

Wednesday, September 18, 2013

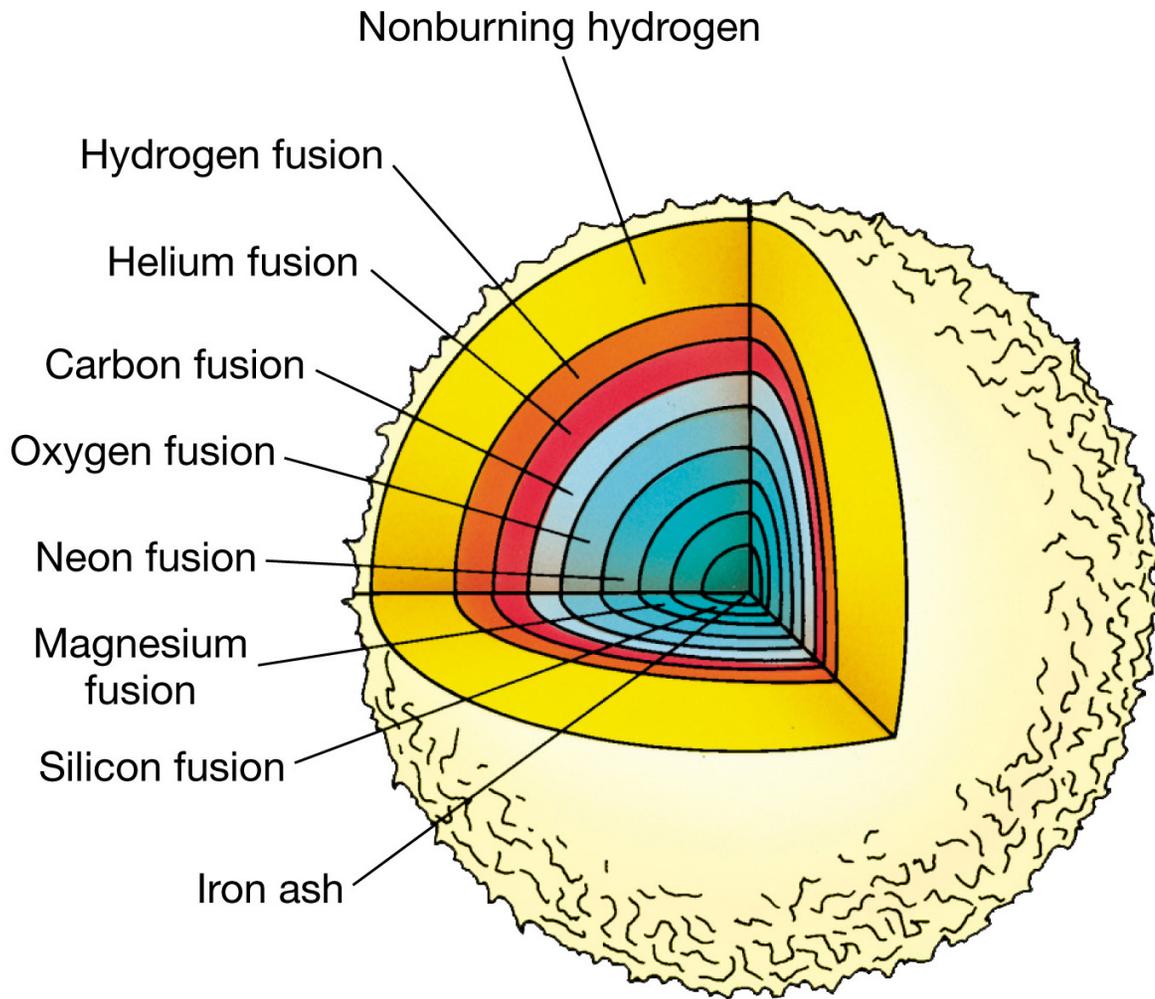
Exam back, grades on Blackboard, key posted on class web site,

Reading Chapter 6 (continued) Sections 6.4, 6.5, 6.6, 6.7
(background: Sections 1.2, 2.1, 2.4, 2.5, 3.3, 3.4, 3.5, 3.10, 4.1, 4.2, 4.3, 4.4, 5.2, 5.4)

Astronomy in the news?

