

Astrophysics

23 FEB 16

electron capture (rapid and successive) on iron (like) nuclei.

- can produce up until Uranium (after Iron)
but with energy loss

nuclei highly excited \rightarrow emits gamma \rightarrow long lasting
"shine" from supernova

Final Stage:

neutrinos detected during 1987 supernova
detected as soon as light observed \rightarrow same speed
as light

Supernova remnant

$$N_{\text{star}} \quad P_p = 500,000,000 \text{ eV}/c \quad \rightarrow \quad 500 \text{ MeV}/c$$

$$M = 939,500,000 \text{ eV}/c$$

White Dwarf limit $M < 1.4 M_{\odot}$

$N_{\text{star}} \rightarrow M < 2.0 M_{\odot}$

Way of seeing neutron star easily

- periodic radio emission
very precise period

comes from strong magnetic field

not exactly
on axis of
rotation

← [change in flux in a closed loop
creates EMF]

And rotation [high spin rate]

produces the radio waves

rotation of magnetic field acts similar as lighthouse
in seeing pulsing radio waves

Also emits x-rays (accelerates electrons in former
shell)

Photon Pressure Review

$$p \sim \frac{1}{3} u$$

$$M \ll 2.5 M_{\odot}$$

any energy acts like a mass
so needed energy ~~with net~~ causes
runaway collapse

$$E = mc^2$$

Mass collapse to mathematical point

point \rightarrow singularity

Can you ever see it?