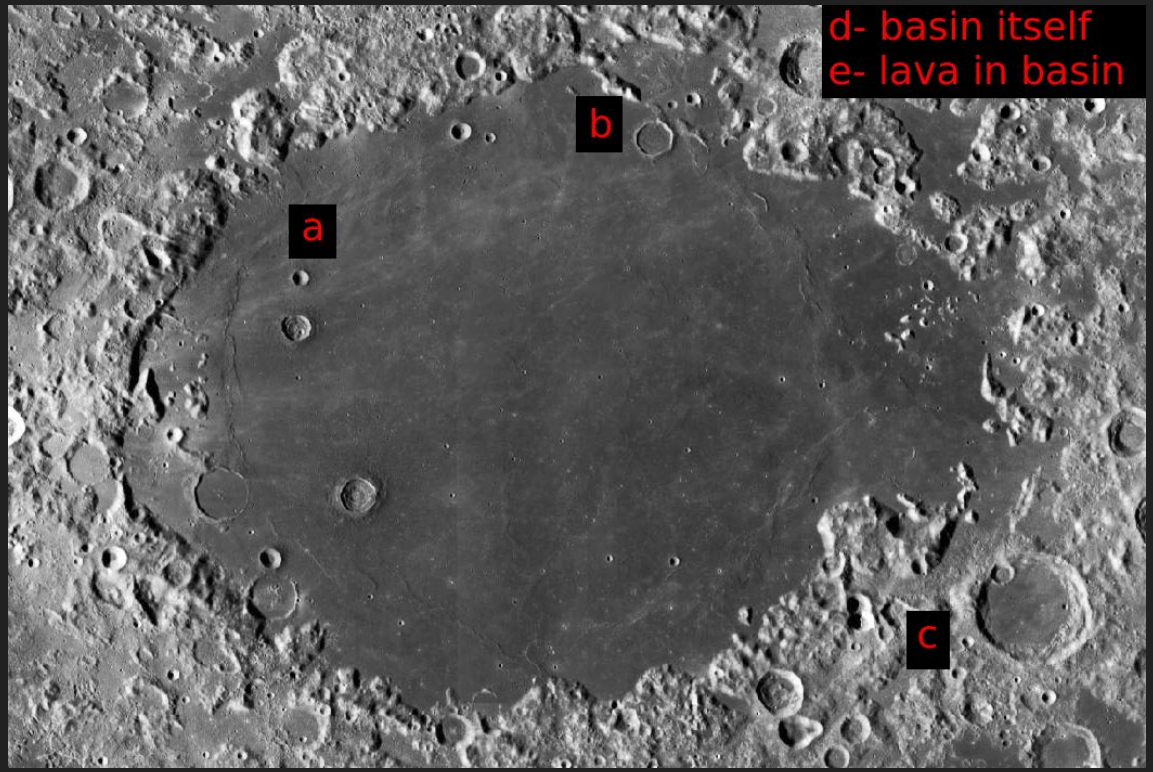
Saturn and Ice Giants

Poll everywhere

When poll is active respond at **PollEv.com/nikhilpatten355**

Send **nikhilpatten355** to **22333**

Poll everywhere



Mare Crisium, Moon

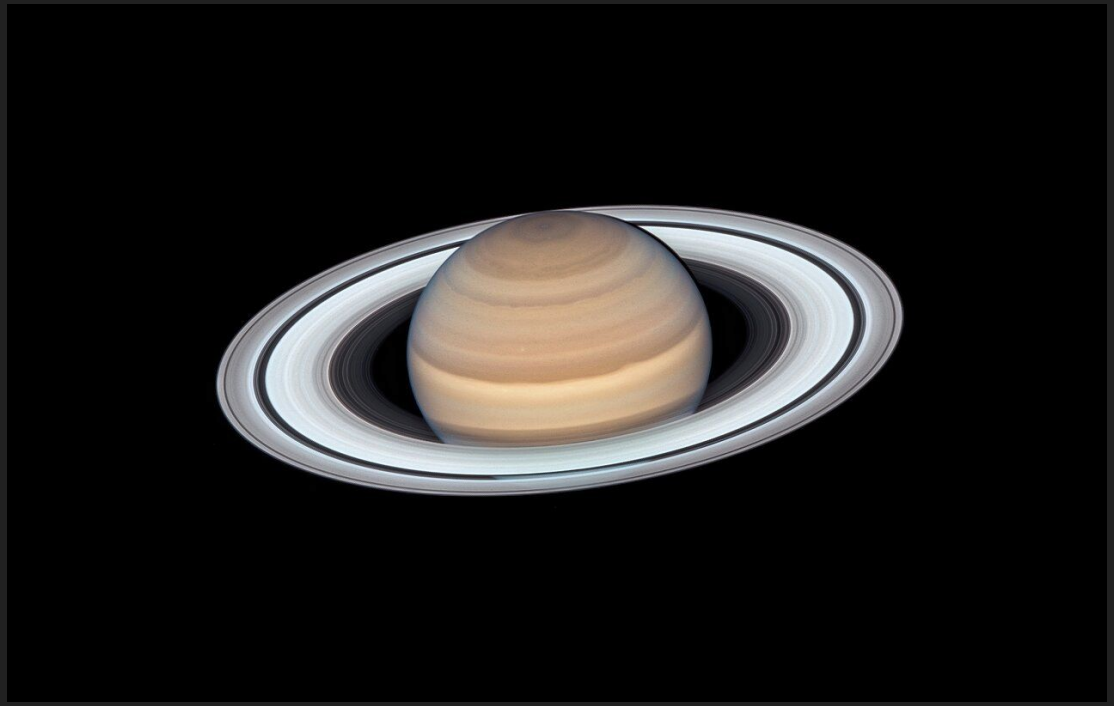
Poll everywhere

