

10/16/06

Exam 2, Chapters 6, 7, **This Friday**

Review sheet posted today

Review session Thursday 5 PM RLM 4.102 [NOTE different room than help sessions].

News? Earthquake in Hawaii,
some damage of telescopes on
Mauna Kea

Pic of the day - Night side of
Saturn from Cassini spacecraft

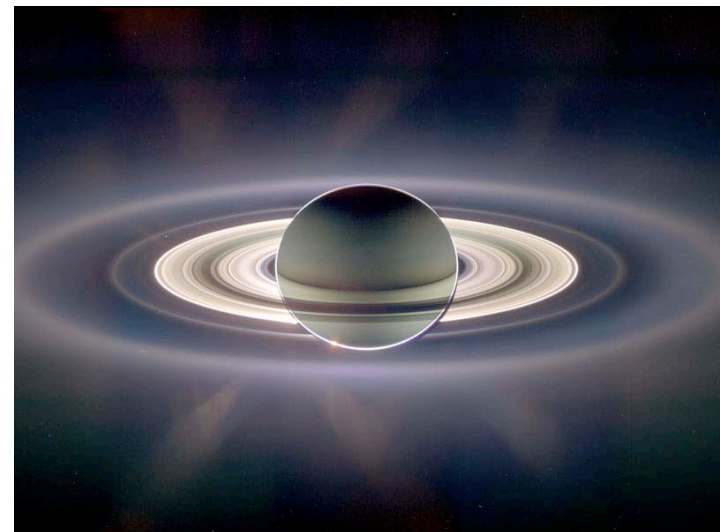
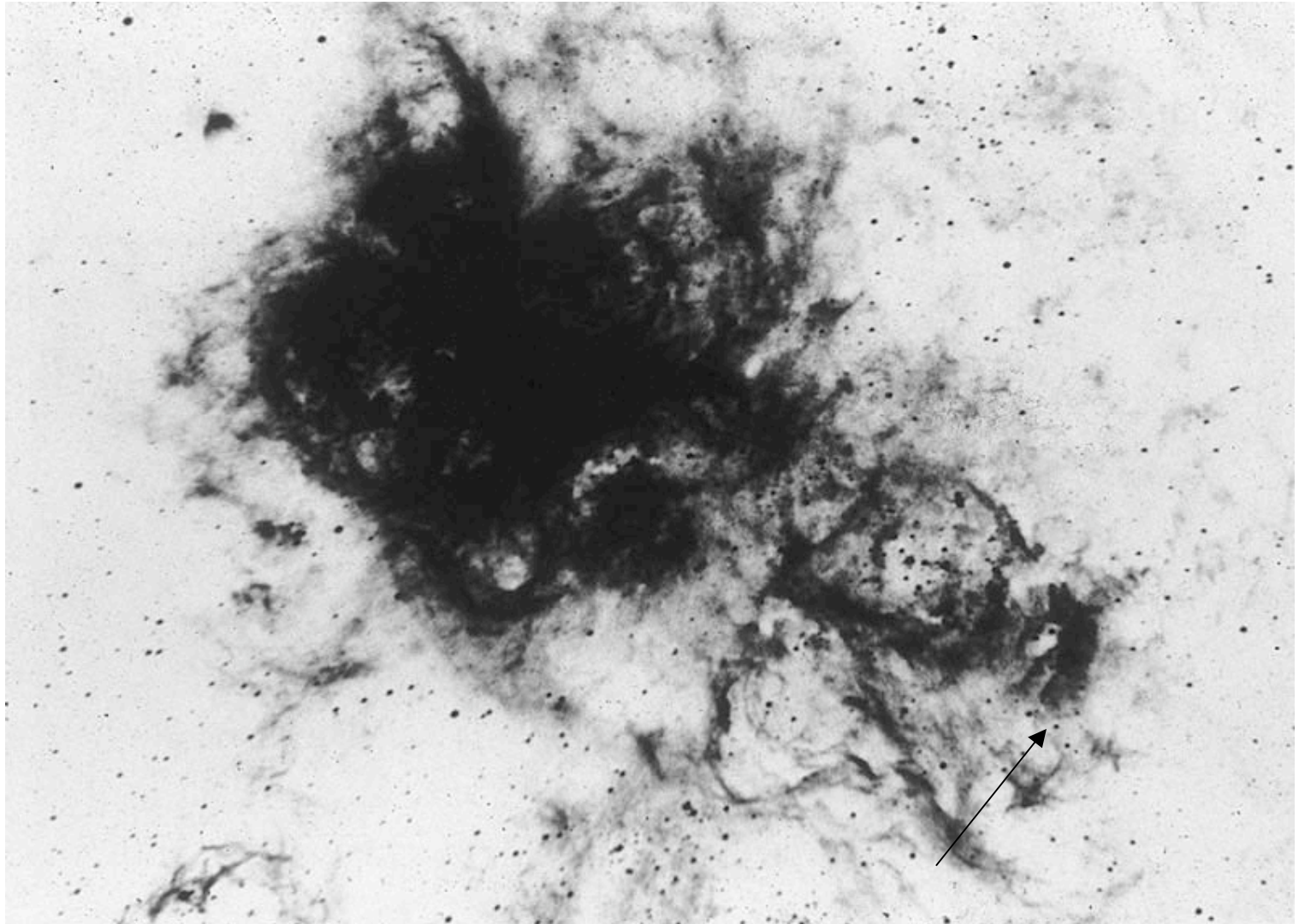
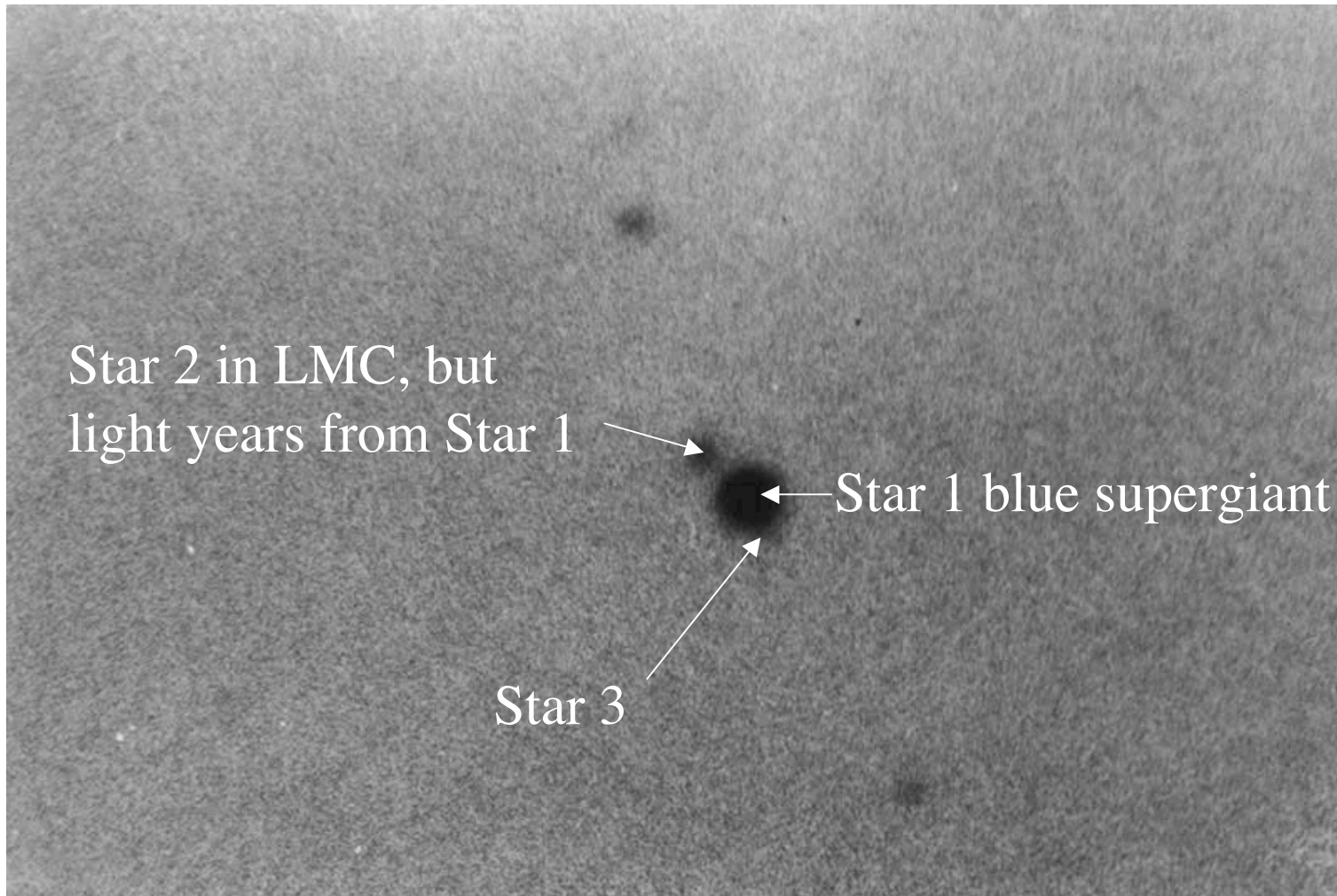


