

The Solar system - II

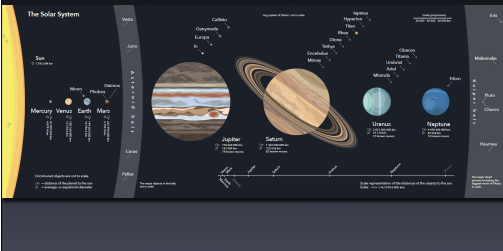


Koupelis : chapters 7 & 8
OpenStax : chapters 11, 12 & 13

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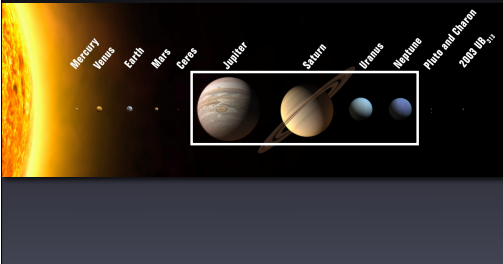
moons in the Solar system

Number of moons: Jupiter: 79, Saturn: 62, Uranus: 27, Neptune: 14



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Gas planets



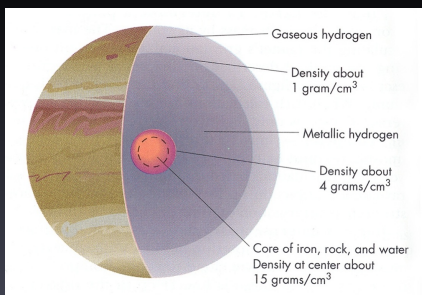
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Jupiter



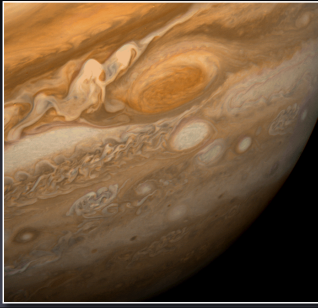
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Jupiter - internal structure



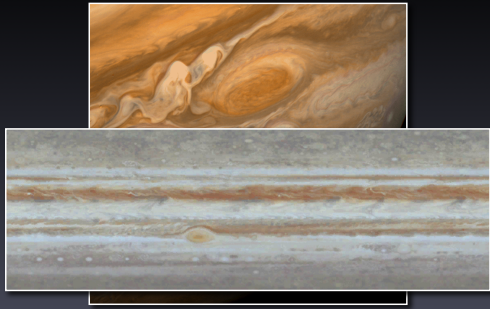
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Jupiter - a super storm in a turbulent atmosphere



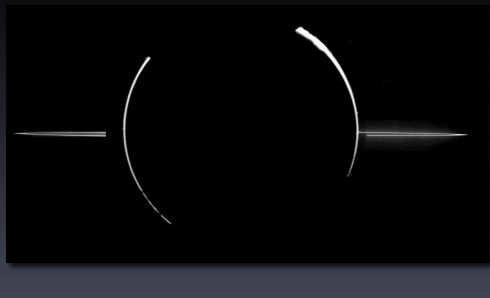
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Jupiter - a super storm in a turbulent atmosphere



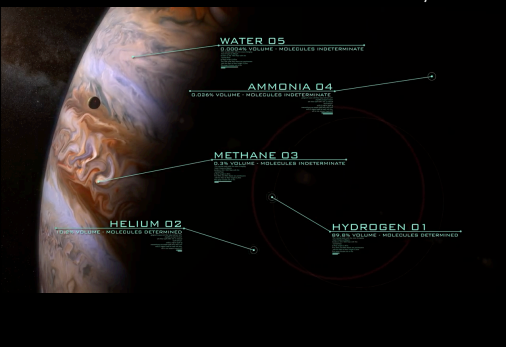
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Jupiter - a system of thin rings



