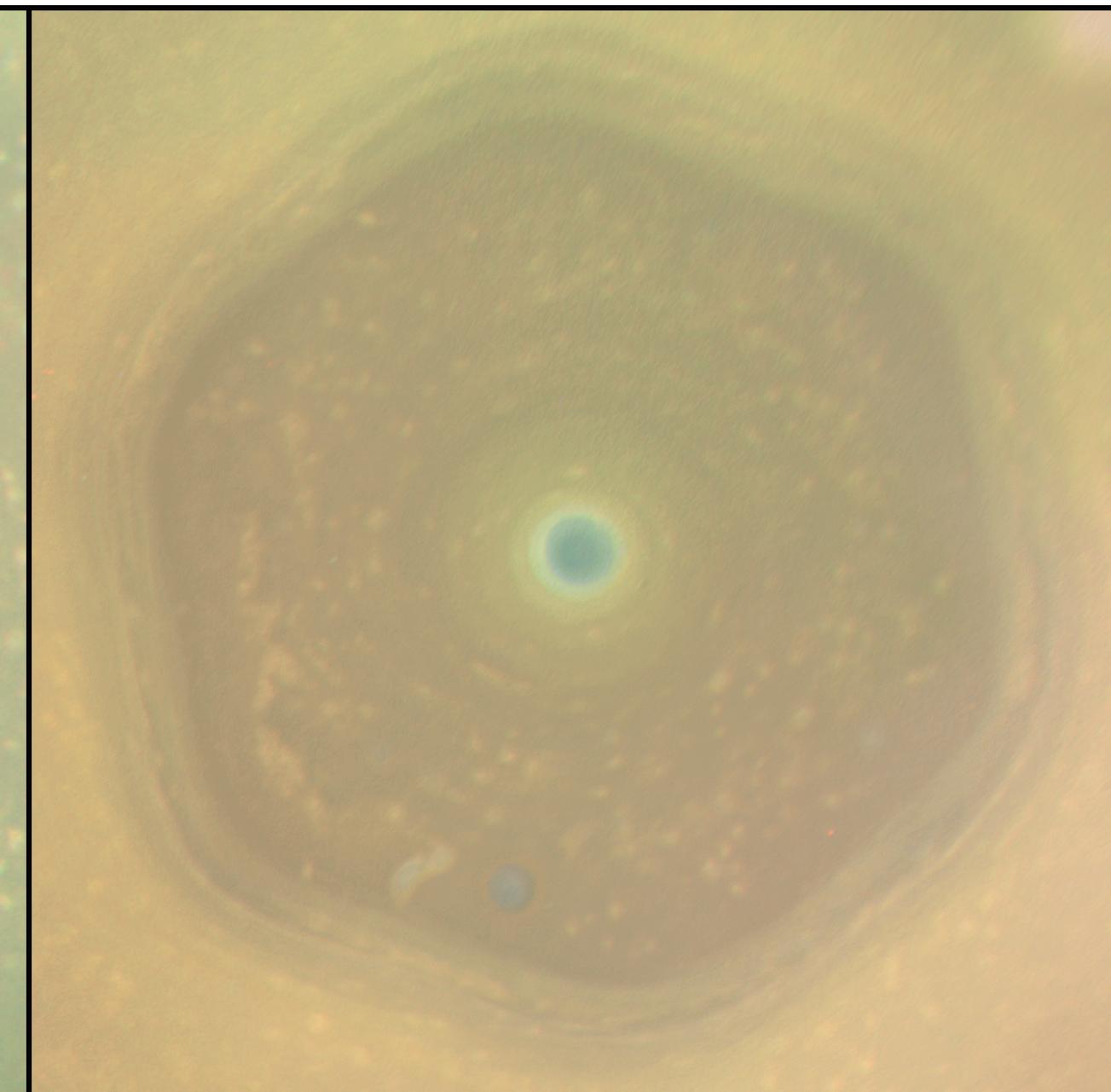