Photo of progenitor star (giraffe)

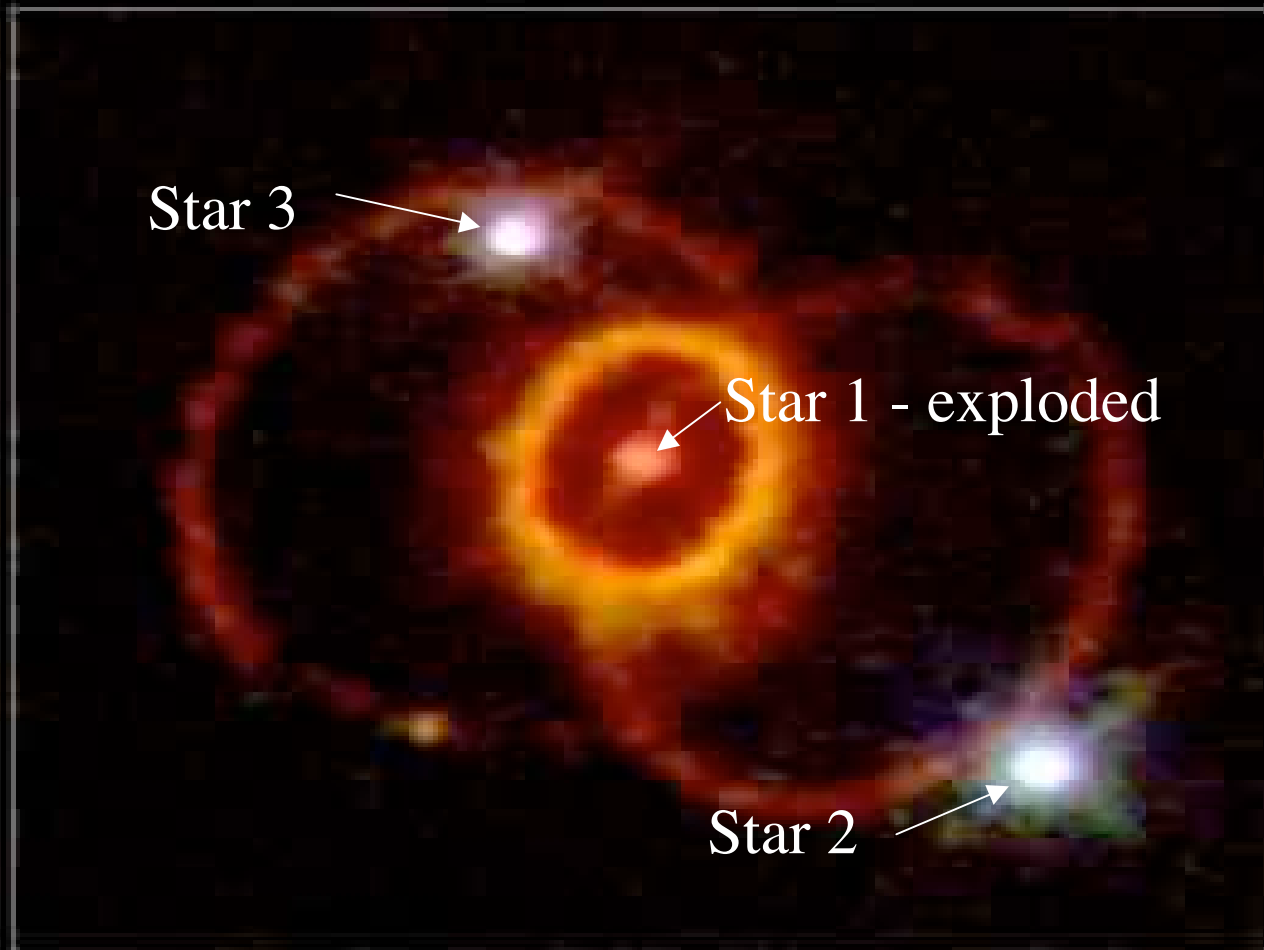


Stars 1, 2, 3



Close-up

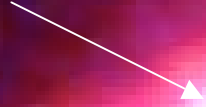
Supernova 1987A Rings