results

Saturn

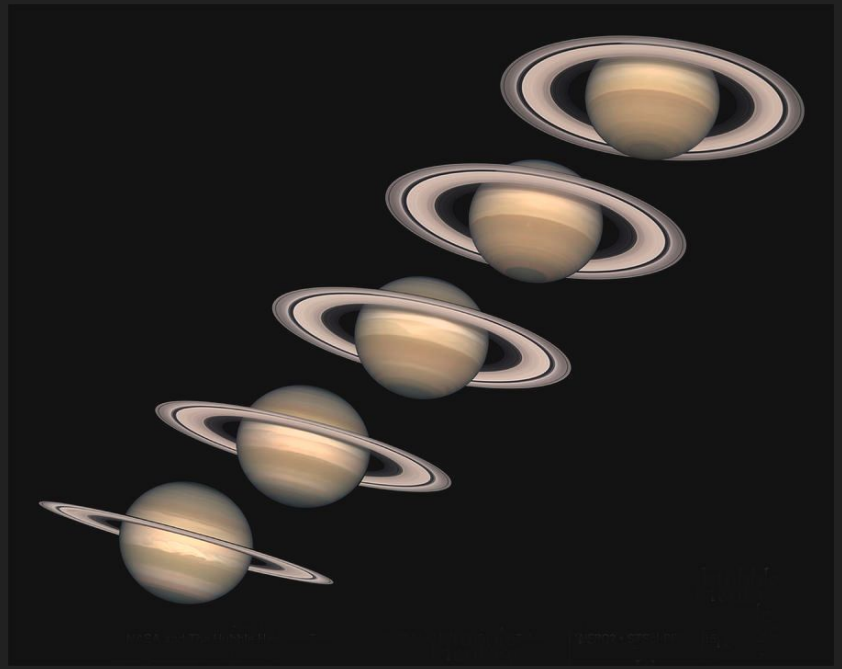
Saturn (left) and Jupiter (right) at twilight

Saturn



Saturn in visible light, *HST*

Saturn



Saturn axial tilt timelapse

Saturn

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Saturn in near infrared, *JWST*

