

The Sun....center of the solar system



If little asteroids hit the Earth all the time,
big ones will hit us once in a while

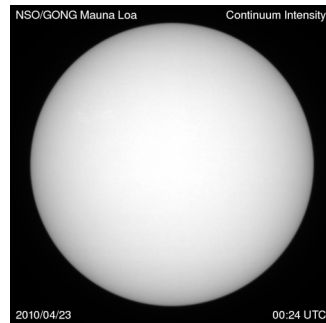
[Big Impact Home Page](#)

Note Ries and Steinheim in Germany...
Double impact

Some impact craters of particular interest

- Chicxulub (possibly caused extinction of dinosaurs)
- Manson (here in the Hawkeye State; 74 million years ago, similar in size to Chicxulub)
- Barringer Crater (Arizona; one of the best-preserved on Earth)
- Ries and Steinholm (Germany; same age, probably binary asteroid)

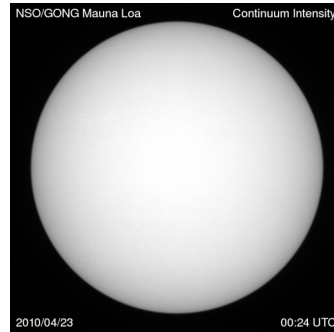
At this point in the semester, we have discussed all the major classes of objects **in orbit** around the Sun, but not the Sun itself



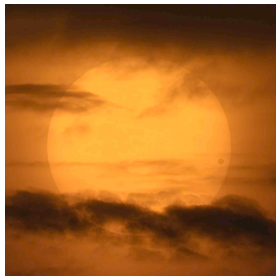
Let's see how the Sun "stacks up" against some of the objects we have talked about

Object	Radius (km)	Mass (kg)
Earth	6378	5.97E24
Moon	1738	7.35E22
Mars	3394	6.39E23
Jupiter	71490	1.90E27

Let's think through how we determine some of the basic properties of the Sun

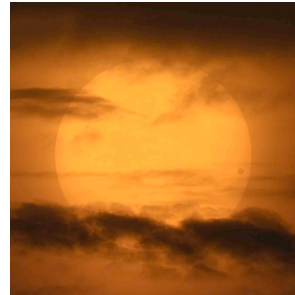


How far away is the Sun?



By this time in the semester, ← A threat!
you had better know!

How could we figure out the radius/diameter of the Sun?

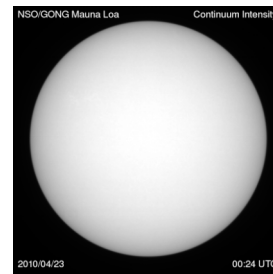


How could we figure out the radius/diameter of the Sun?

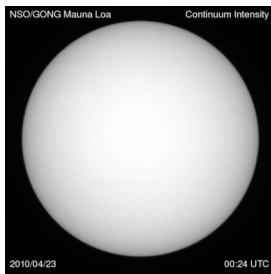


Answer: 696,000 km

How could we determine the mass of the Sun?



How could we determine the mass of the Sun?

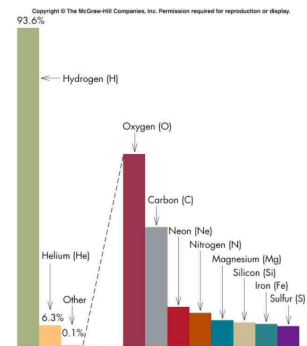


Answer: 1.989×10^{30} kg

What is the Sun made of?

The stuff of the universe

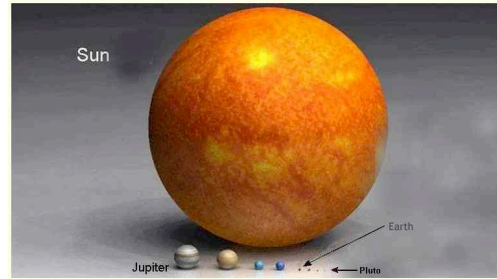
The recipe of Jupiter and Saturn (or vice versa)



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Sun	696,000	1.99E30

The Sun is in an entirely different class of objects than the planets...it is a star



Question for SGU graduates (or anybody else): what kind of star is the Sun?

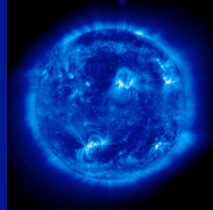


One emphasizes (somewhat) different aspects of the Sun in a solar system astronomy class



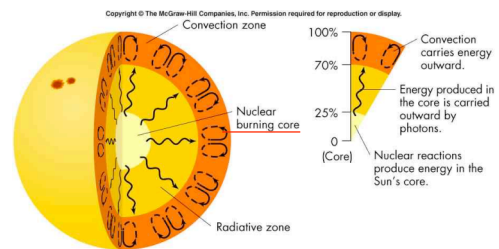
Reign of Akhenaten and Nefertiti (~1350 BCE)

Point to make: when observed in the light of ultraviolet lines, the Sun is not a constant, static object



[SOHO watches the ultraviolet Sun rotate](#)

Why does the Sun shine?



Luminosity (or power output) of $3.85E26$ Watts

Because the Sun is the type of star it is...

- It produces the “right luminosity” for us ($3.85E26$ Watts)
- This luminosity is believed to have been stable for the last several billion years
- It shines at this luminosity long enough for us to arrive on the scene and enjoy it