Hubble Space Telescope
Wide Field Planetary Camera 2

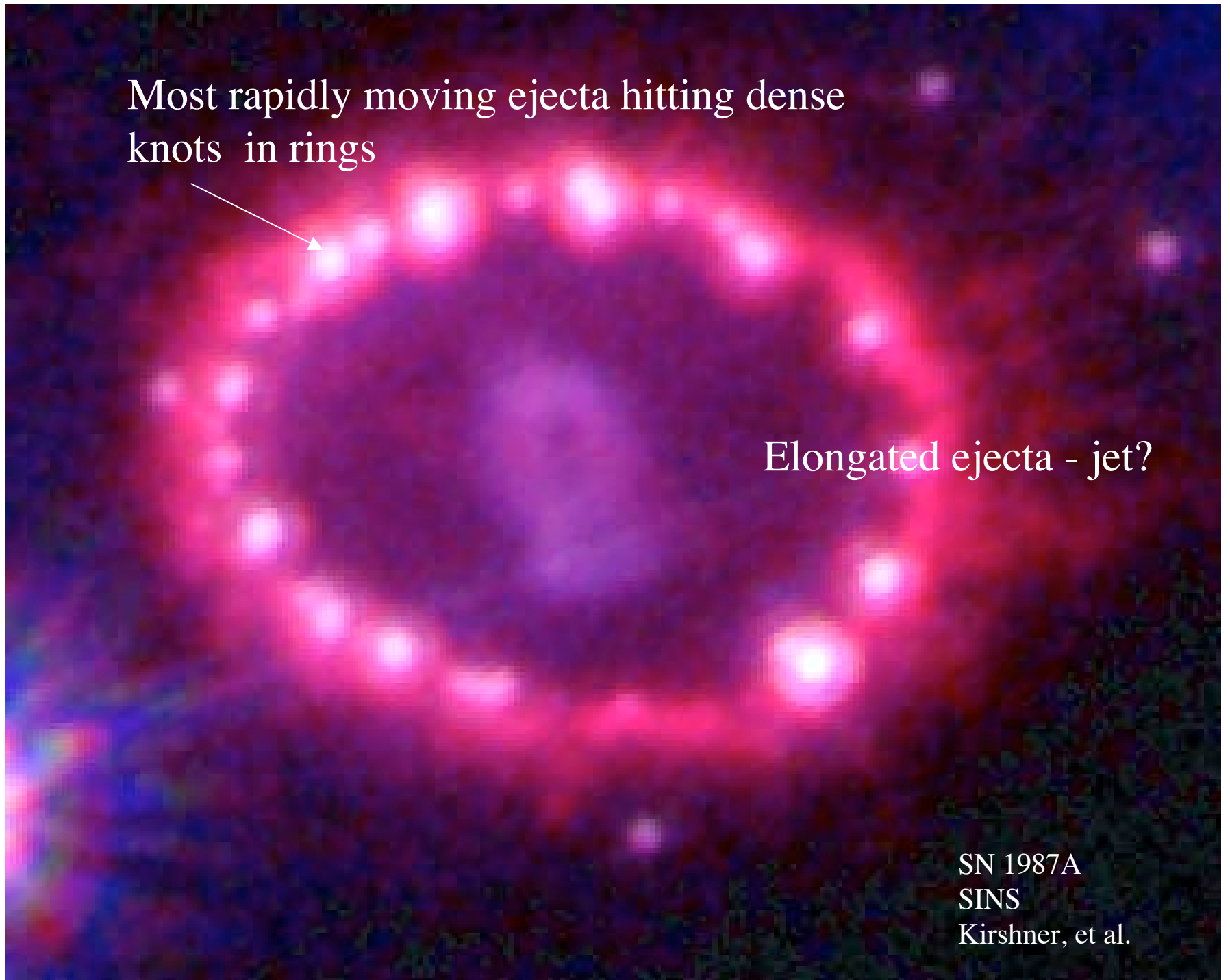


Most rapidly moving ejecta hitting dense knots in rings



Elongated ejecta - jet?