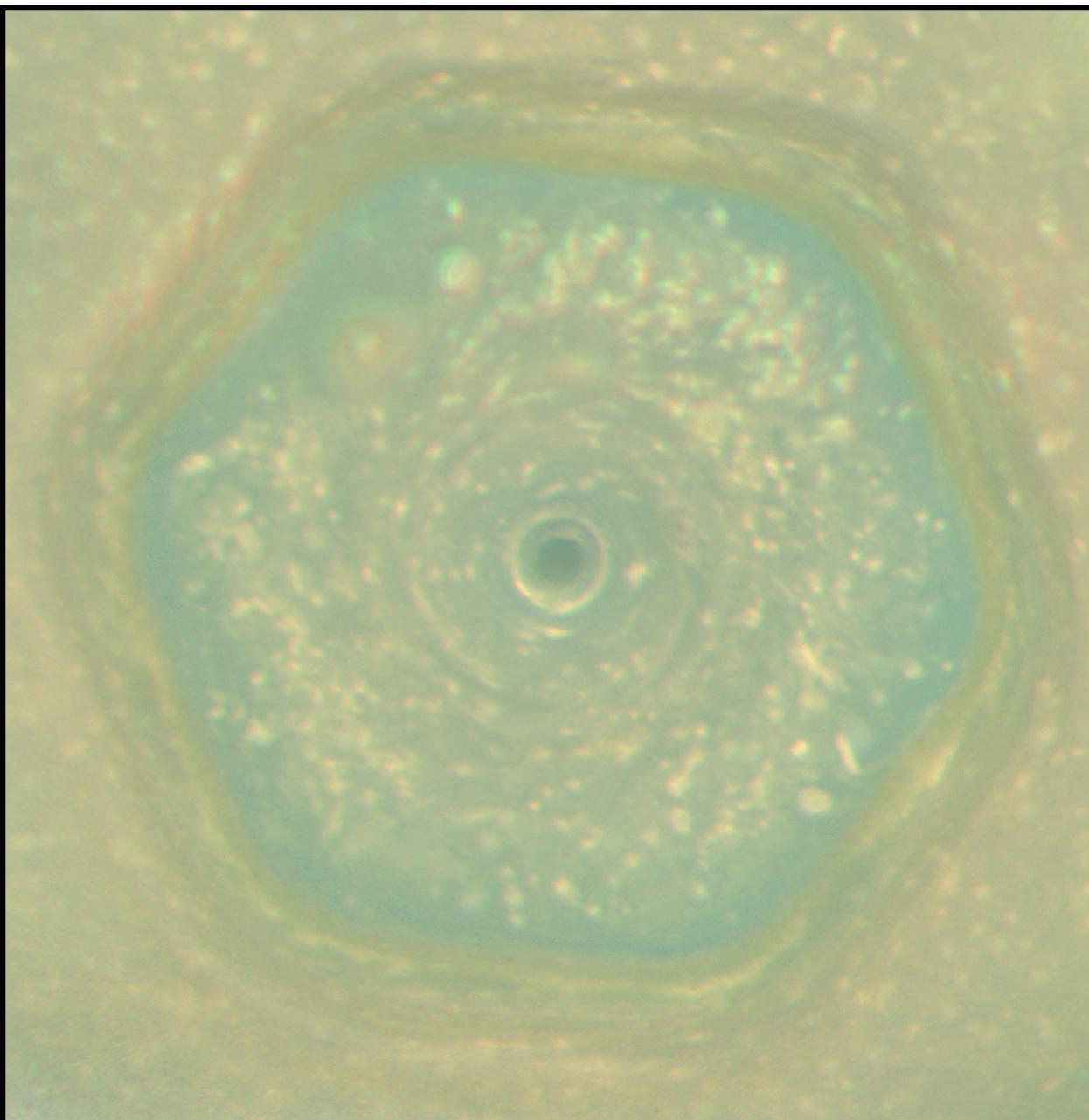
Saturn



