9/29/06

Extra Credit Back

News?

Pic of the day - Two spiral galaxies 140 million light years away.

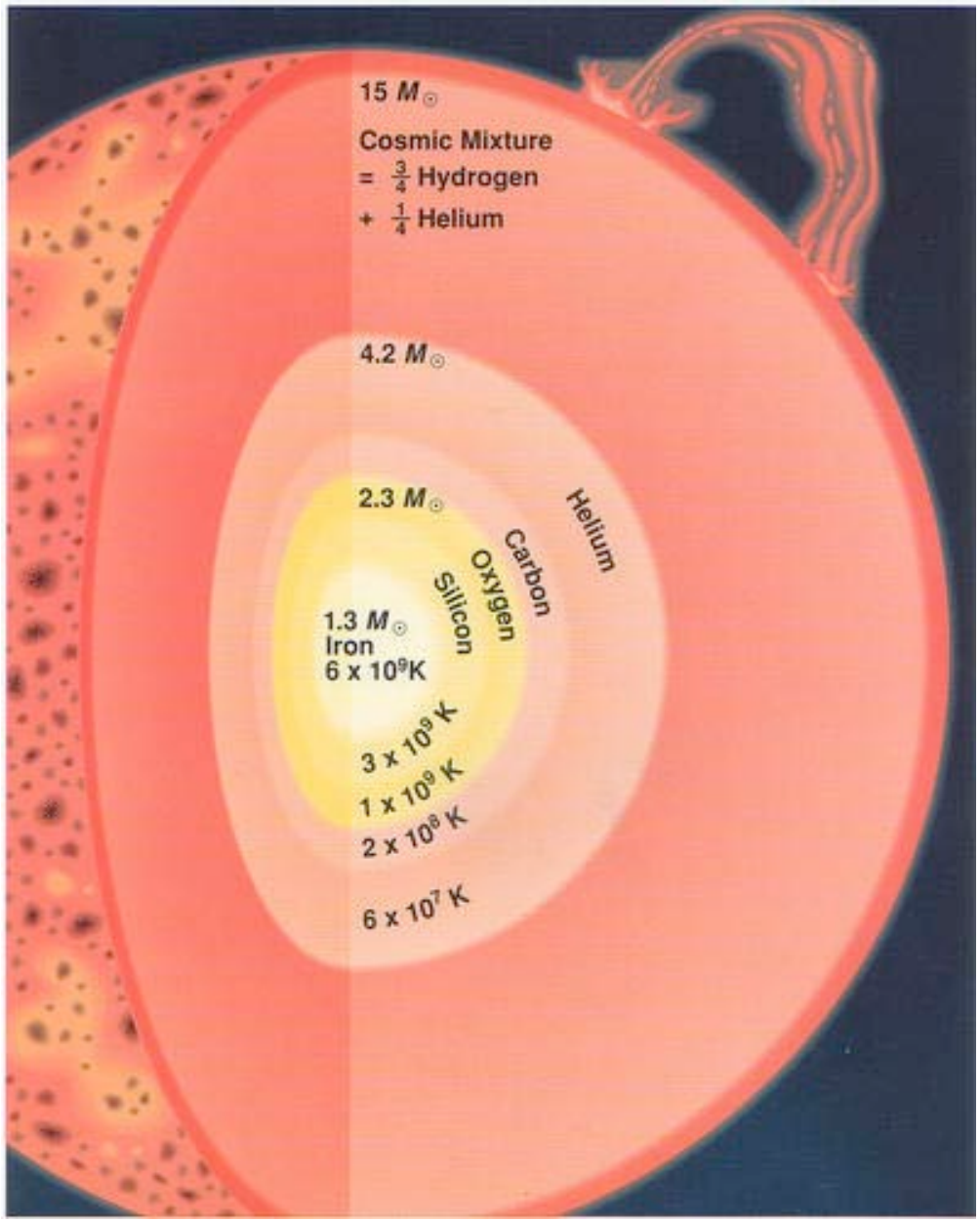
One minute exam

A supernova explodes in an elliptical galaxy. Near peak light what element do you expect to see in the spectrum?