SN 1987A
SINS
Kirshner, et al.



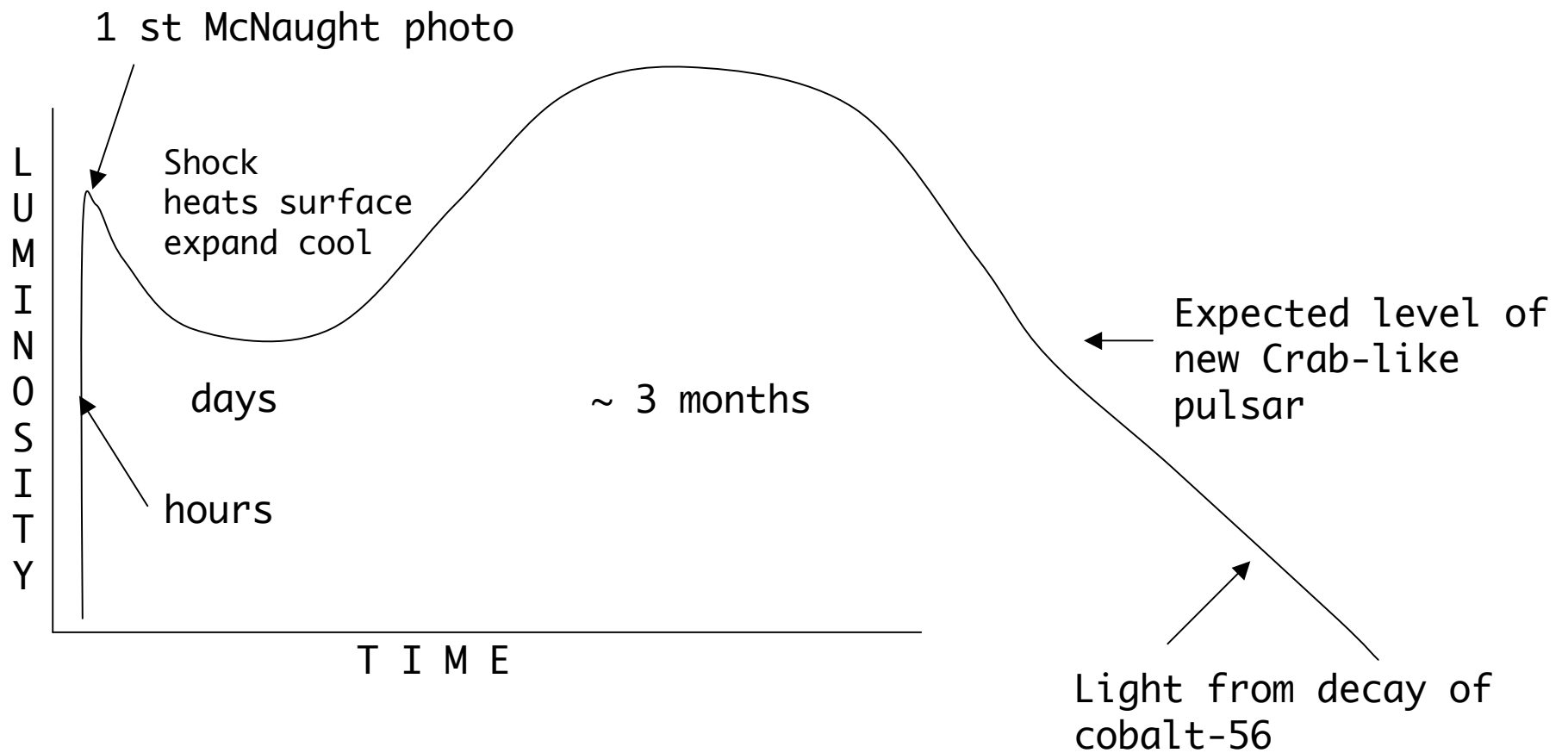
The single most important thing about SN 1987A is that we detected the neutrinos!