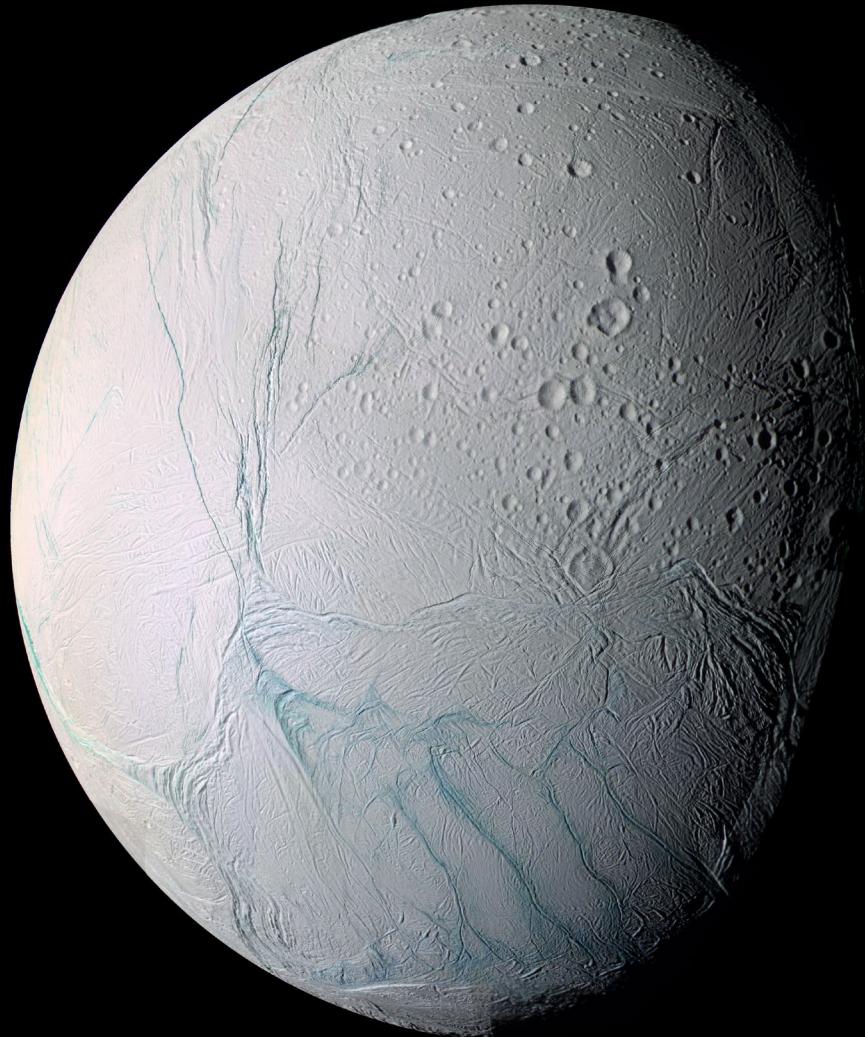


Saturn

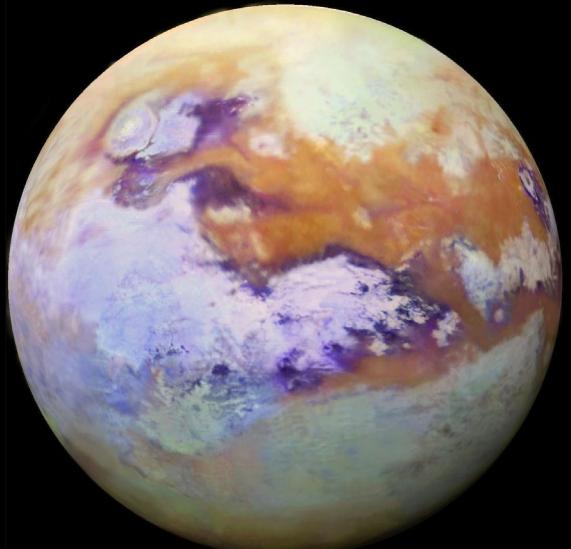




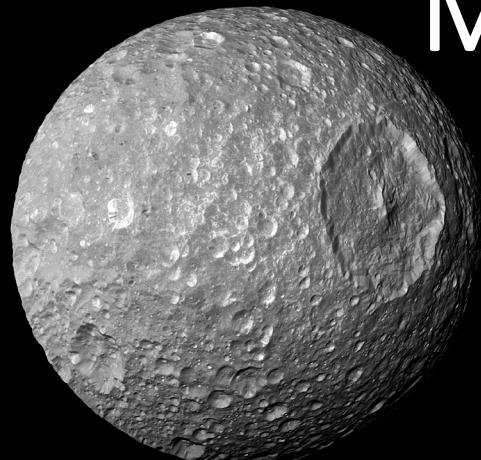
