

Introductory Astronomy

Week 3: Solar System(s)

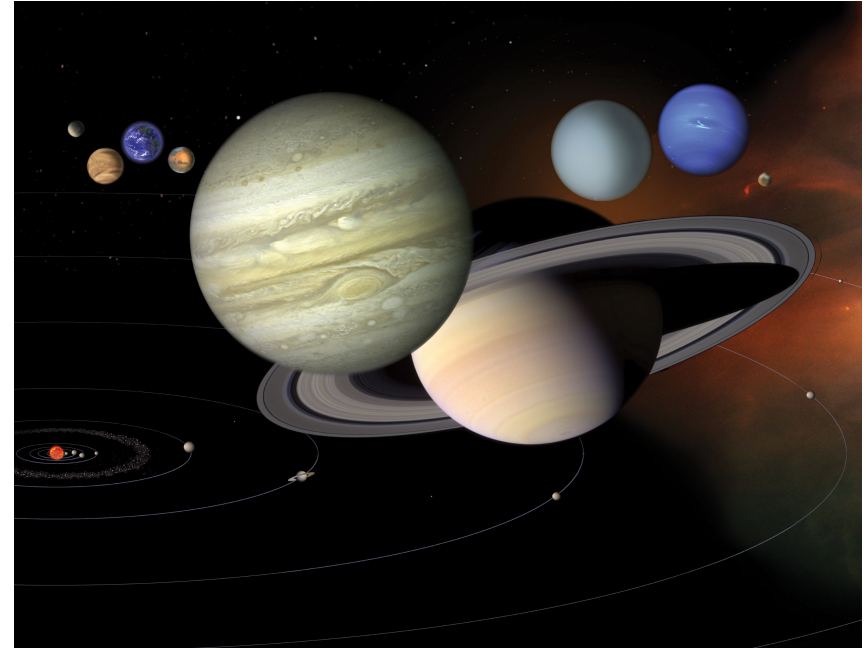
Clip 1: Introduction

Sun

- Mostly, Solar system is an average ($1M_{\odot}$) main sequence star
- Sun contains about 99.9% of the bound mass
- Radiation heats planets
- Solar wind – charged particles streaming from Sun at high energy carry $1M_{\oplus}$ in $150My$

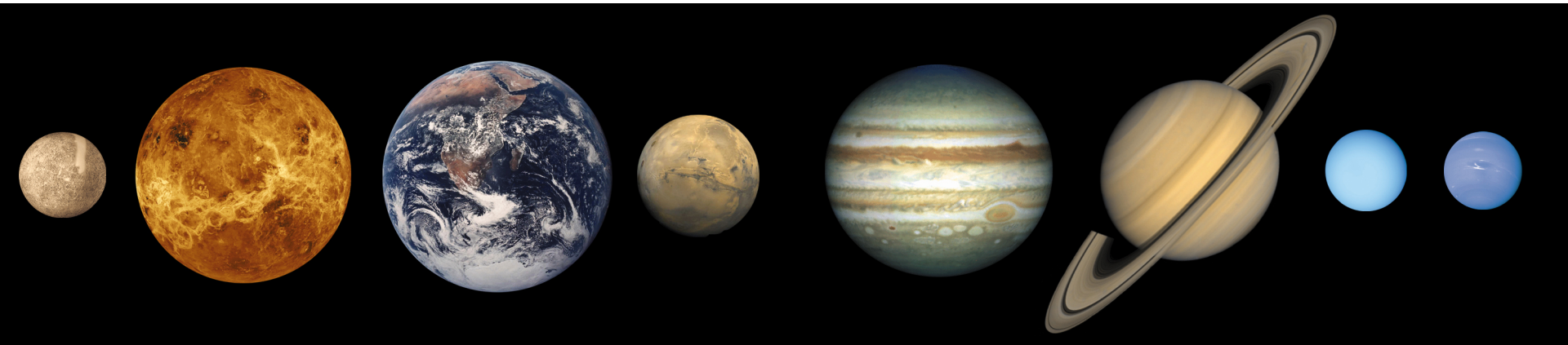
What is Out There

- Eight planets orbit Sun in slightly eccentric elliptic orbits
- Radius 0.39 – 30 AU
- Orbits near ecliptic match Sun rotation



