

February 12, 2010

Reading, Sections 6.4, 6.5. Sections 1.2, 2.1, 2.4, 2.5 for background.
Next week, Section 6.6, Chapter 7.

Astronomy in the News? Solar Dynamics Observatory launched yesterday.

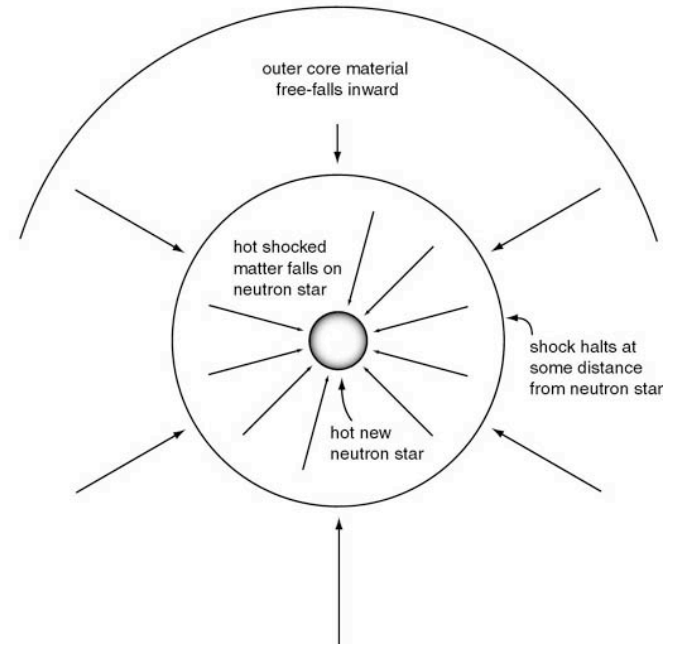
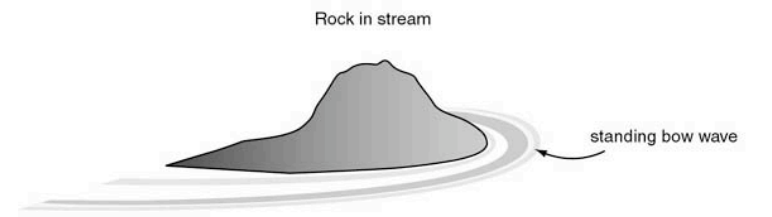
Pic of the Day - Polaris and Iridium satellite over Tiede volcano on Tenerife, Canary Islands, a major observatory.



New-born neutron star over compresses and rebounds - potential mechanism for explosion,

DOES NOT WORK!

Form *standing shock*, and outer material just continues to fall in, pass through shock front and settle onto the neutron star.