Saturn's Moons



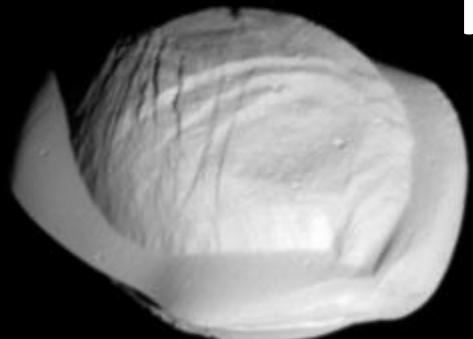
Enceladus



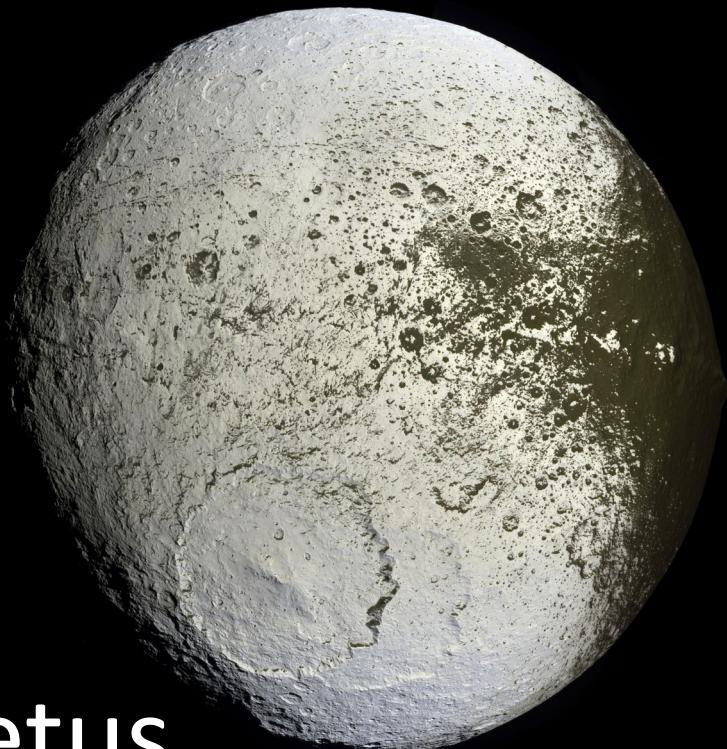