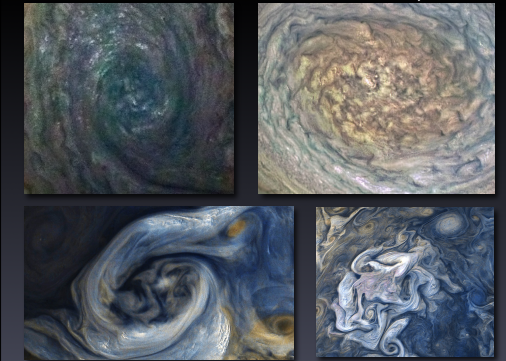
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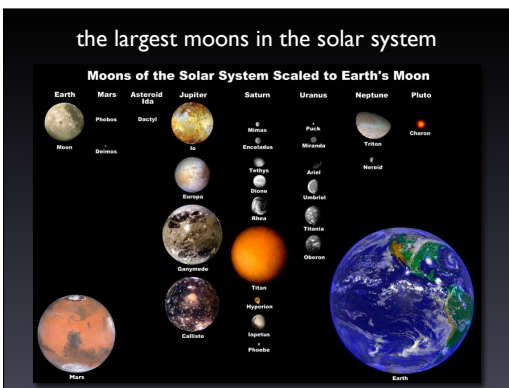
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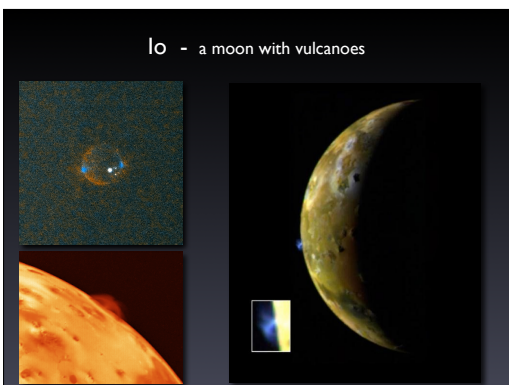
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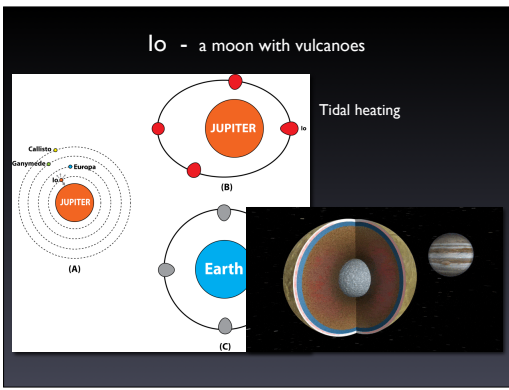
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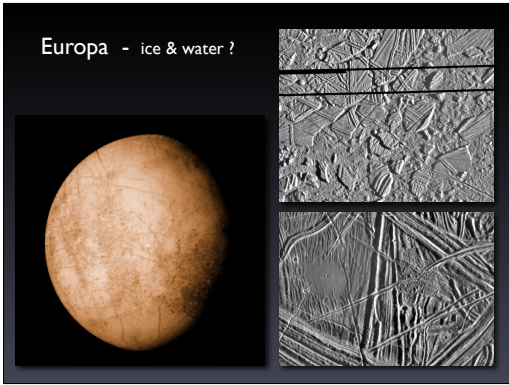
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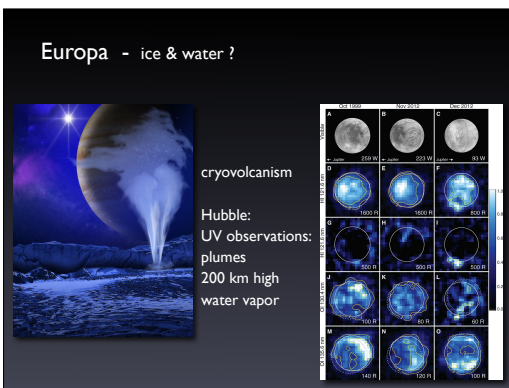
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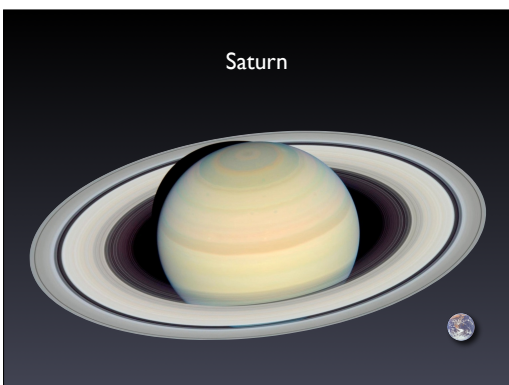
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Saturn - internal structure

Labels in diagram: Molecular hydrogen gas, Helium droplets in hydrogen, Metallic hydrogen, Rock, iron, and water core, Earth for comparison.

