February 8, 2010

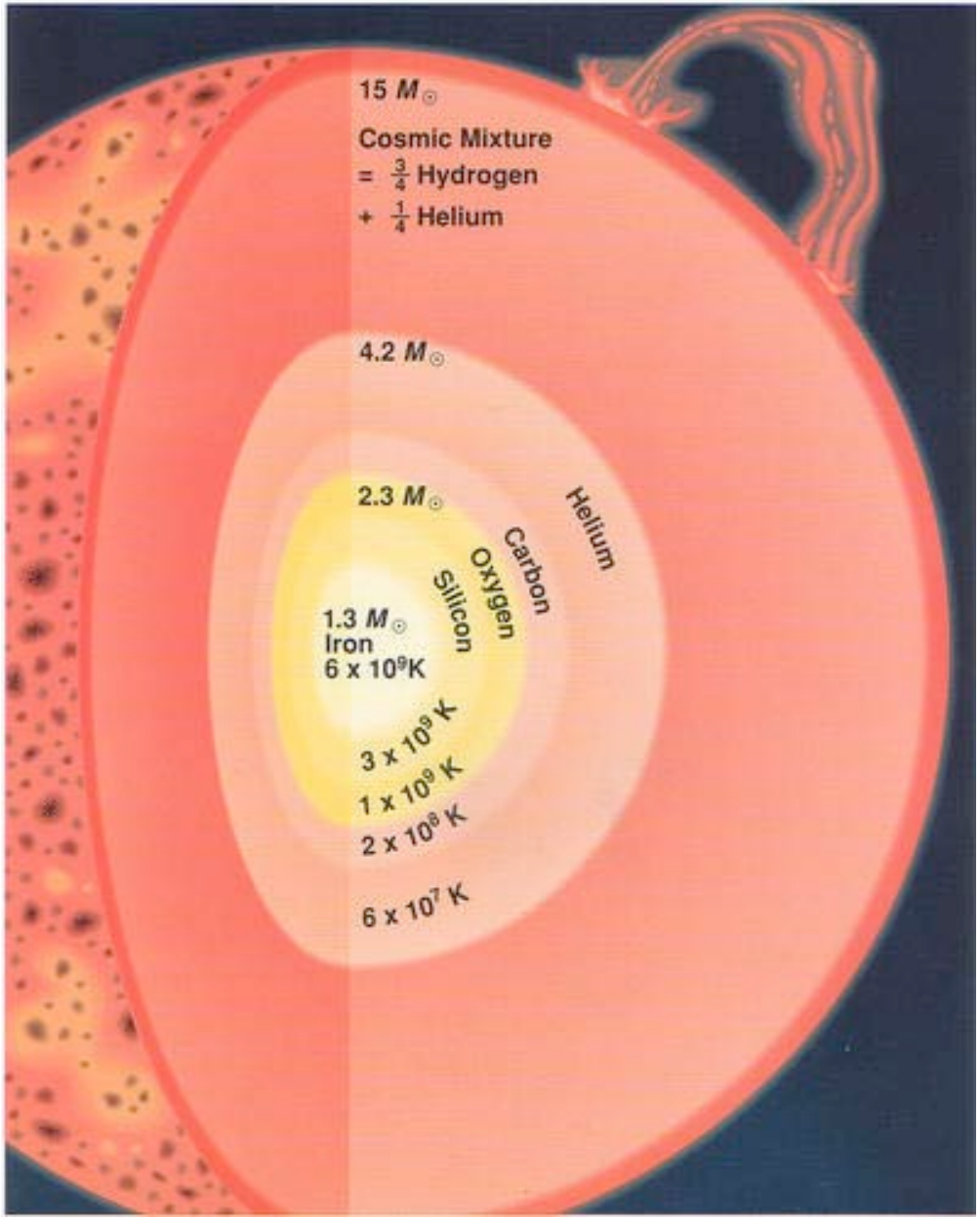
Exams will be returned Wednesday, answers posted on web page.

Sky Watch - working together is encouraged, but you must write up **independent** reports in your own words.

Reading, Sections 6.2, 6.3. Sections 1.2, 2.1, 2.4, 2.5 for background.

Astronomy in the News? Shuttle Endeavor launched early this morning to International Space Station. Only four more scheduled before de-comissioning.

Pic of the Day - ice crystal Sun halo in Cambodia.



Origin of Type II, Ib. Ic

How does a massive star get from hydrogen to iron, and why iron, and what then?

Discussion point:

What do you know about iron?

Evolution - gravity vs. charge repulsion
§ 2.1

Discussion point: Why do you have to heat a fuel to burn it?