Titan
Mimas



Iapetus

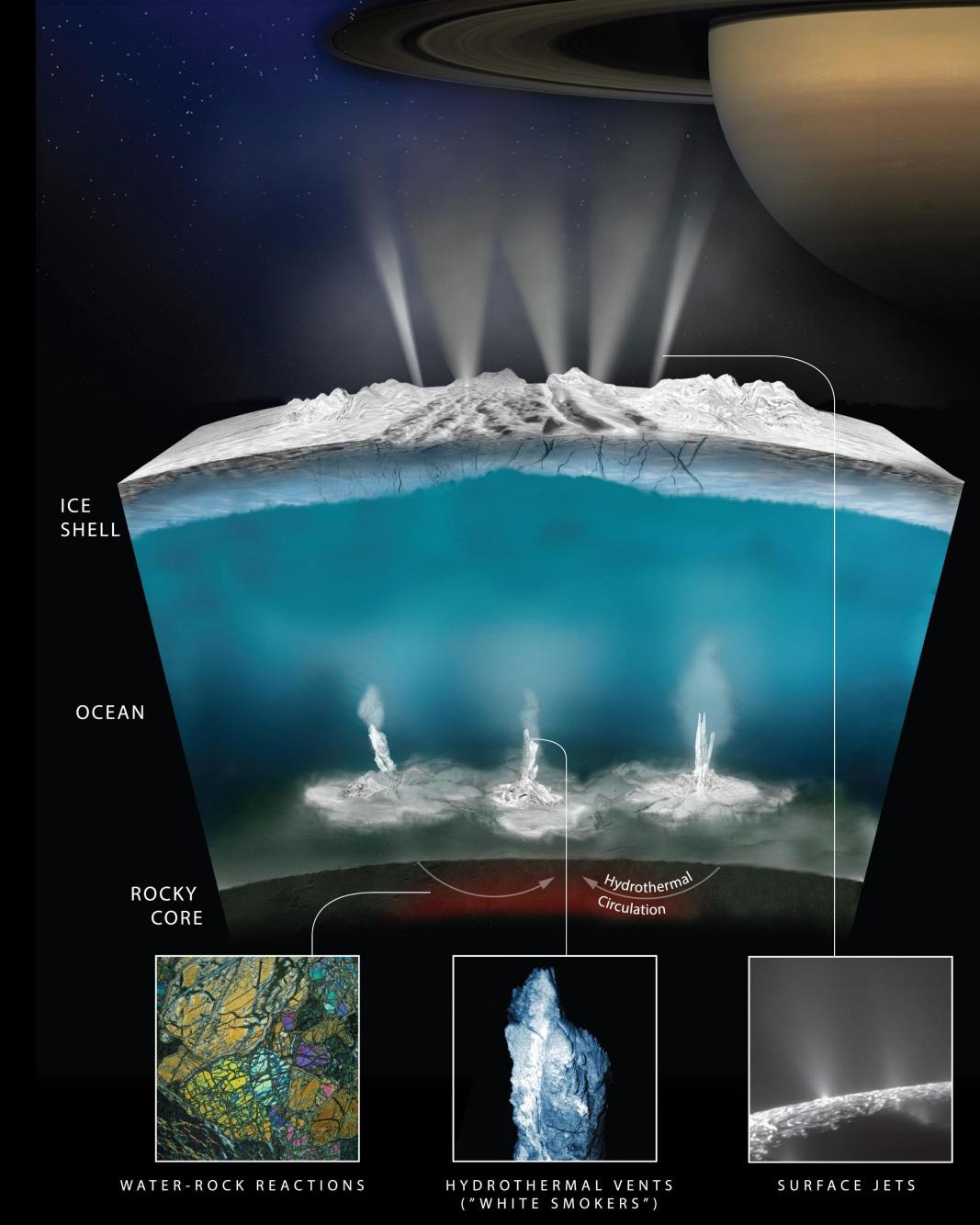
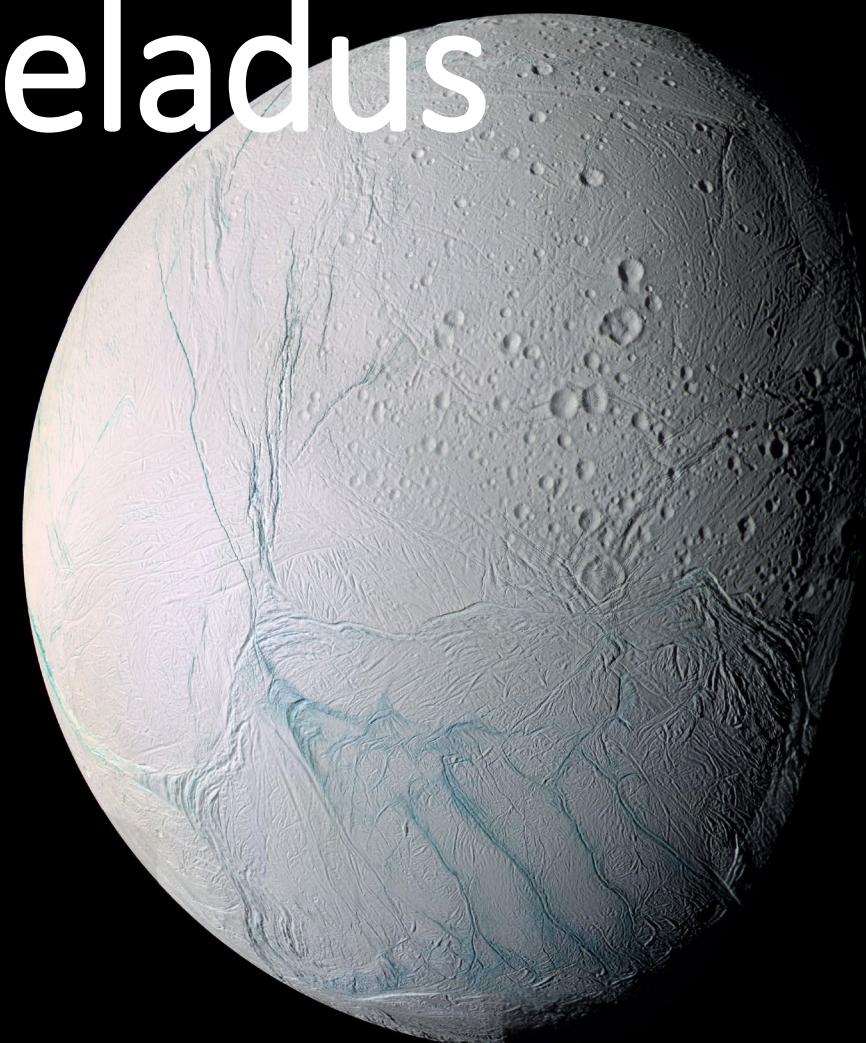