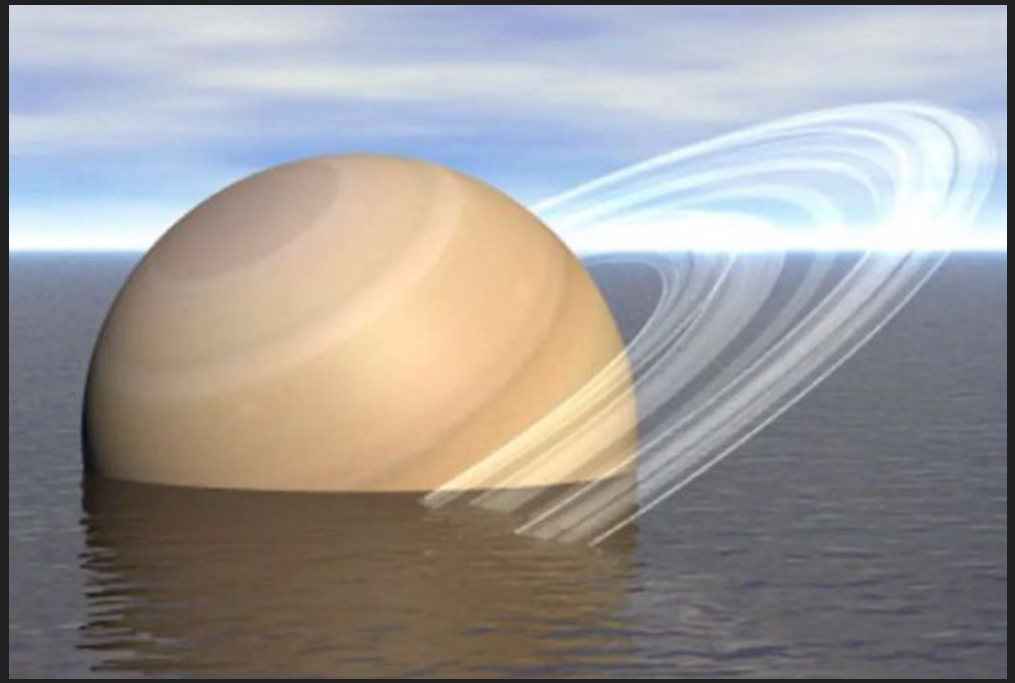
Saturn- Orbit

- Named after the Roman god of wealth, Saturn
- 95 times the mass of Earth.
- 120, 540 km in diameter.

Saturn- Orbit

1. Saturn has mass 95 times the mass of the Earth, and diameter 120, 540 km. Calculate the density of Saturn, in kg m^{-3}. Earth has mass 5.98×10^{24} kg. Hint: Volume of a sphere is $V=4/3\ \pi\ R^3$.

Saturn- Orbit



Saturn would float in water

Saturn- Orbit

- Named after the Roman god of wealth, Saturn
- 95 times the mass of Earth.
- 120, 540 km in diameter.
- Saturnian day- 10.7 hours
- Semi-major axis 9.5 AU
- Saturnian year- 29.5 Earth years
- Orbital eccentricity of 0.056
- Axial tilt of 27°
- 274 moons (most are tiny, 10-100 km)

Saturn- Titan

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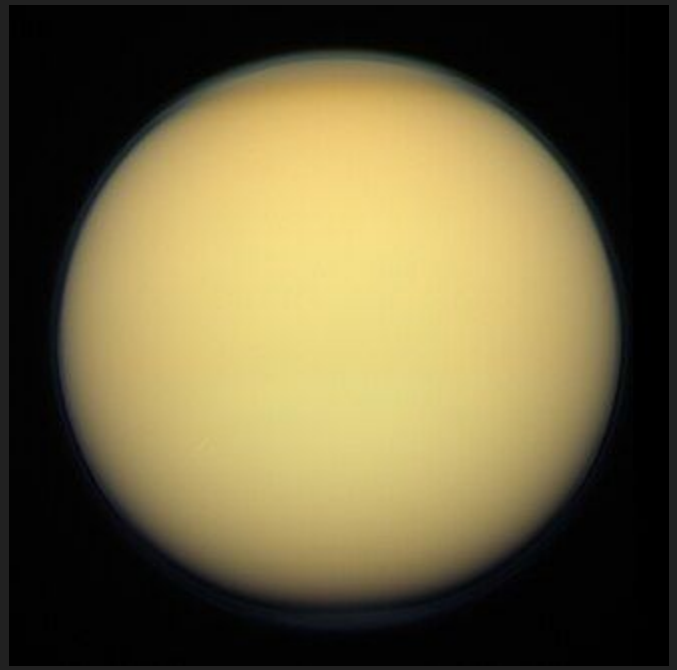
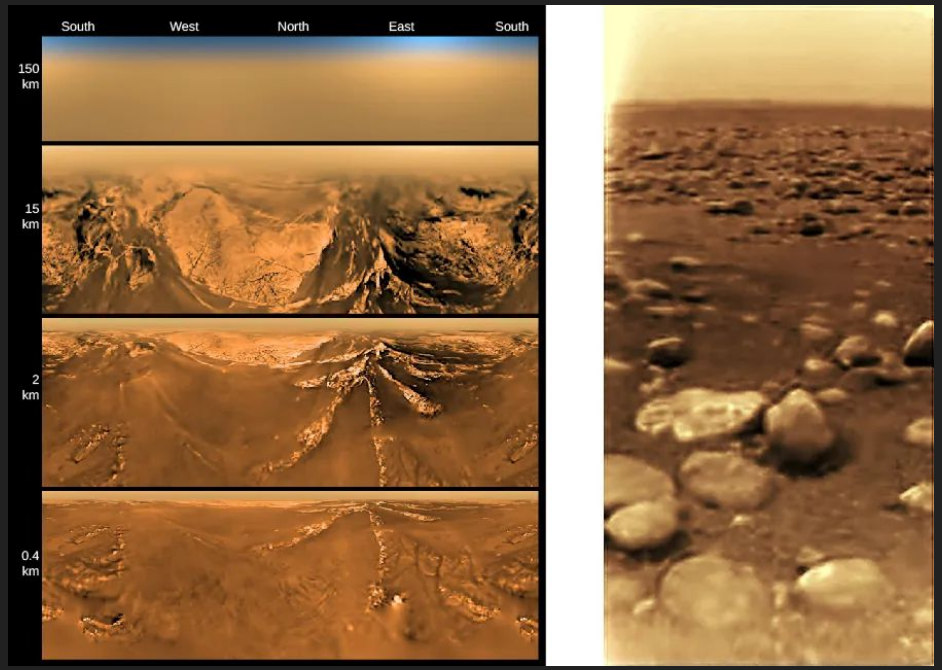