It was definitely a core-collapse event

10^{57} neutrinos emitted, most missed the Earth. Of those that hit the Earth, most passed through since neutrinos scarcely interact.

About 19 neutrinos were detected in a 10 second burst.

150,000 year history!



SN 1987A had a rather peculiar light curve because it was a relatively compact blue supergiant, not a red supergiant, brief shock heating, rapid cooling by expansion, no plateau, subsequent light all from radioactive decay

Neutrinos from SN 1987A proved a neutron star formed and lasted for at least 10 seconds while neutrinos were detected - where is it?

Expected to see it in ~ 1 year - still looking almost 20 years later

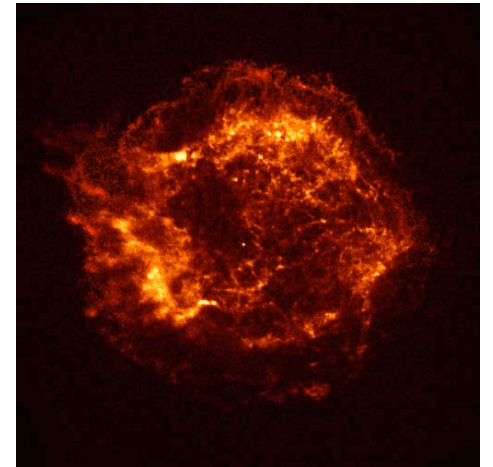
Any neutron star is dimmer by at least a factor of 10 than 1000 year-old Crab pulsar

If similar to object in Cas A, much too dim to detect
100 to 1000 \times dimmer than Crab pulsar

Possibly black hole, not neutron star??

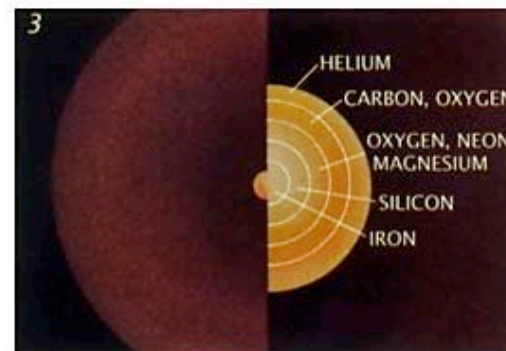
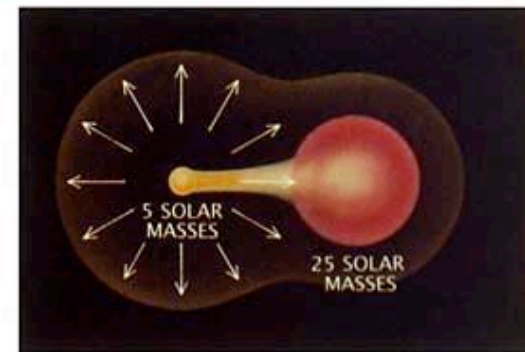
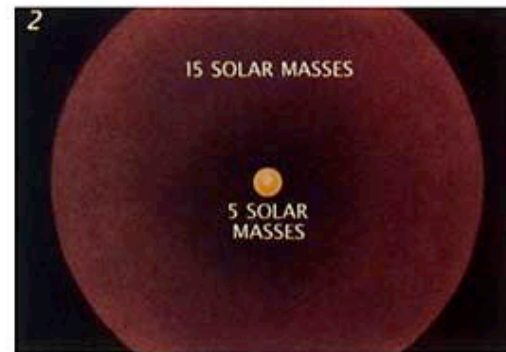
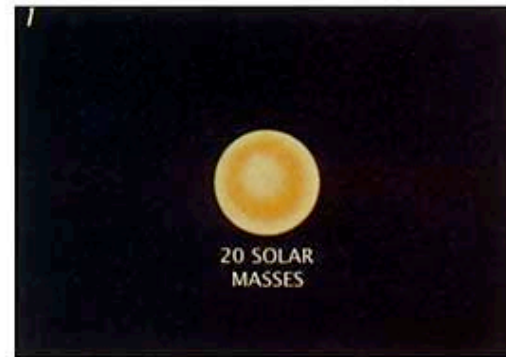
Don't know. Can't rule out.