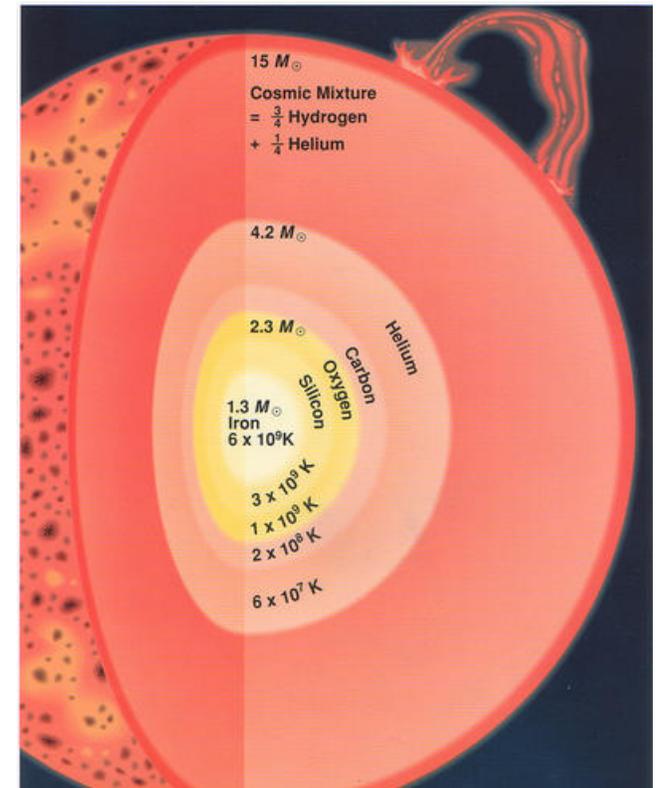
Goal

To understand how a massive star gets from hydrogen to iron, and why iron?



Origin of Type II, Ib, Ic

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



Evolution - gravity vs. charge repulsion

§ 2.1

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

$H \rightarrow He \rightarrow C \rightarrow O$

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 loses energy**,
but gravity squeezes, core contracts and
HEATS UP

overcomes higher charge repulsion, burns
new, heavier fuel, *until get to iron*

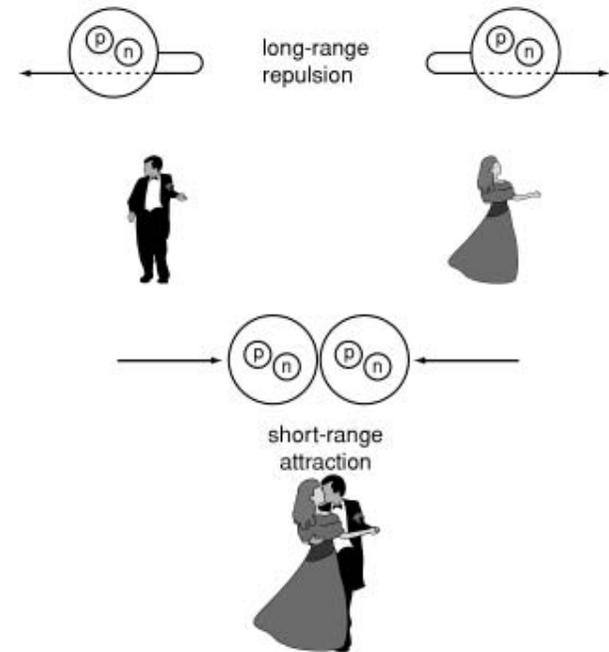
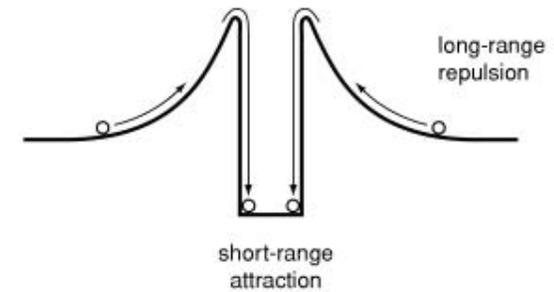


Figure 2.1

Make succession of heavier elements

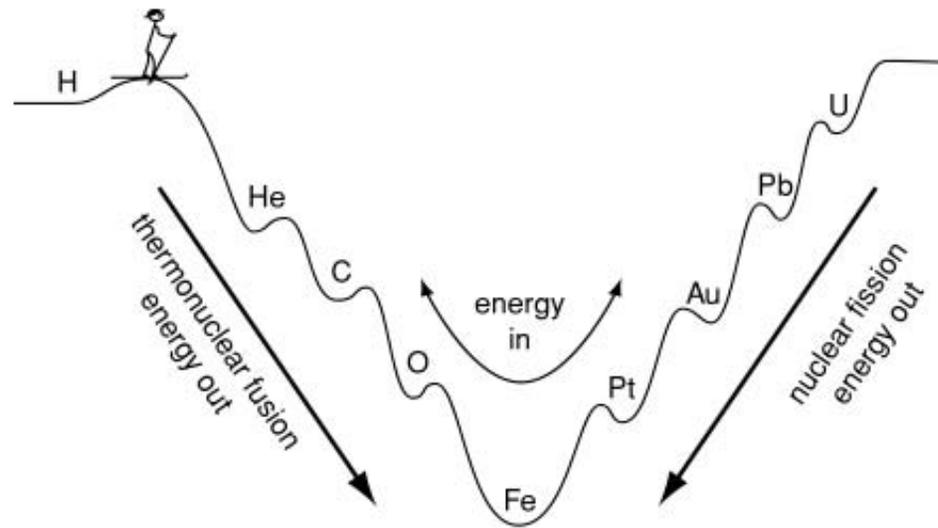


Figure 2.3
measure of
binding
energy of
protons and
neutrons in
the atomic
nucleus

Special role of Iron - 26p, 30n, most tightly bound arrangement of protons and neutrons.

Endothermic - must put energy in to break iron apart into lighter elements or to forge heavier elements. Irons absorbs energy, lowers pressure, core contracts, iron absorbs more energy, more contraction...

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