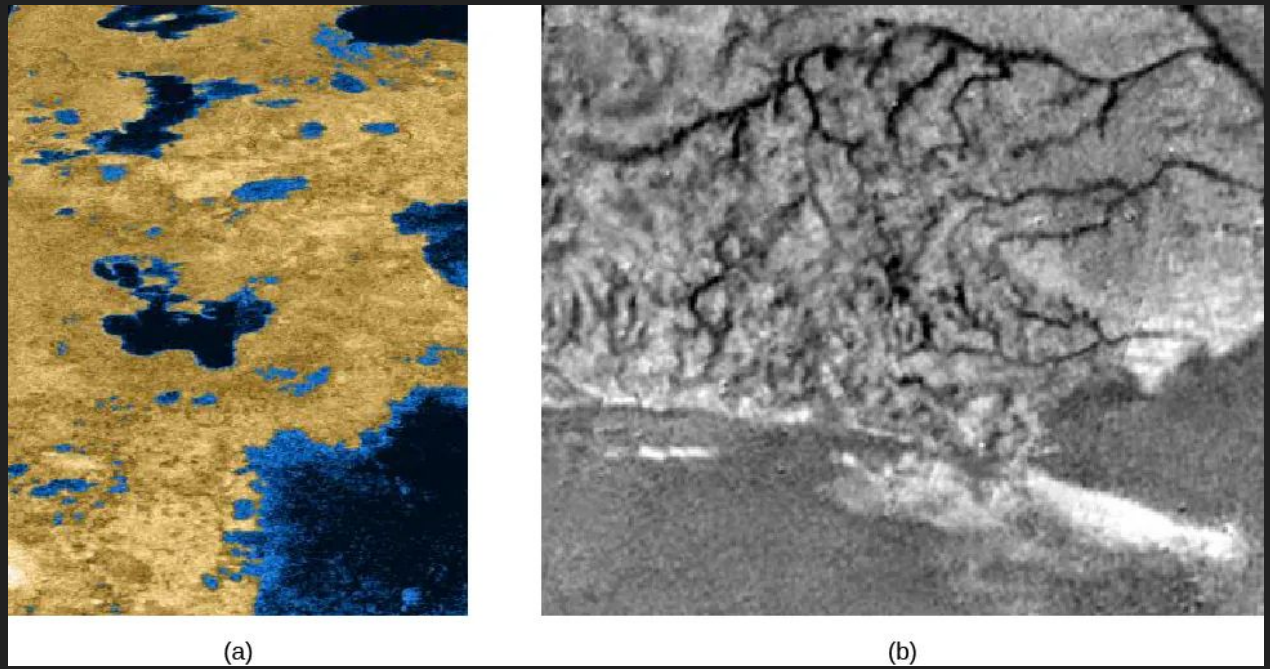
Titan, Cassini orbiter.

Saturn- Titan



Titan descent.