Neutron star could be "hidden," or a slow rotator, or with a weak magnetic field, but counter to notion of jet - some evidence for jet

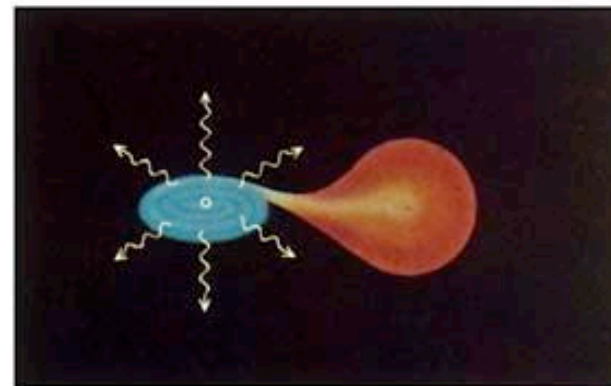
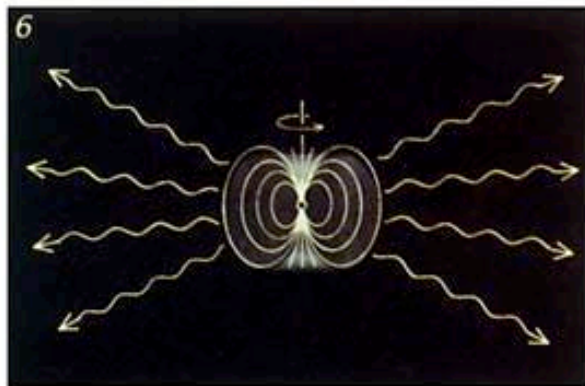
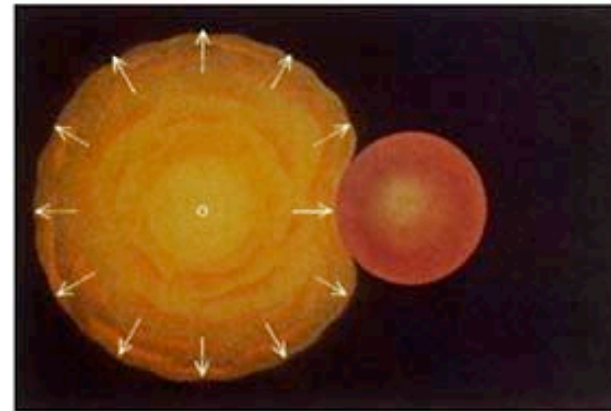
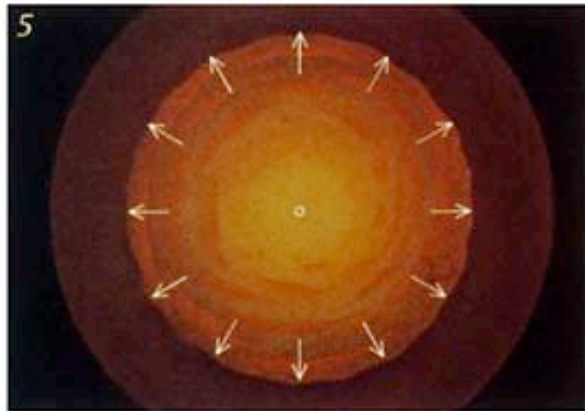
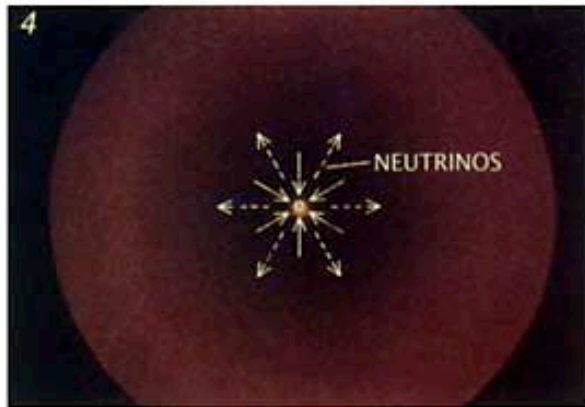


Single star: Type II

Same star in binary: Type Ib/c



Same evolution
inside star, thermal
pressure, regulated
burning, shells of
heavier elements,
whether envelope
there or not



Rotating,
magnetic
radio
pulsar.

Neutron
star in
binary
system,
X-ray
source

End of Material for Test 2