Thursday, October 15, 2009

Astronomy in the News?

Pic of the Day - fireball meteor over Groningen, Germany



Start of material for Test 3

Chapter 8, Neutron Stars

Reading

Chapter 8

Sections 8.1, 8.2, 8.5, 8.6, 8.7, 8.10

NEUTRON STARS (Chapter 8)

mass of Sun

radius ~ 10 km, size of a city

density like atomic nucleus (even a few times more!)

gravity at surface huge - crush human highest "mountain" ~ 1 foot Pulsars - rotating magnetic neutron stars

~1200 radio pulsars known "active" for ~1-10 million years, then magnetic field decays or aligns → no radiation

Probably ~ billion "inactive" neutron stars $\sim 1\%$ of all stars in the galaxy

To radiate, pulsars must be *magnetic*:

Wiggle magnetic field \Rightarrow wiggle electric field \Rightarrow wiggle magnetic field \Rightarrow *Electromagnetic radiation*

Simplest configuration North, South poles *Dipole* "lines of force" connecting poles

Magnetic axis must be *tilted* with respect to the rotation axis

If the magnetic axis is aligned with the rotation axis, the system is too symmetric to "wiggle"

Magnet, filings

Pulsars are rotating, magnetic neutron stars with magnetic axis tilted with respect to spin axis.



magnet

pulsar

Most pulsars rotate about once per second, young ones faster, Crab pulsar rotates 30 times per second - would rip apart anything but a neutron star