The Solar System

10/23/2009

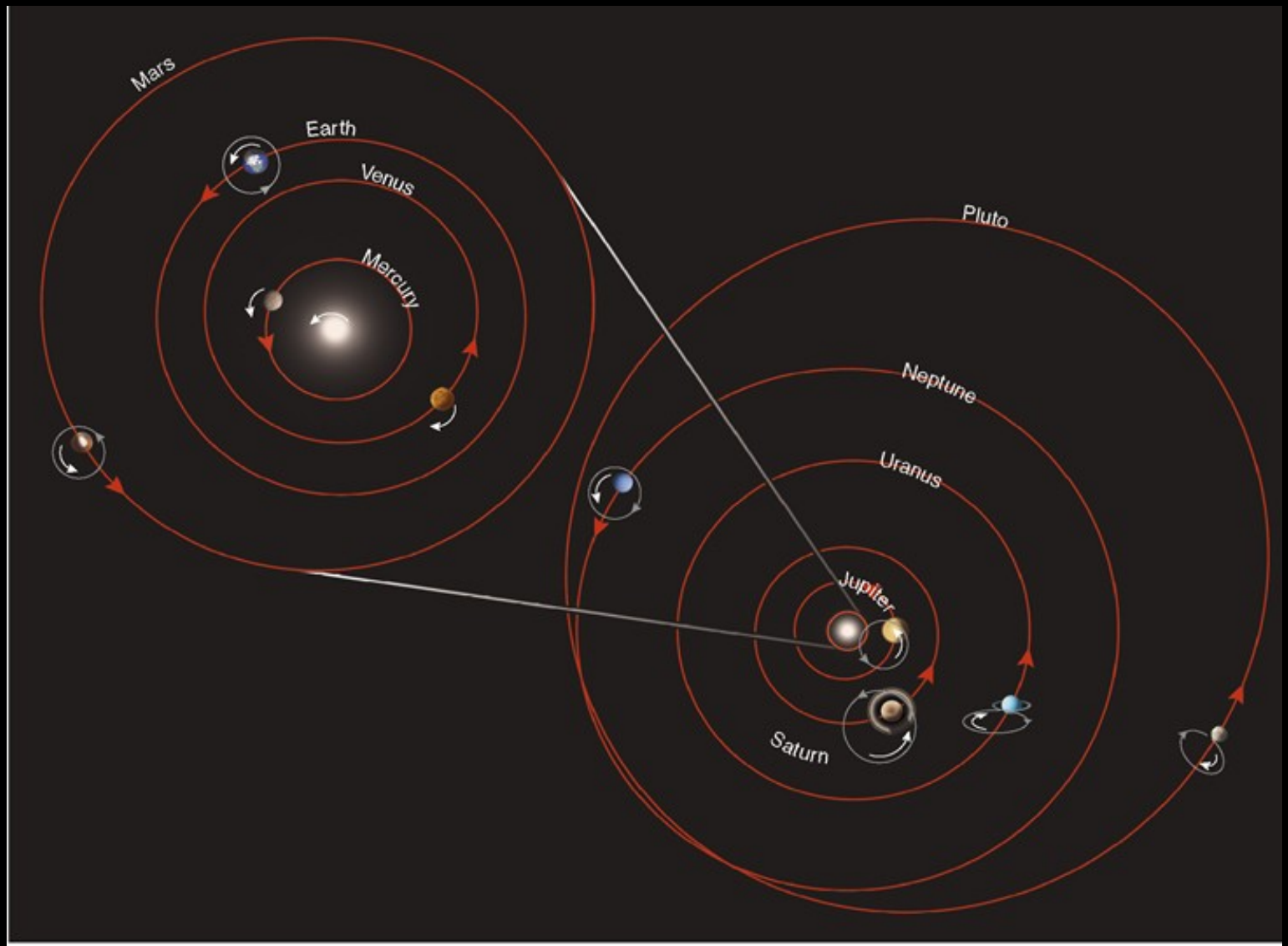
Opening Discussion

- Have you seen anything interesting in the news?
- Why I write hard tests. Why I want you to be able to do the harder problems.