Average density of Saturn: 0.687 gram/cm³
 → could float on water!

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Saturn

majestic rings

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Ring system seen from Earth

Labels in diagram: Sun, Earth's orbit, Saturn's orbit, X (1996), W (1988), Y (2003), Z, View from Earth.

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3 perspectives on Saturn

seen from Earth

the Earth in 4 pixels

from Cassini

from within Saturn's shadow

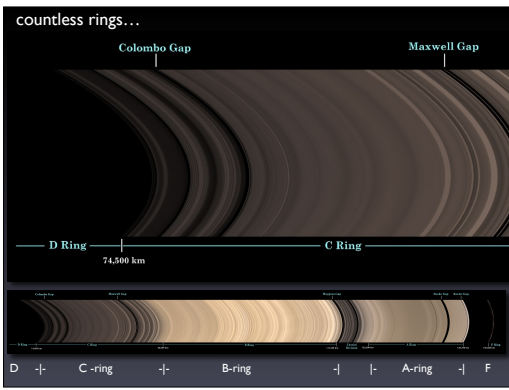
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Rings

Kepler's laws are valid here too!

gaps and compressions due to resonances with the many moons

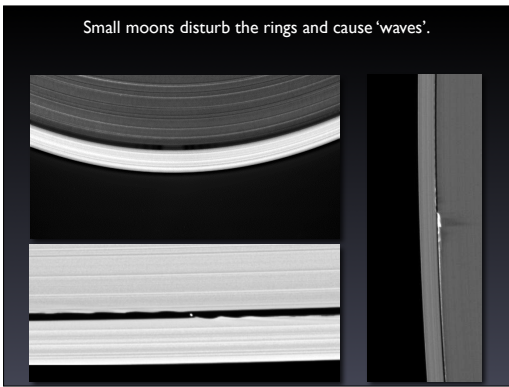
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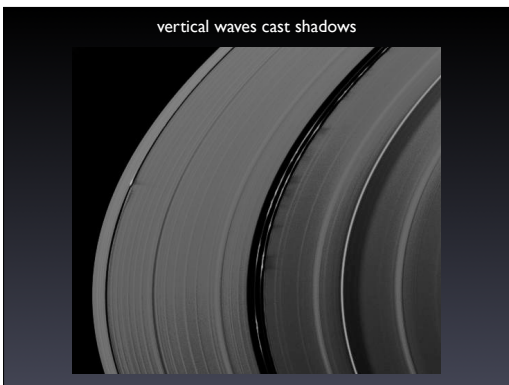
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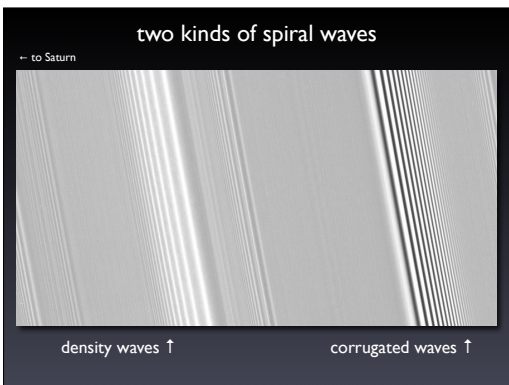
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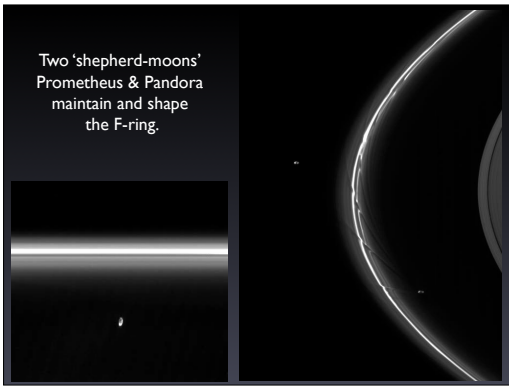
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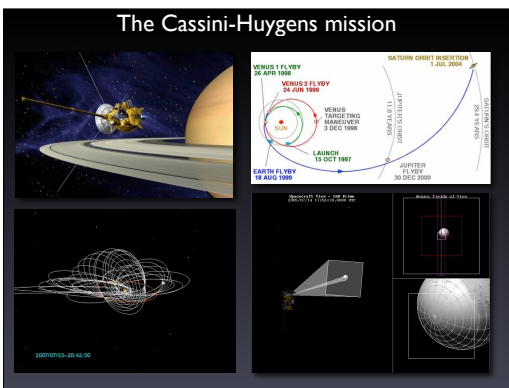
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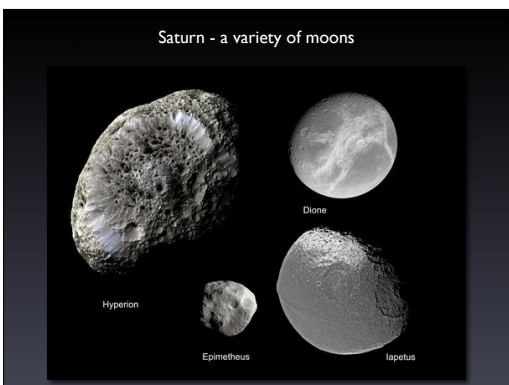
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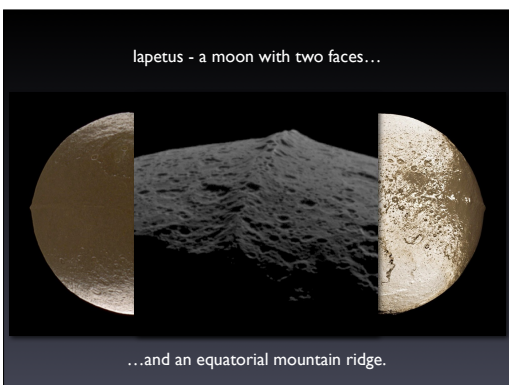
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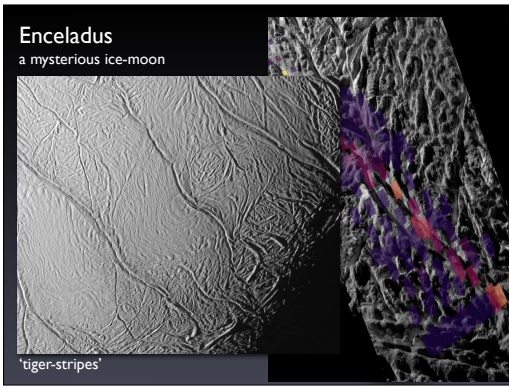