Pan



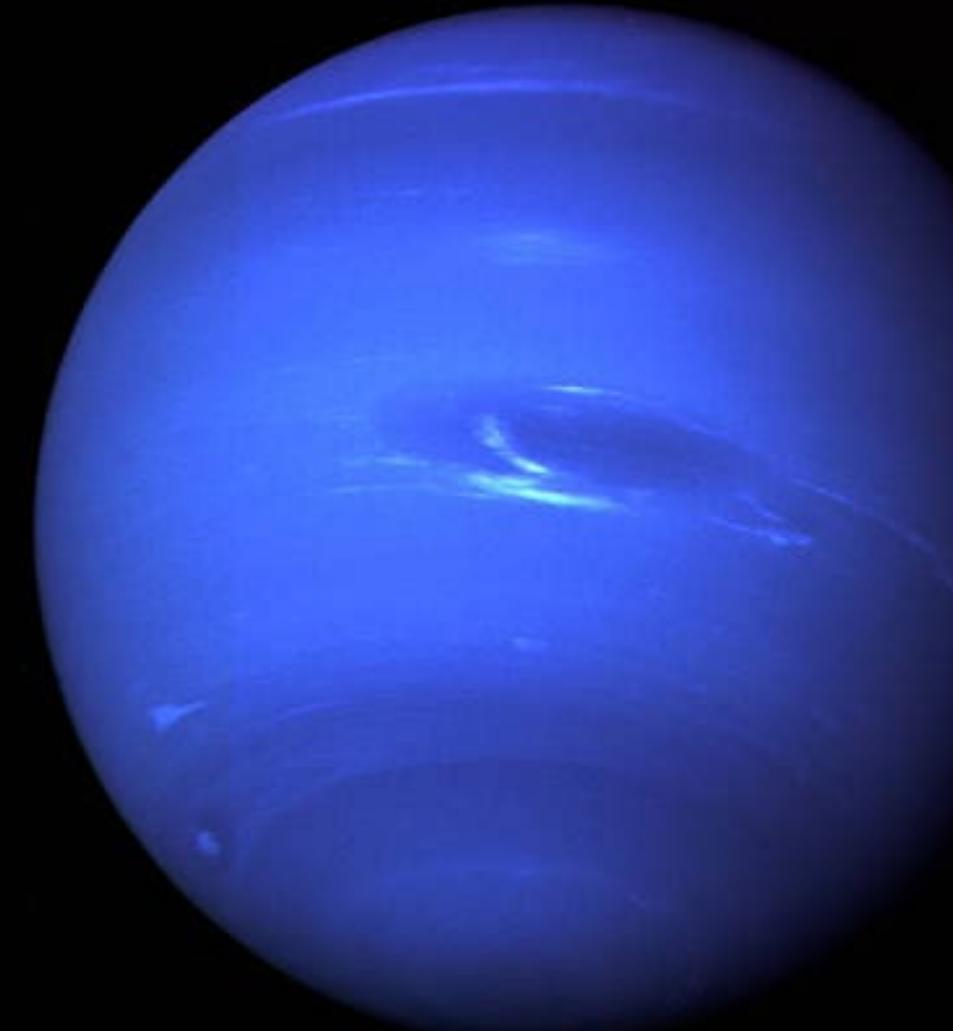


Saturn/ Enceladus



ENCELADUS

The Ice Giants



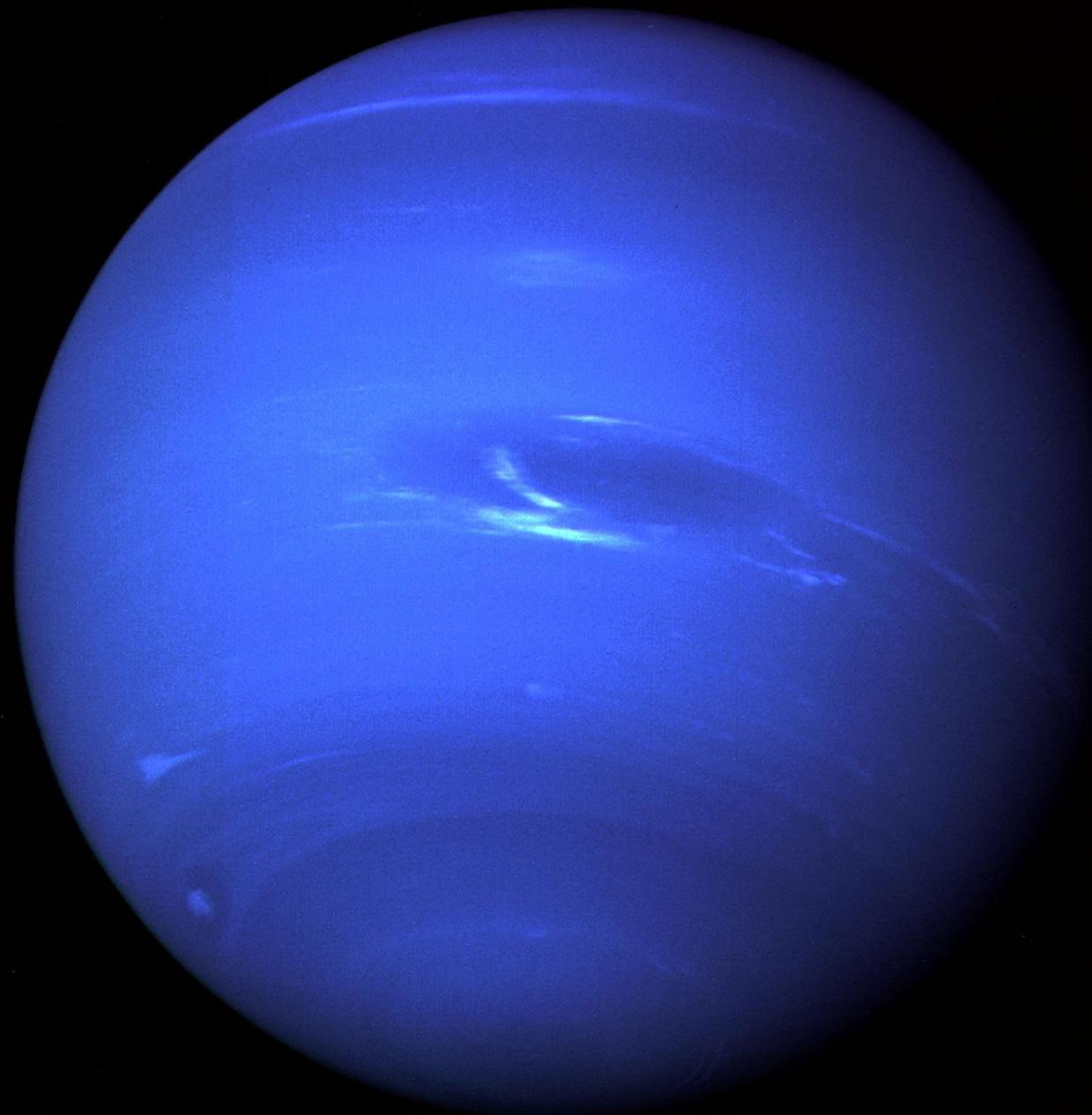


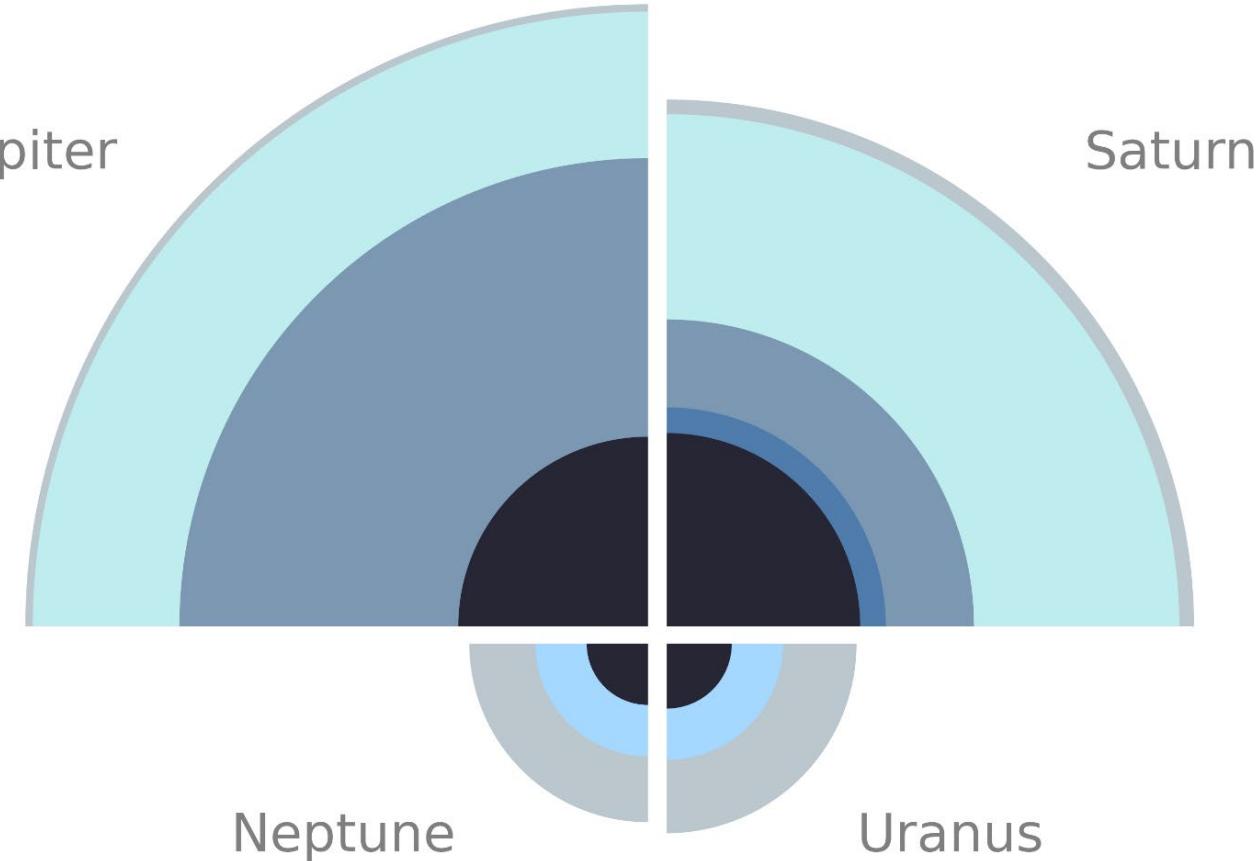
Uranus





Neptune





- core
- metallic hydrogen
- liquid hydrogen