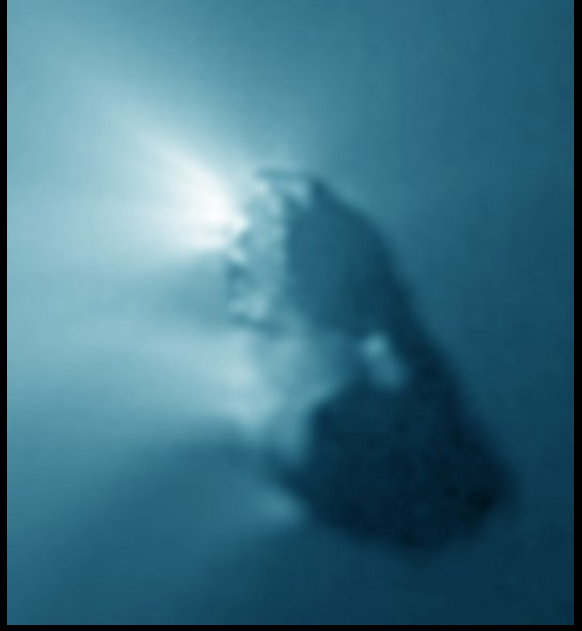
Introduction to the Solar System

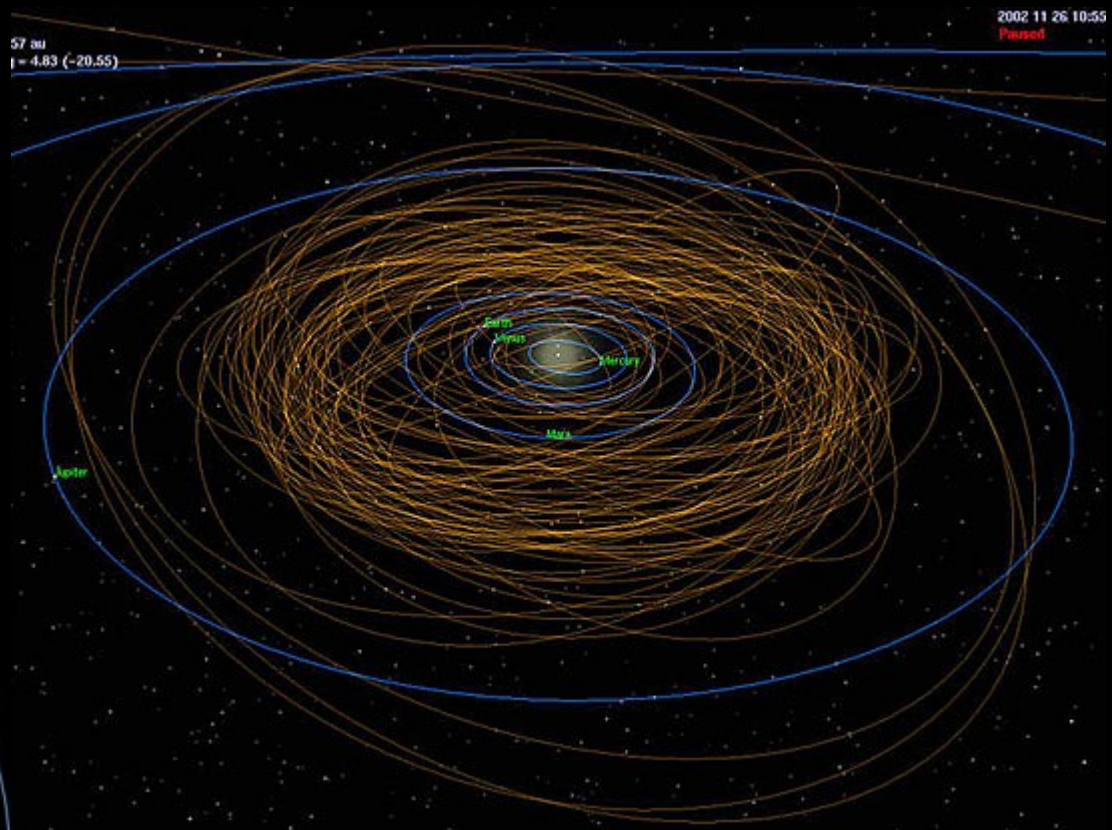
- Most of the rest of the semester will be spent doing comparative planetology. That is where we compare the features of planets to gain a deeper understanding of them. Today and next class though we will familiarize ourselves with the basics of our Solar System.
- Our Solar System has 4 terrestrial planets (Mercury, Venus, Earth, and Mars) and 4 jovian planets (Jupiter, Saturn, Uranus, and Neptune).