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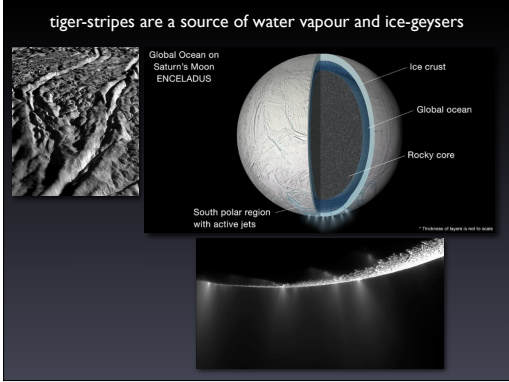
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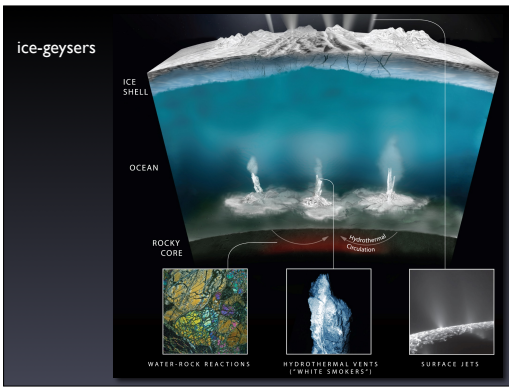
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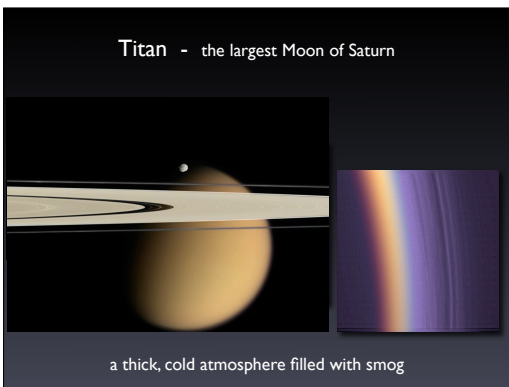
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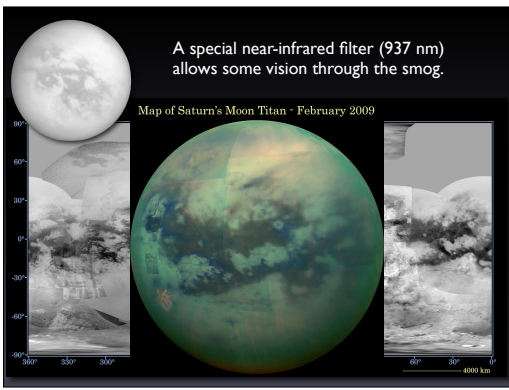
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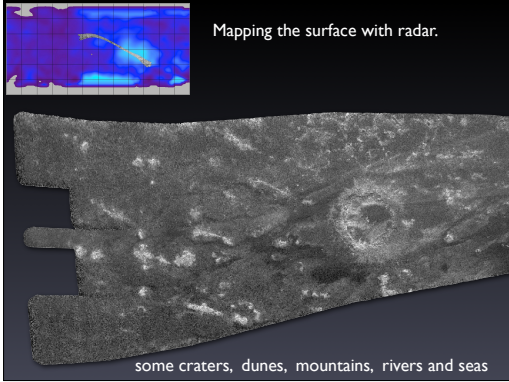
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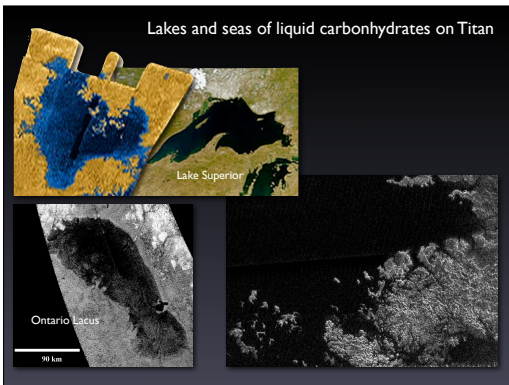
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Titan - a young surface with much erosion