Saturn- Titan



Hydrocarbon lakes, meth- and ethane rain/water.

Uranus

Uranus in the night sky

Uranus

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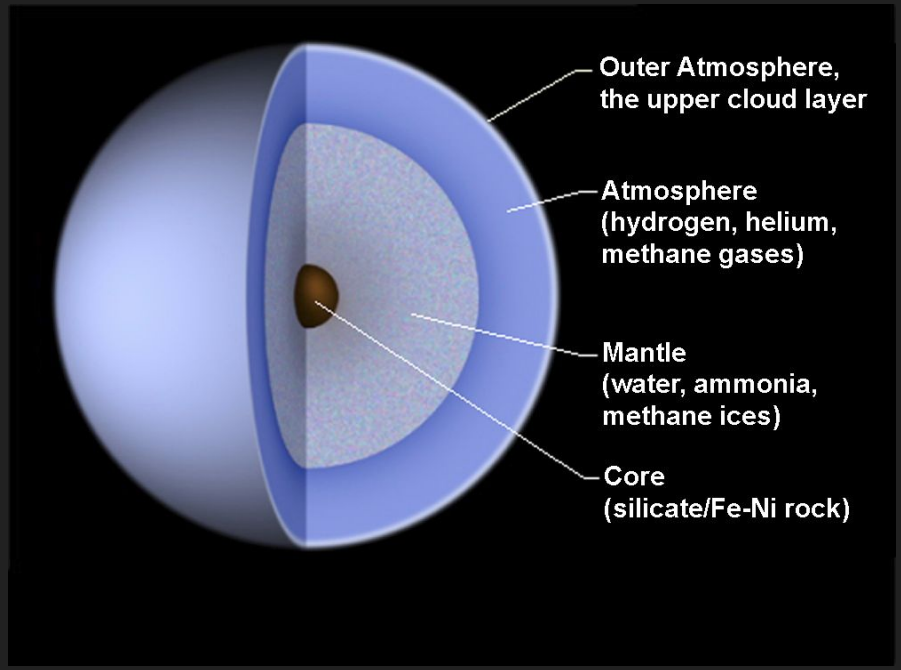
Uranus captured by Voyager 2

Ice Giant- layers



- Less hydrogen than gas giants, weak magnetic field

Uranus

Uranus and her moons in near infrared, *JWST*

Uranus- orbit

- Named after the Greek god of sky, Oranos (Caelus in Latin).
- 14 times the mass of Earth.
- 51, 200 km in diameter.
- Uraniun day- 17.2 hours
- Semi-major axis 19.2 AU
- Saturnian year- 84.1 Earth years
- Orbital eccentricity of 0.046
- Axial tilt of 98°
- 28 moons.

Uranus- seasons

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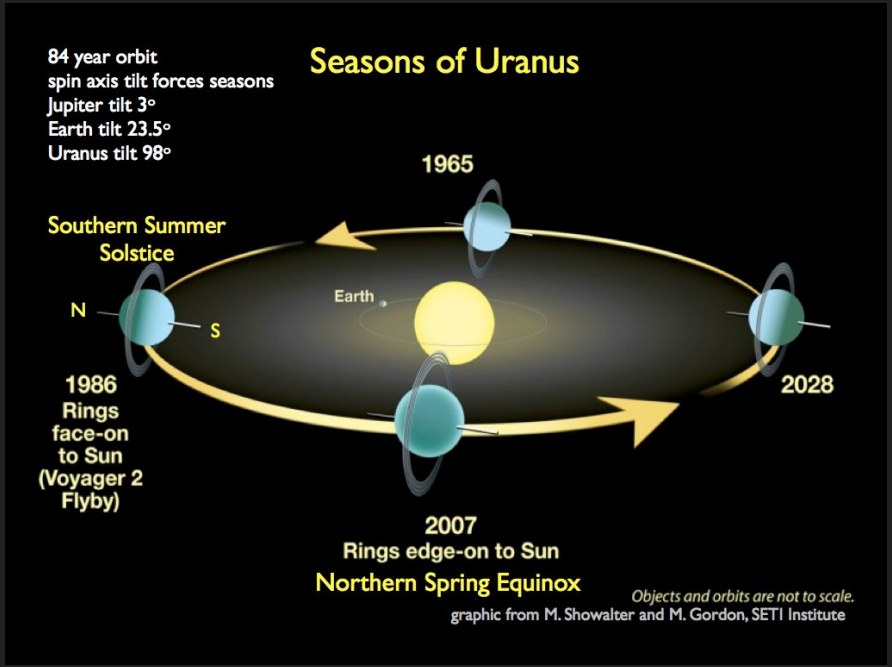