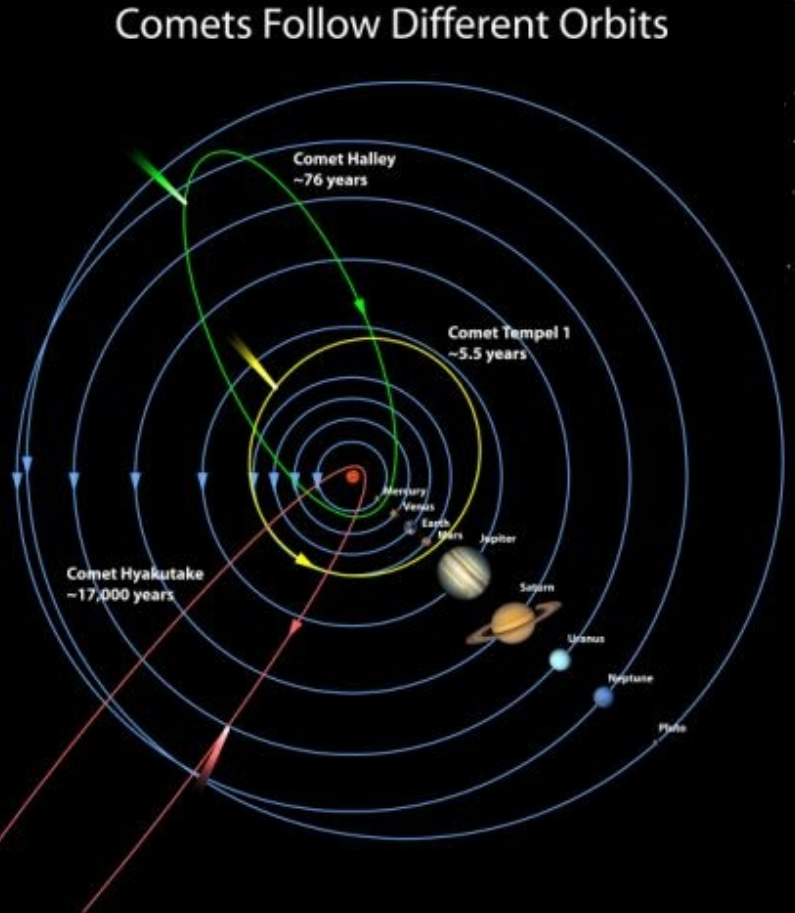
Patterns in Motion



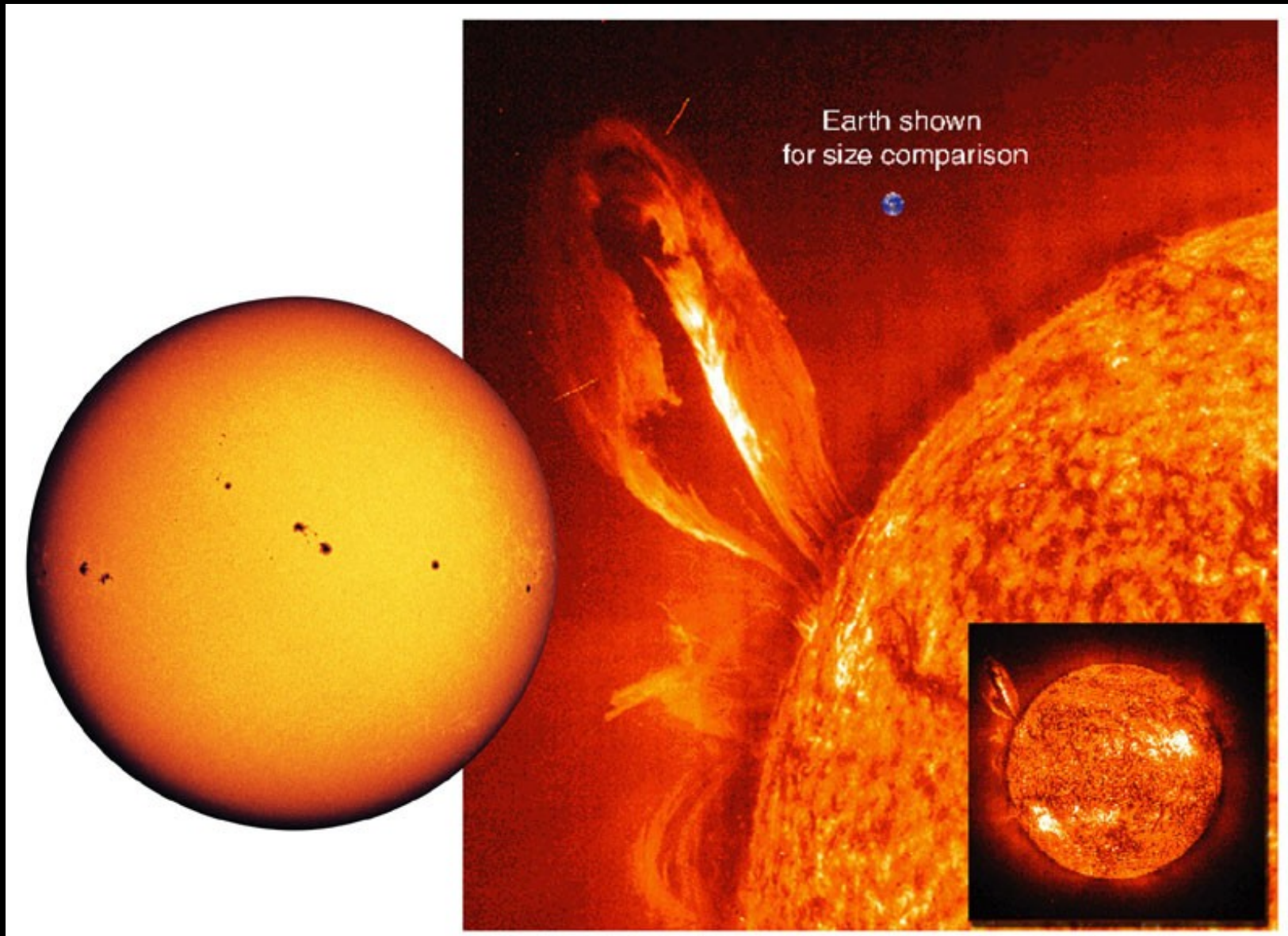
Small Bodies



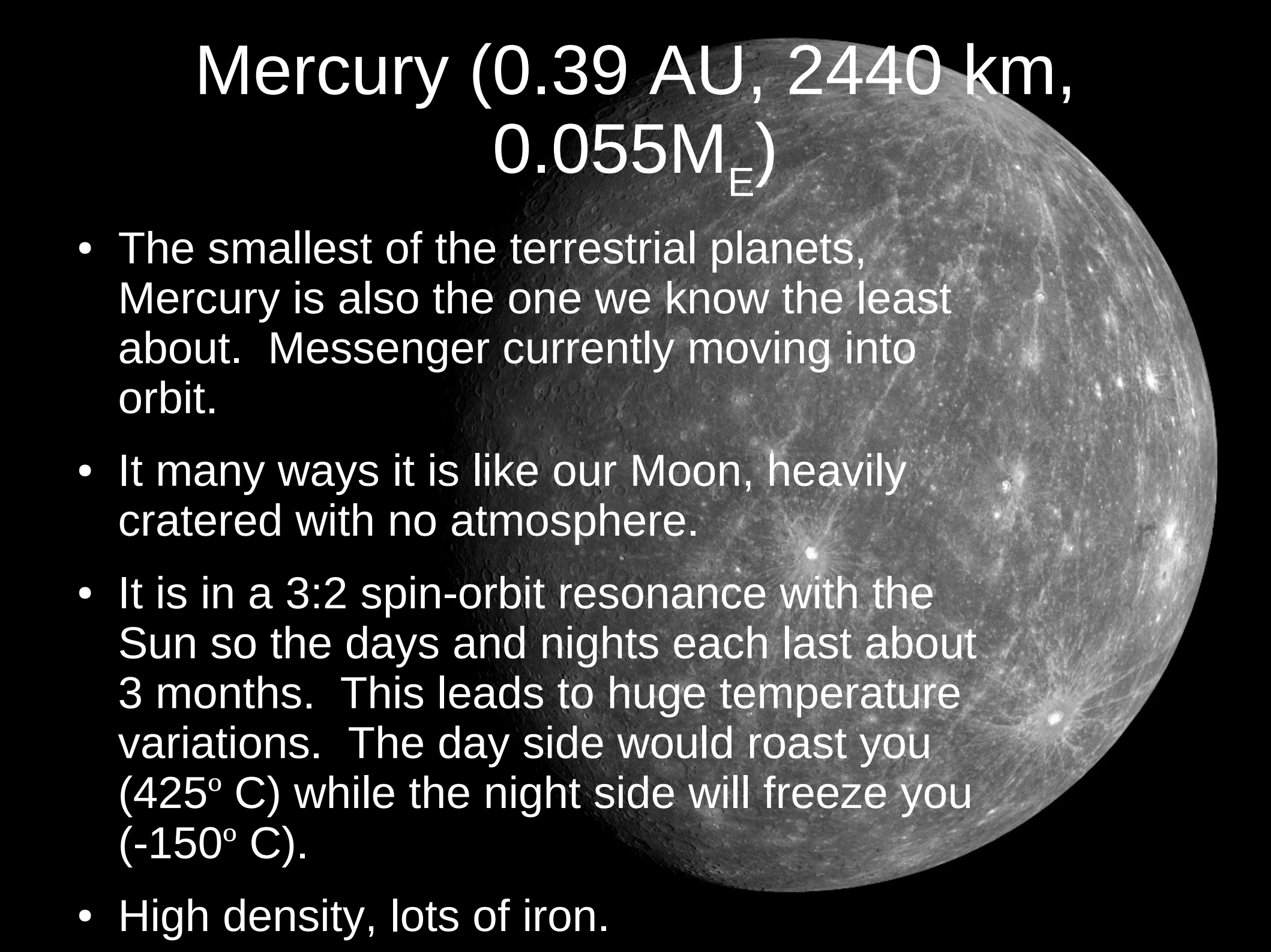




The Sun



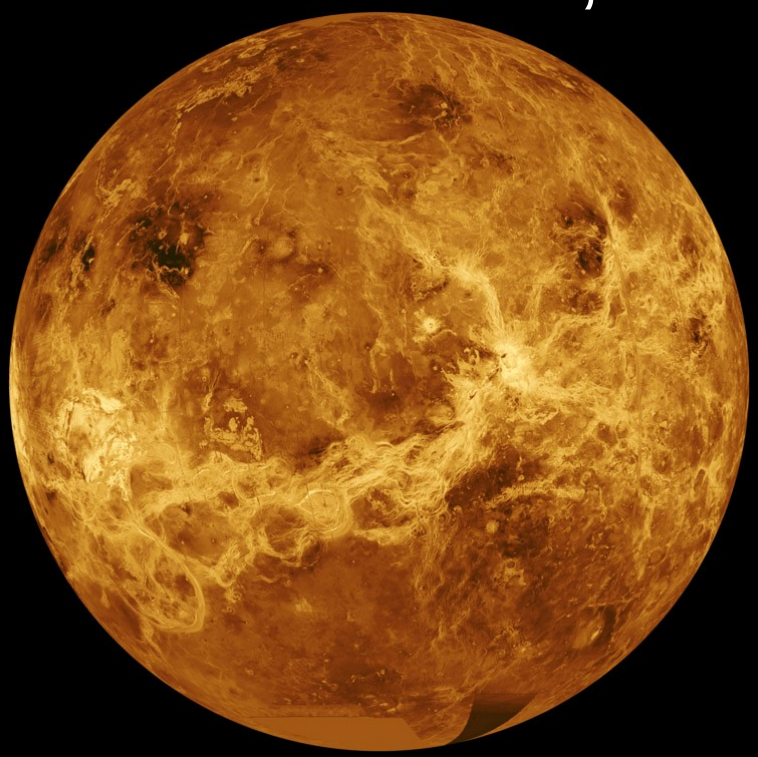
Mercury (0.39 AU, 2440 km, $0.055M_E$)



- The smallest of the terrestrial planets, Mercury is also the one we know the least about. Messenger currently moving into orbit.
- It many ways it is like our Moon, heavily cratered with no atmosphere.
- It is in a 3:2 spin-orbit resonance with the Sun so the days and nights each last about 3 months. This leads to huge temperature variations. The day side would roast you (425^o C) while the night side will freeze you (-150^o C).
- High density, lots of iron.