Two Kinds of Planets

- Four **Inner** planets within **1.6 AU**
 - Dense
 - Small
 - Rocky
- Four **Outer** planets from **5-30 AU**
 - Less dense
 - Huge
 - Fluid

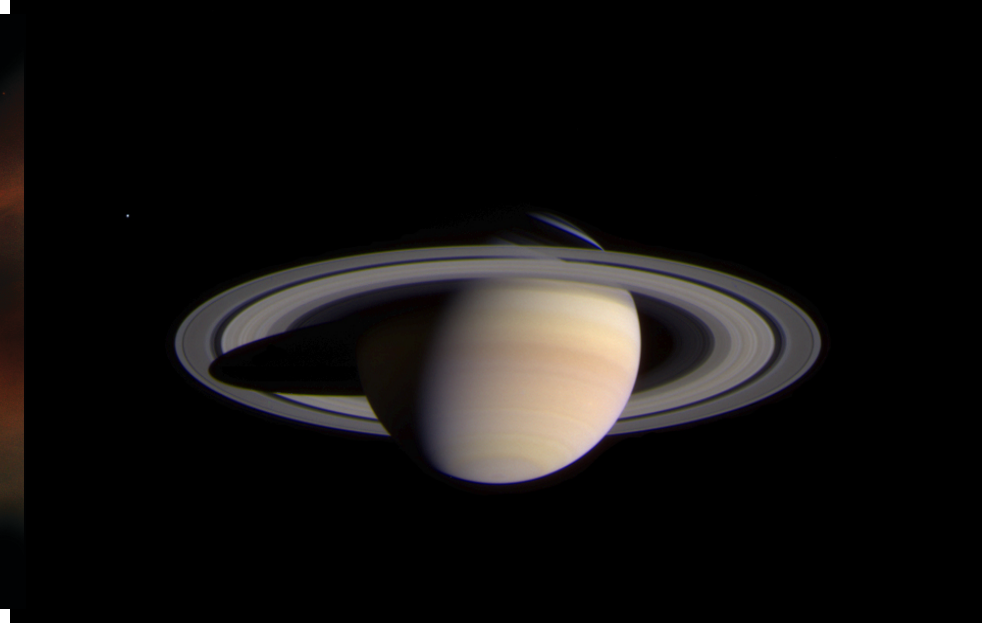


What Else?