Uranus at different points in its orbit

Neptune

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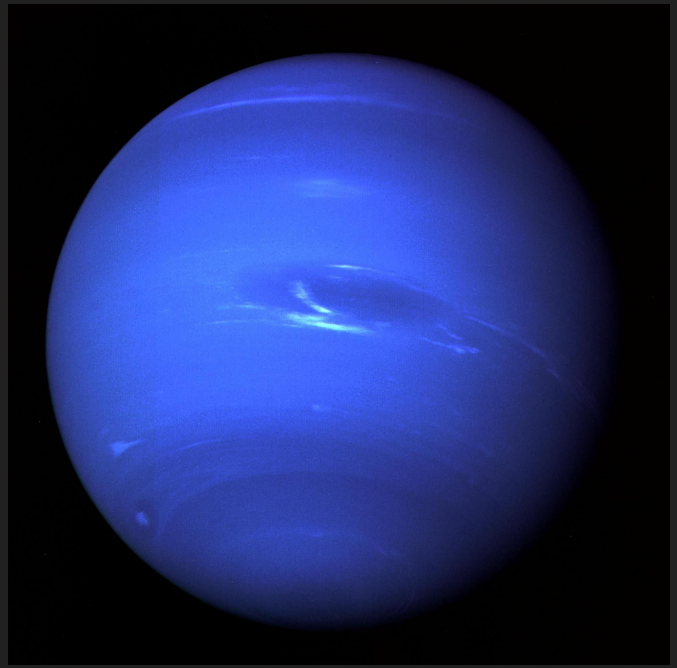

Neptune captured by Voyager 2

Neptune

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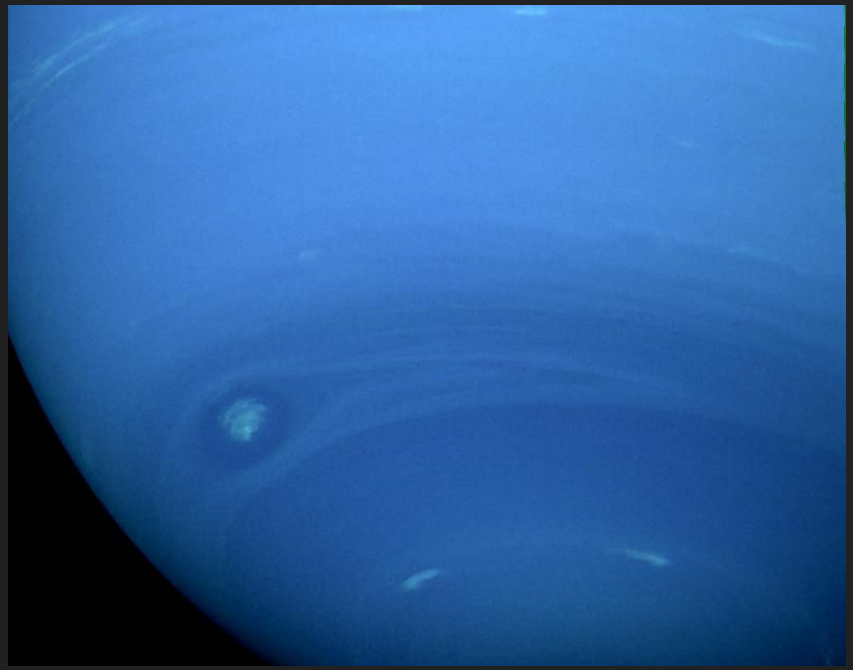
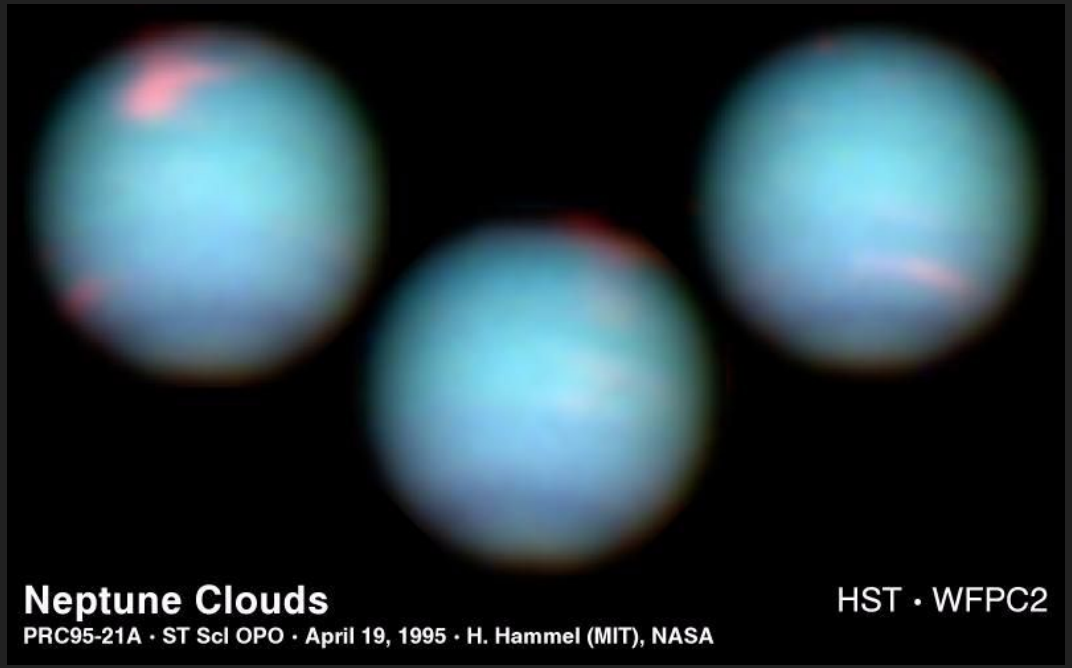


