

10/4/06

Reading - Chapter 6, also look at posted revised Chapter 6 on web site (under “Second Edition) for discussion of polarization, jets, etc.

News? Nobel Prize in Physics to Mather and Smoot for Big Bang radiation

Pic of the day - comet and tail, evidence of solar wind



One Minute Exam

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

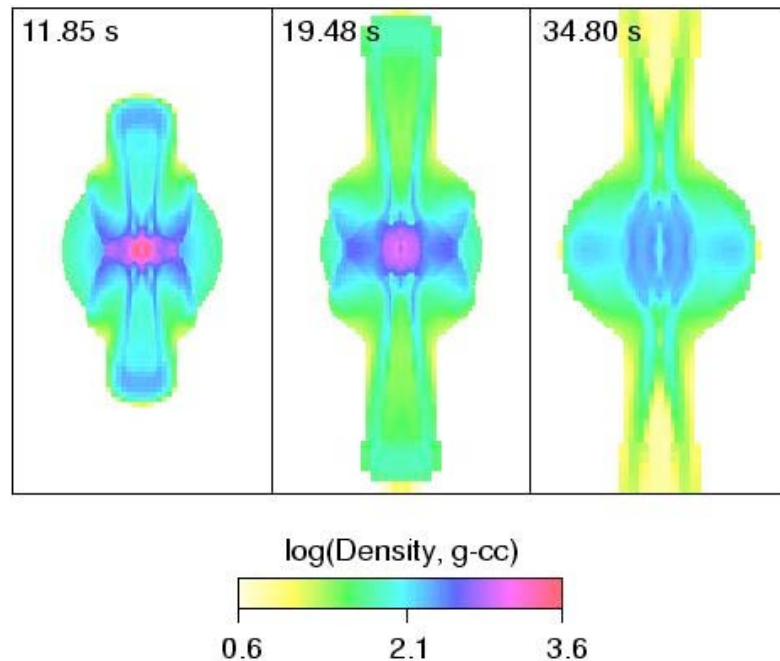
- A) It fades away
- B) It propagates out through the star and causes an explosion
- C) It stalls at some distance from the neutron star
- D) It traps neutrinos

Polarization studies (last 10 years) show that all Core Collapse Supernovae are out-of-round.

Perhaps combination football, frisbee, or something else.

They 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.



computer
models
predict a
jet/torus
structure

Khokhlov
et al. 1999

These supernovae may be related to *gamma-ray bursts*.

This is the first new idea to understand these supernovae in thirty years.

Jet Movies

How to define a particular direction in space?

Rotation - rotation axis.

How to make a jet? Some variation on squeeze and squirt (toothpaste mechanism)

Rotate magnetic neutron star, amplify the magnetic field, eject mass if field is strong enough.

Magnetic lines of force, locus of equal field strength, act somewhat like rubber bands, they are elastic and tend to rebound if deformed and can be twisted and coiled.

Twisted magnetic fields have tension along them and exert pressure sideways.

Magnetic jet movies, rubber band.