Infrared image through the smog. from 16km altitude: rivers, clouds, shoreline? the surface...

rivers and lakes of liquid methane, ethane and other organic compounds

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Uranus

25,600 km Molecular hydrogen gas
18,000 km Water
7,500 km Iron and rock
Earth for comparison

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Uranus - a system of rings

and many moons

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Uranus - extreme obliquity of the rotation axis

URANUS
N
Rotation axis
S

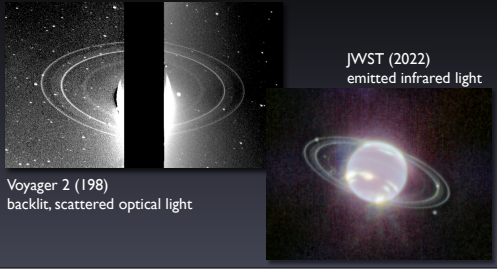
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Neptune

Triton

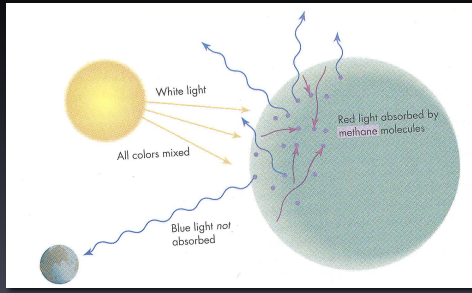
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Neptunus - again, a system of rings



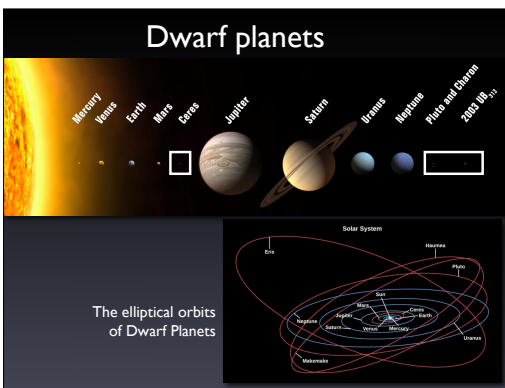
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Uranus & Neptune - why are they blueish?



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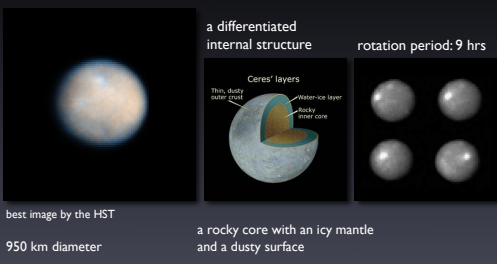
Dwarf planets



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Ceres

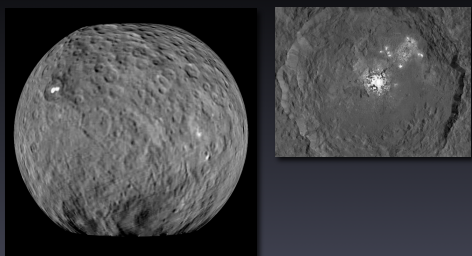
a dwarf planet between Mars and Jupiter in the asteroid belt



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Ceres

a dwarf planet between Mars and Jupiter in the asteroid belt



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Pluto & Charon

a double dwarf planet

Pluto & Charon with four newly discovered moons

See: *New Horizons* mission to Pluto <http://pluto.jhuapl.edu>

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Pluto & Charon

See: *New Horizons* mission to Pluto <http://pluto.jhuapl.edu>

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Pluto & Charon

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Pluto - a thin, layered atmosphere

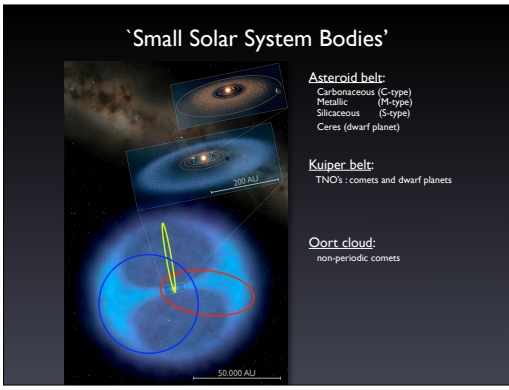
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Eris and its moon Dysnomia

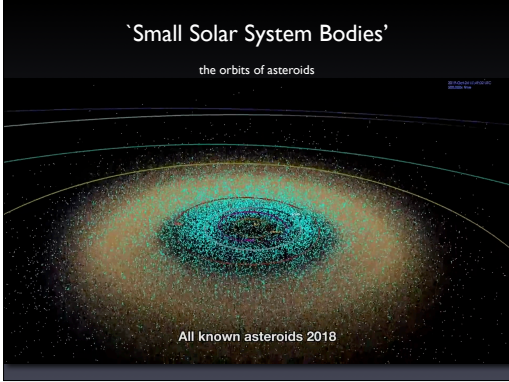
Eris : 559-year orbit
0.3% of Earth mass
2850 km diameter (82% of Moon diam.)