Lots of Moons



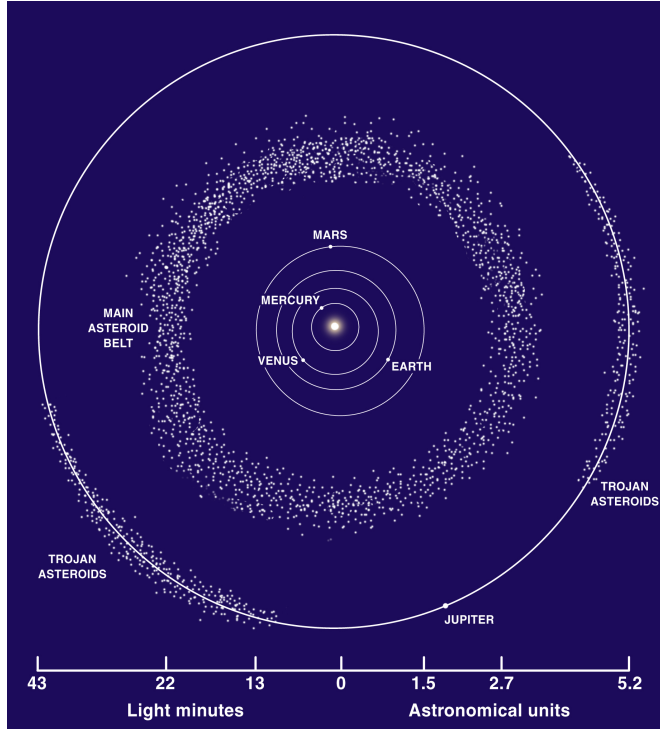
Rings



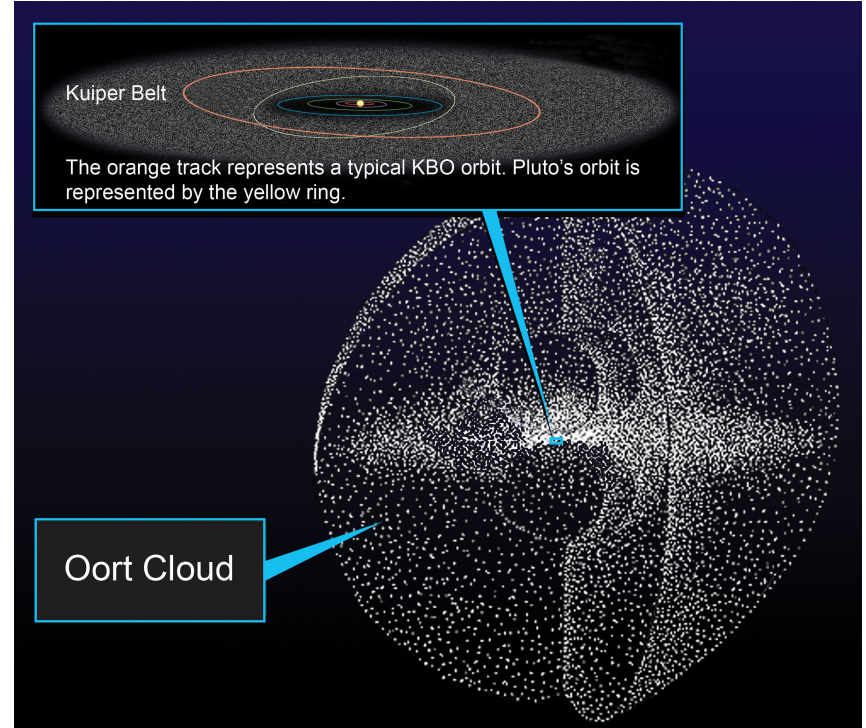
Craters



Asteroids

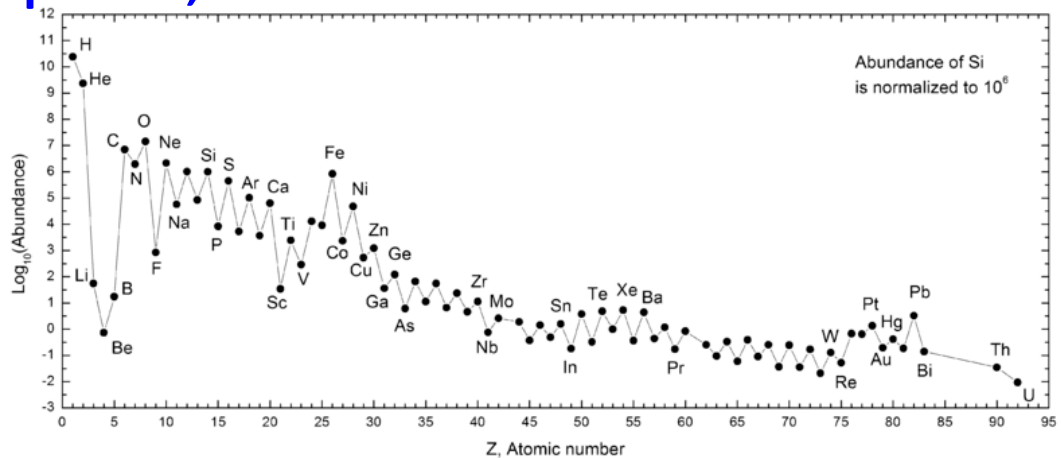


Farther Out



What it's Made Of

- 99.9% of mass is Sun
- 90% of rest is Jupiter, Saturn
- 70.5% Hydrogen
- 27.5% Helium
- 2% Metals



Questions

- Why are all planet orbits circular and in a plane? Why aren't comets'?
- Why are planets and large Moons round?
- Why aren't asteroids?
- Why are inner planets small, rocky, dense while outer planets are large, fluid, light?
- Why aren't asteroids a planet?
- What is the story with Pluto?
- What are rings? Why are Saturn's different?
- What made all the craters? Where did it go?
- Why do comets fall into inner Solar System? Why do asteroids fall into near-Earth orbits?
- If orbits can change – will planet orbits? Have they?
- Where did it all come from? When?

Credits

- Images : NASA/Lunar and Planetary Institute
<http://solarsystem.nasa.gov//multimedia/>