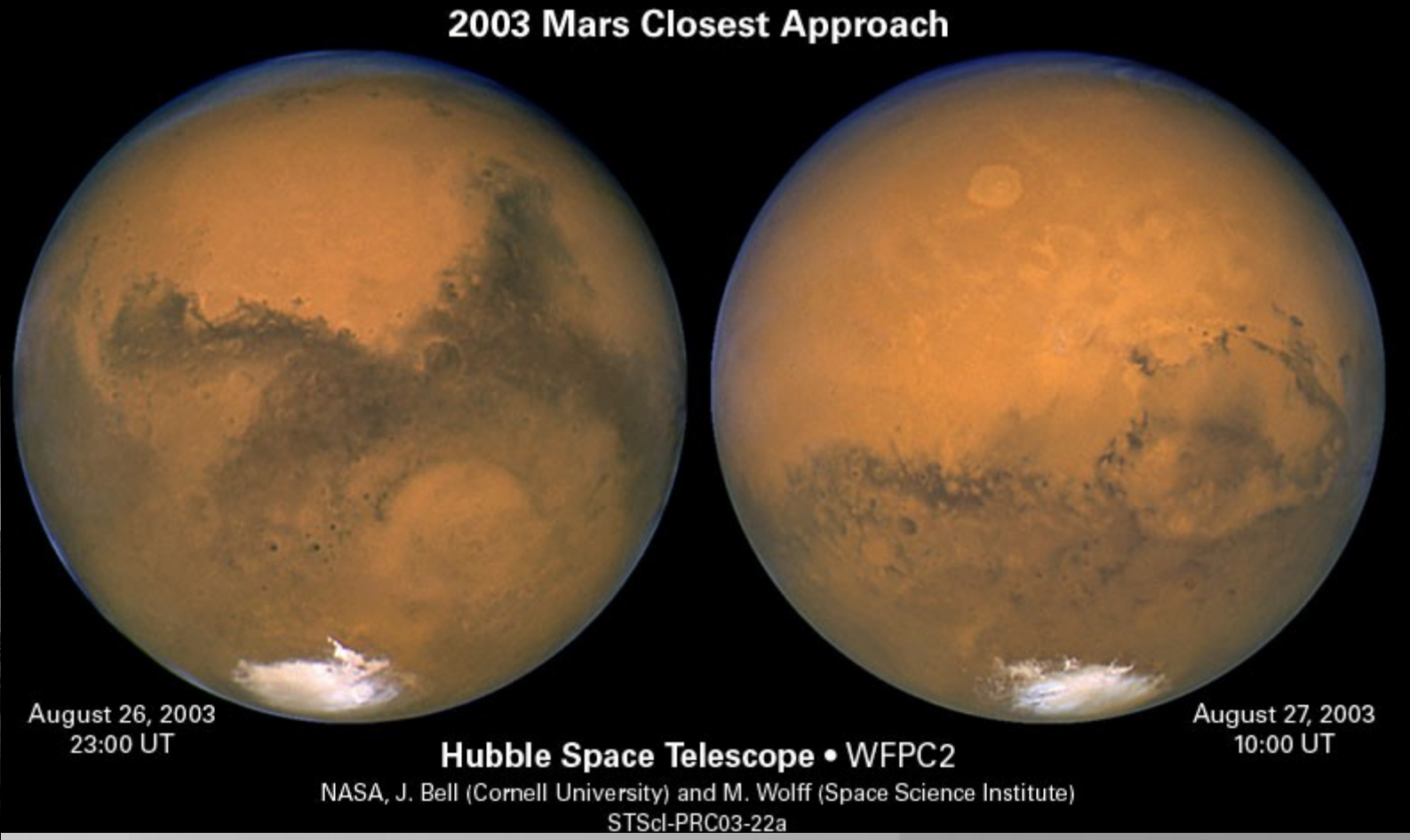
Venus (0.72 AU, 6051 km, 0.815M_E)

- Hottest planet in Solar System (425^o C) thanks to extremely thick CO_2 atmosphere. Days and night extremely long, but both equally hot.
- Surface hard to see through clouds and haze, requires radar imaging.