Neptune storm captured by Voyager 2

Neptune



Neptune clouds in infrared, *HST*

Neptune

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Neptune in near infrared, JWST

Neptune- orbit

- Named after the Roman god of sea, Neptune.
- 17 times the mass of Earth.
- 49, 500 km in diameter.
- Neptunian day- 16.1 hours
- Semi-major axis 30.0 AU
- Neptunian year- 164.8 Earth years
- Orbital eccentricity of 0.01
- Axial tilt of 28°
- 16 moons.

Neptune- Perturbations in Neptune's orbit

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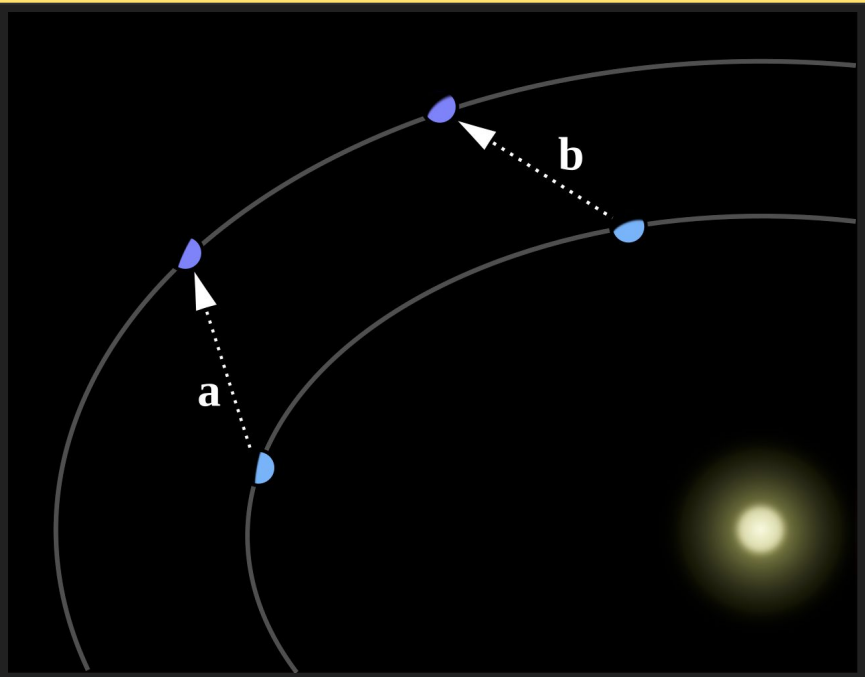

Neptune was predicted mathematically before it was confirmed.

Announcements

- Exam this Friday (3 October).
- Lab today.

Next time

- Exam review