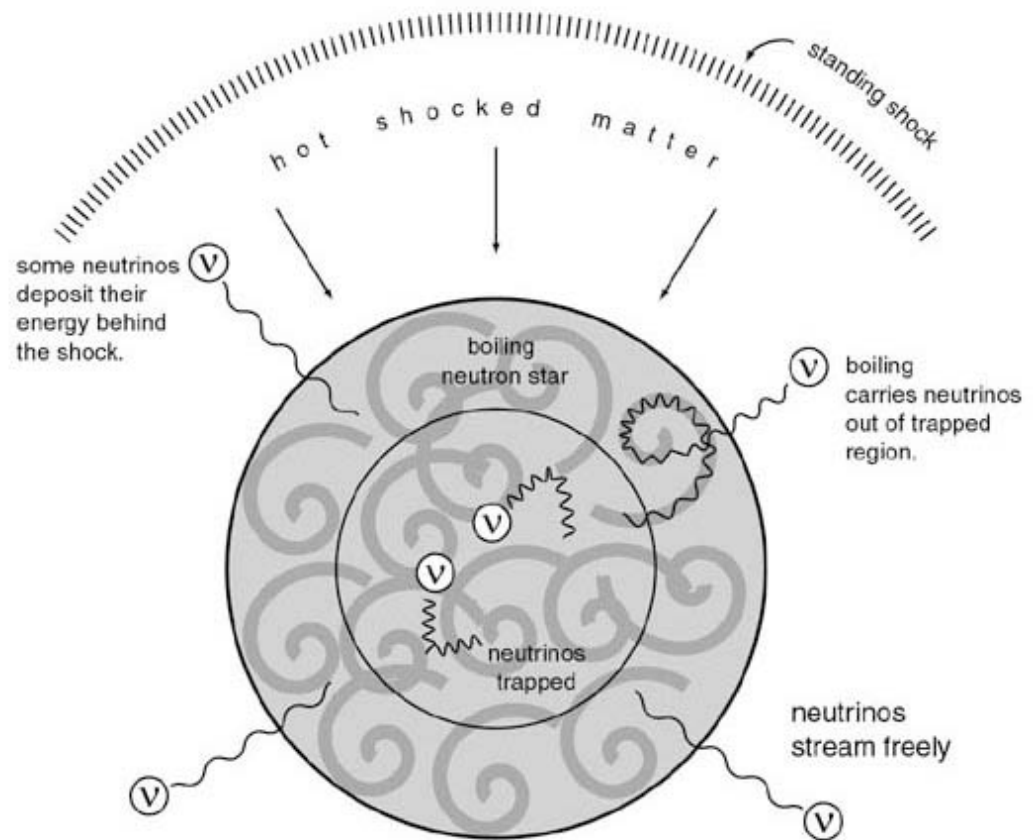


Perhaps the neutron star can boil out neutrinos at a higher rate...

Possible, but still not proven,

A bit like boiling a pot on the stove, the steam comes out, but lid just rattles, it does not explode to the ceiling.

May need a new idea...



One Minute Exam:

Most of the energy liberated in the formation of a neutron star is emitted in the form of:

 Neutrons

 Protons

 Neutrinos

 Photons

One Minute Exam

What happens to the *shock wave* produced when an iron core collapses to form a neutron star and bounces?



It fades away



It propagates out through the star and causes an explosion

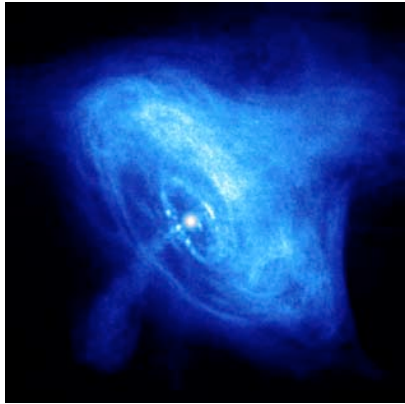


It stalls at some distance from the neutron star

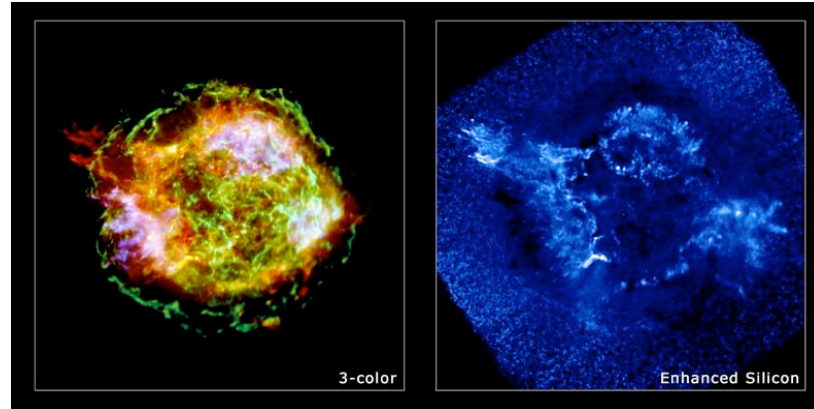


It traps neutrinos

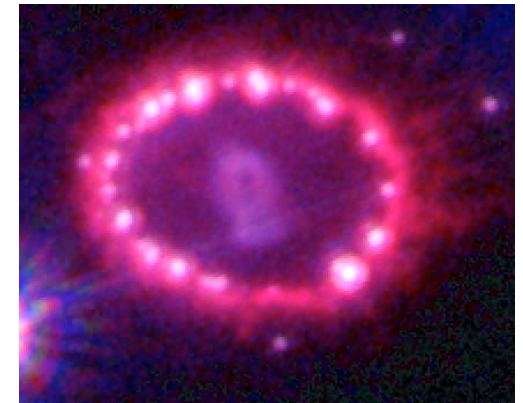
New possibility - Jet-induced supernova (Ch 6, p. 94)



Crab Nebula



Cassiopeiae A



SN 1987A

Are jet-like flows typical? Are they important?

Studies (last 10 years) show that all Core Collapse Supernovae (massive stars: Type II, Ib, Ic) are out-of-round.

Perhaps combination football, frisbee, or something else.
Death Star Explosion (YouTube)

Supernovae show shapes consistent with (but not necessarily proving) jet-like flow.

Calculations show jets emerging from newborn neutron star can explode the star, make it out-of-round.

Predict a jet/torus “bagel and breadstick” shape