Dysnomia : 16-day orbit
indicates mass of Eris
1/8th the diameter of Eris

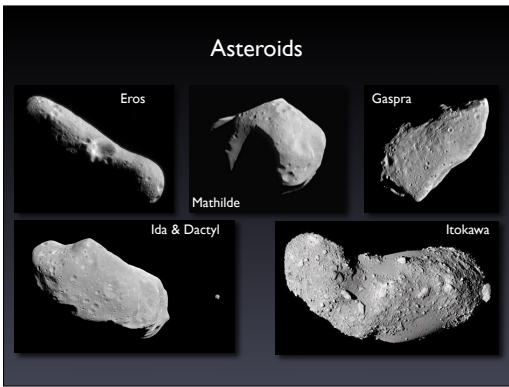
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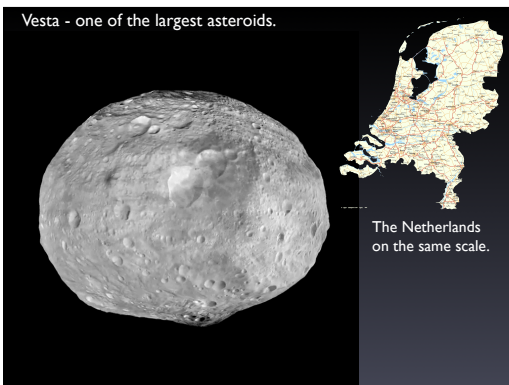
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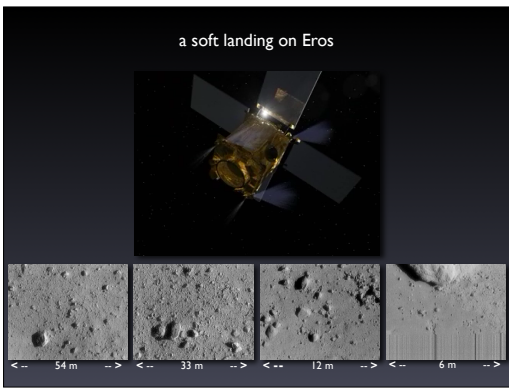
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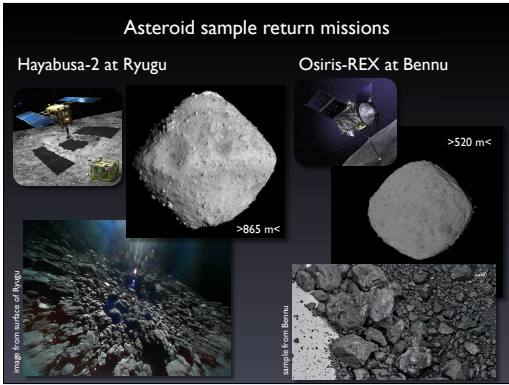
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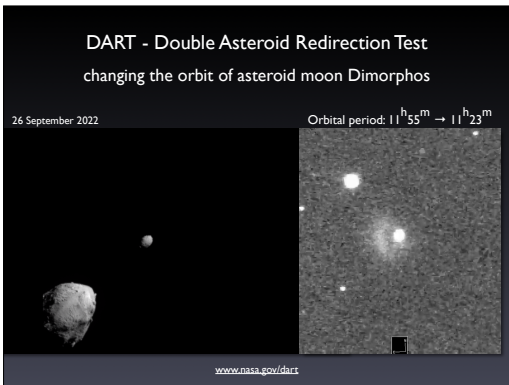
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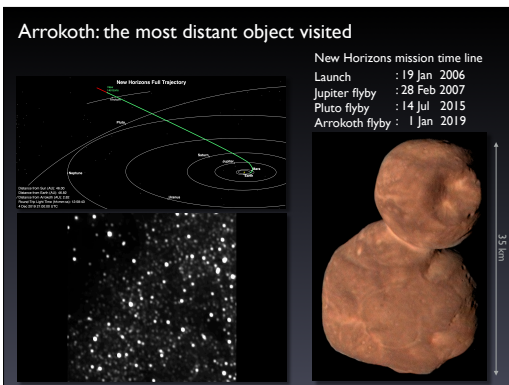