- atmosphere
- ice core
- mantle

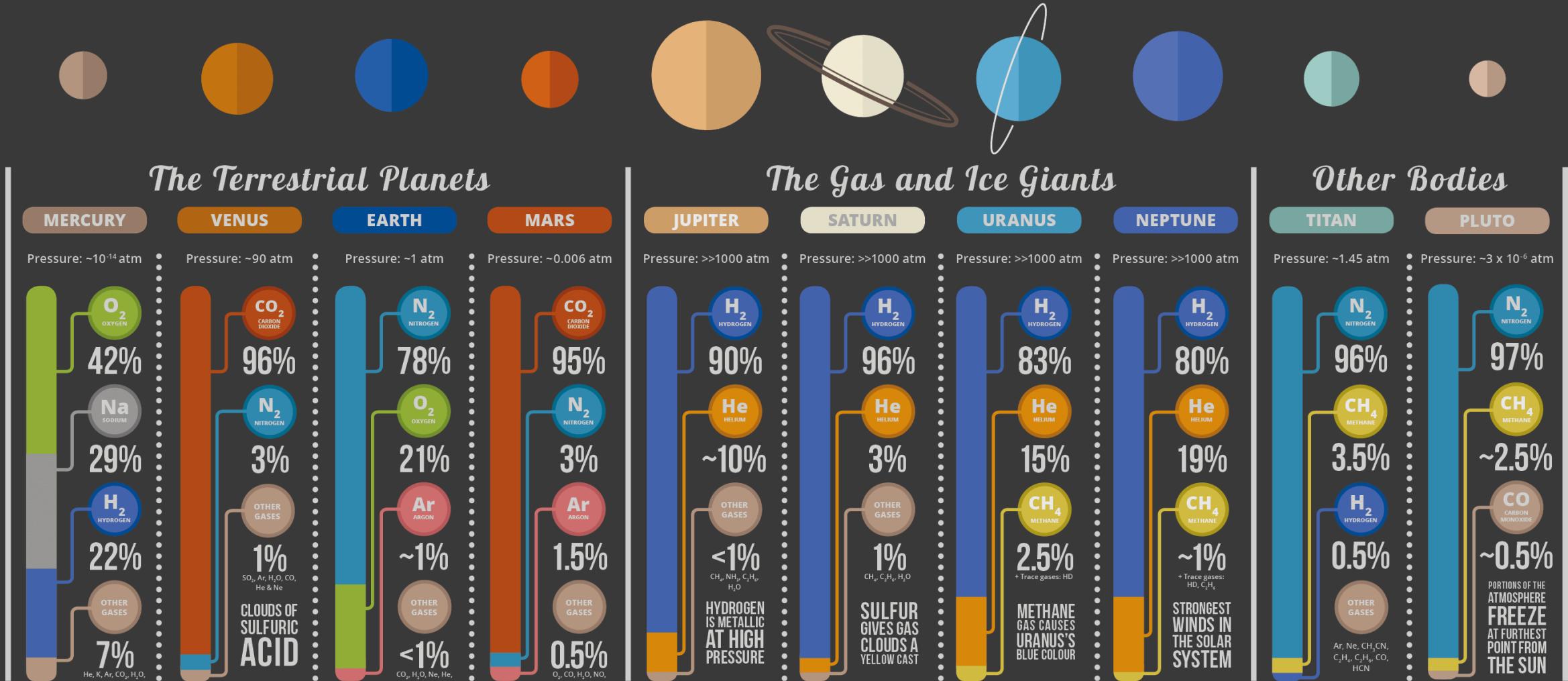
Quick Quiz



- 1. What gases are the Gas Giants made out of? ***
- 2. Do the gas giants have a solid surface?**
- 3. Which gas giants have rings?**



THE ATMOSPHERES OF THE SOLAR SYSTEM



Note: Planet sizes not to scale. Pressures for terrestrial planets are surface pressures. Mercury's atmosphere is not an atmosphere in the strict sense of the word, being a trillion times thinner than Earth's.





Up next:

Planetary Surfaces