H → He → C → O
more protons, more charge repulsion, must get ever hotter to burn ever "heavier" fuel

Just what massive stars do!
Support by thermal pressure.
When fuel runs out, core tries to cool but gravity squeezes, core contracts and HEATS UP
overcomes higher charge repulsion, burns new, heavier fuel, ***until get to iron***

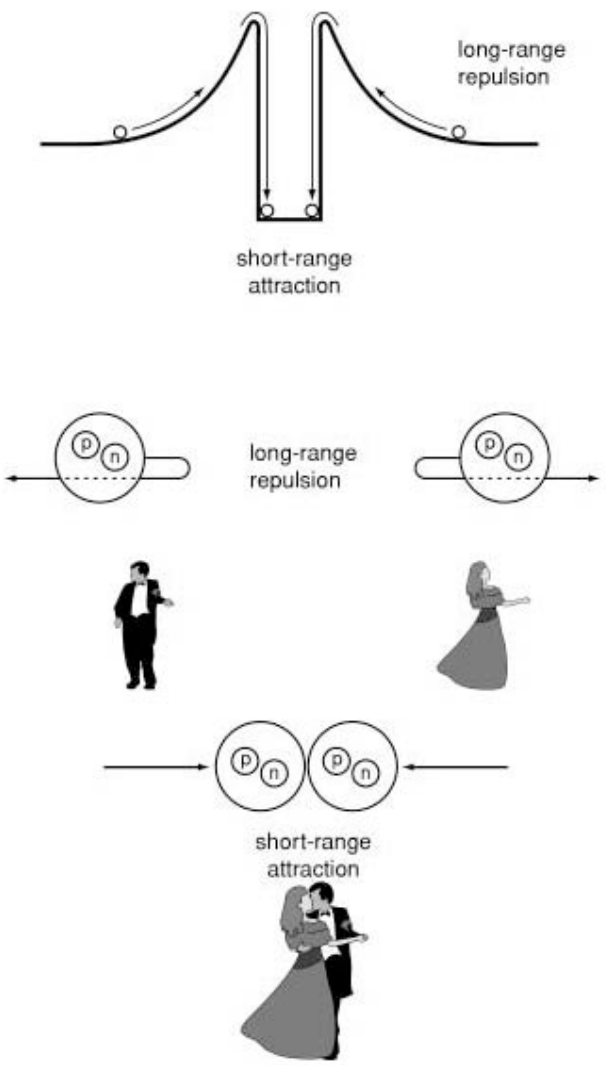


Figure 2.1

Make succession of heavier elements

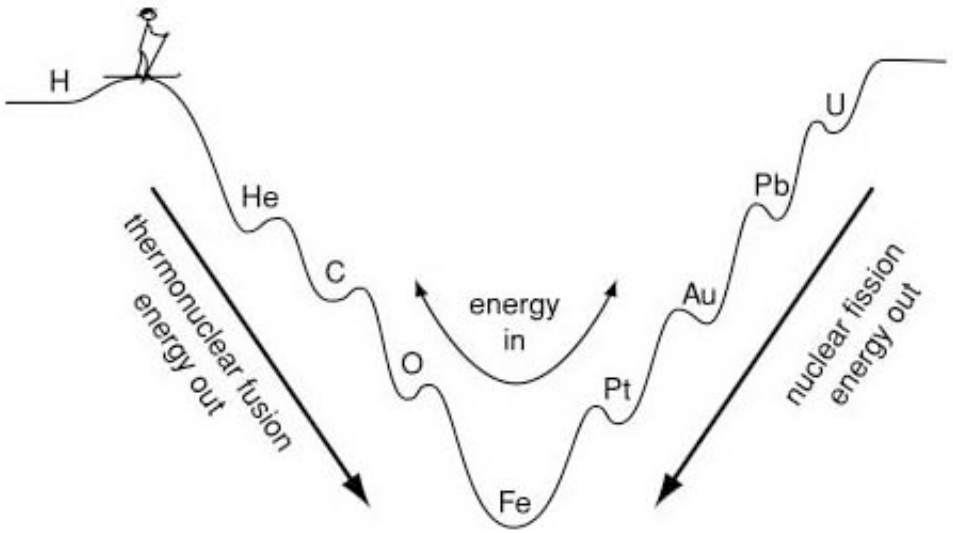


Figure 2.3

Special role of Iron - 26p, 30n

Endothermic - must put energy in to break iron apart into lighter elements or to forge heavier elements, absorb energy, lower pressure, core contracts, absorb more energy, more contraction…

=> The iron core quickly collapses! Catastrophic death of the star.

When iron core forms - star is doomed to collapse, form a neutron star (or maybe a black hole), composed essentially of all neutrons.

$p + e \rightarrow n + \nu$ ***neutrino***,

Action of Weak Nuclear Force (Chapter 1.2)

One ν is generated for every p that is converted. a star's worth of protons

$\Rightarrow$***<u>lots of neutrinos</u>***

$\Rightarrow$99% of energy of collapse is carried off by neutrinos (Ch 1.2, 2.1, 2.2)