Earth (1 AU, 6378 km, $1M_E$)

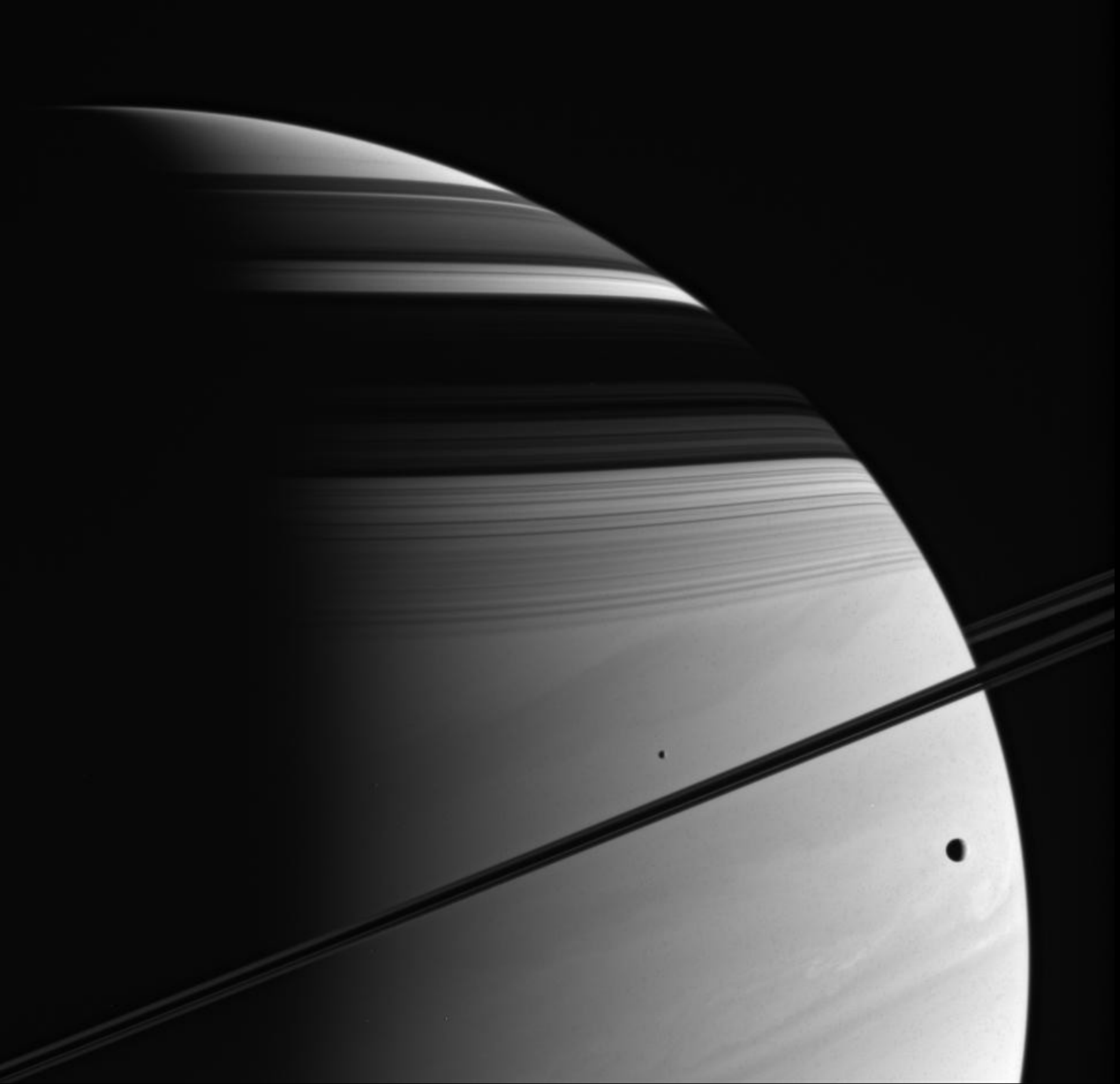
Mars (1.52 AU, 3397 km, 0.107M_E)



Jupiter (5.2 AU, 71492 km, 317.9M_E)

- Largest planet has a 300 year old storm, 4 large moons with many smaller ones, and thin rings.

Saturn (9.54 AU, 60268 km, 95.18M_E)



Uranus (19.19 AU, 25559 km, 14.54M_E)

- Uranus is tipped on its side.
- It has a collection of narrow rings.
- The blue-green color comes from significant amounts of methane in the atmosphere.
- Has only been visited by Voyager 2.

Neptune (30.06 AU, 24764 km, 17.13M_E)

- Twin to Uranus, including color from methane in atmosphere.
- Has a large storm called the great dark spot.
- Largest moon, Triton, orbits backwards.
- Has ring arcs.
- Also has only been visited by Voyager 2.

Minute Essay

- Tell me one fact about the planets we discussed today that you hadn't previously known.