A) Hydrogen

B) Helium

C) Silicon




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

Evolution - gravity vs. charge repulsion
§ 2.1

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***

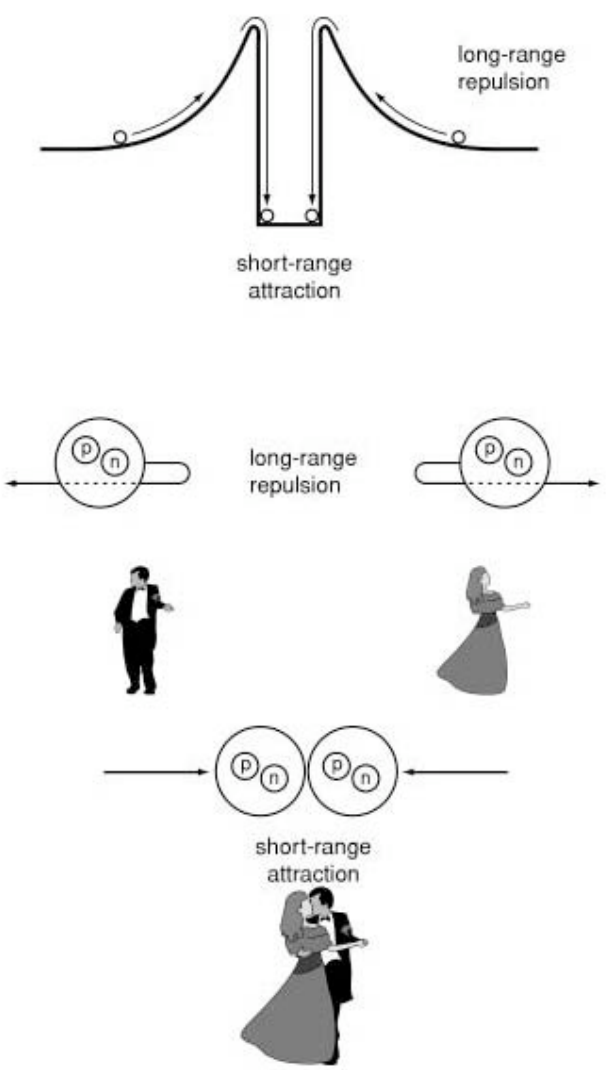



Figure 2.1

Make succession of heavier elements

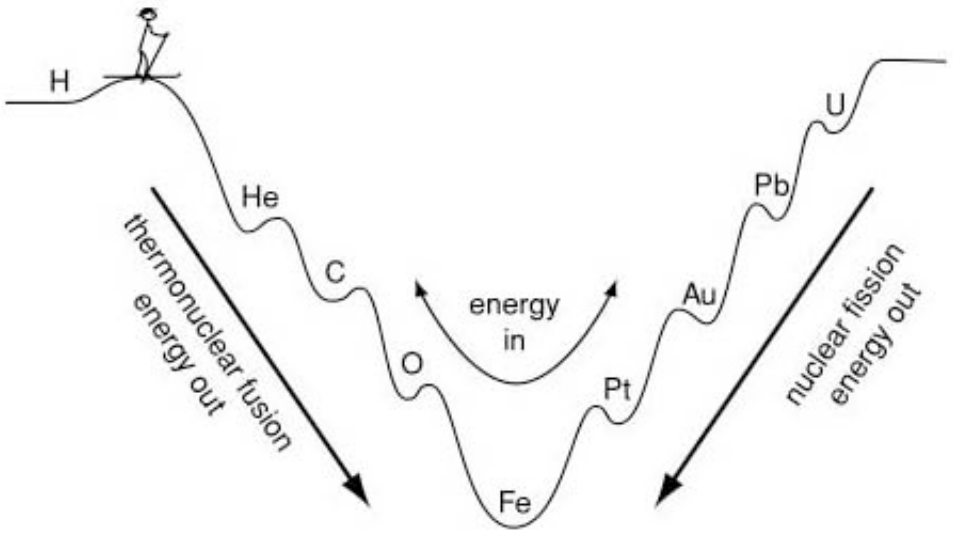



Figure 2.3

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***,

one $\nu$ is generated for every p that is converted

$\Rightarrow$***lots of neutrinos***

$\Rightarrow$99% of energy of collapse is carried off by neutrinos (Ch 1 2.1, 2.2)

One minute exam

Why do you have to heat a nuclear fuel to make it burn?

A) Charge repulsion keeps nuclei apart

B) The strong nuclear force keeps nuclei apart

C) To overcome the loss of neutrinos