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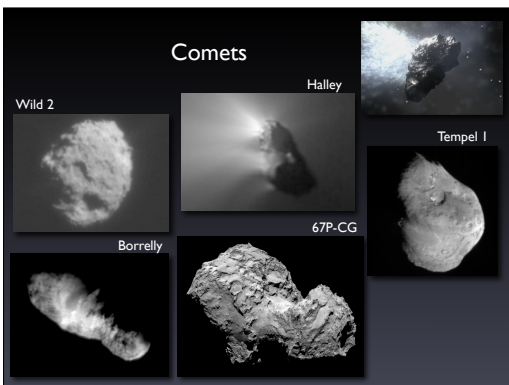
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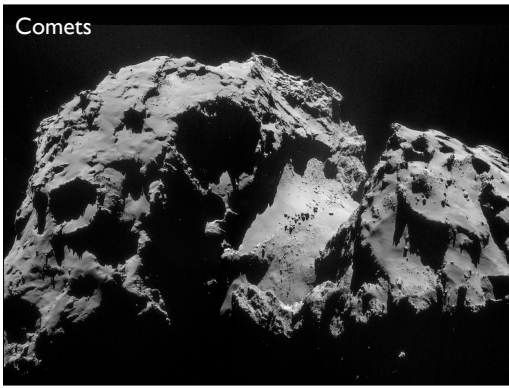
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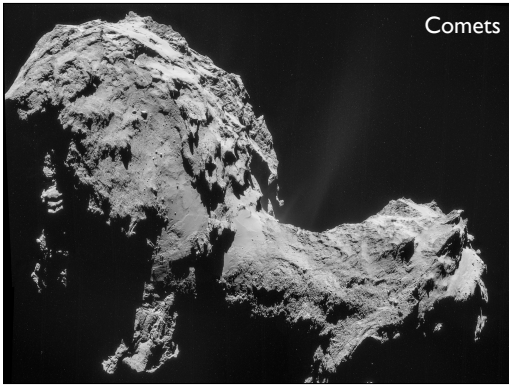
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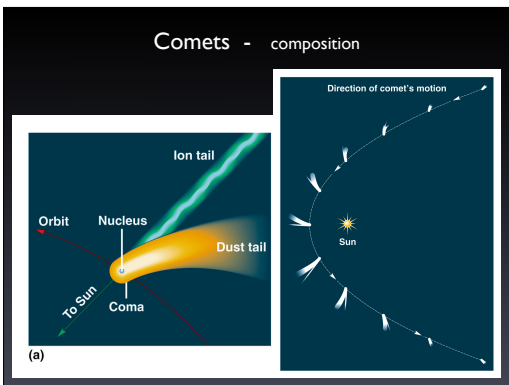
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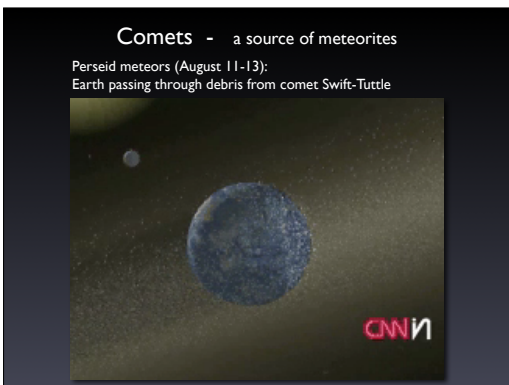
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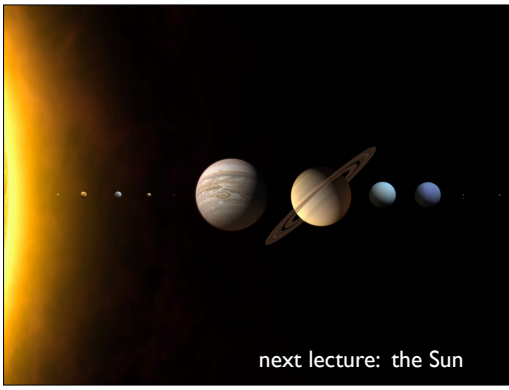
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next lecture: the Sun