Thursday, September 24, 2009

IYA extra credit opportunity: Nobel Prize winner Steven Weinberg, "The Uses of Astronomy" Humanities Research Center, Friday, September 25, 7 - 8 PM.

Astronomy in the news - Indian satellite Chandrayaan-1 found evidence for water (HO hydroxyl) on the Moon - maybe one quart per cubic yard of dirt. Maybe heat the dirt, out pops water! Maybe formed by protons in solar wind hitting, colliding with O in lunar rocks.

Pic of the Day -Equinox Sunset



One minute exam

Why do the elements carbon, oxygen, magnesium, and silicon frequently appear in the matter ejected from supernovae?

- A) They are built up from the element iron
- B) They are built up from the element hydrogen
- C) They are built up from the element helium
- D) They are built up from the element calcium

Type II Supernovae - "other" type discovered early, show Hydrogen in the spectrum early, Oxygen, Magnesium, Calcium, later

Most occur in spiral galaxies, *in the spiral arms*, they have no time to drift from the birth site sometimes in irregular galaxies never in elliptical galaxies



SN 1999em

We expect such stars to evolve to form iron cores and collapse to a neutron star or black hole (physics to come)



Light curves of Type II supernovae are consistent with explosion in a Red Giant

Betelgeuse is a massive red giant, 15 solar masses: we expect it to become a Type II supernova. *Maybe tonight!* Rigel probably burning He to C/O, explode later.

SN 386, 1181 records are sparse, might have been Type II Crab was a "peculiar" Type II (high helium abundance, slow explosion) Cas A was probably something else (next topic), SN1987A was a "peculiar" Type II.

Not obvious that any of the historical supernovae were a "normal" Type II, although Type II are common in other galaxies



Type Ia

no Hydrogen or Helium intermediate mass elements early on, iron later avoid spiral arms, occur in elliptical galaxies peaked light curve *all consistent with explosion in white dwarf, total disruption*

Type II

Hydrogen early on, Oxygen, Magnesium, Calcium later explode in spiral arms, never in elliptical galaxies "plateau" light curve

consistent with massive, short-lived star that has an explosion deep within a Hydrogen Red Giant envelope by core collapse to leave behind a neutron star (or maybe a black hole). One minute exam

A supernova explodes in an elliptical galaxy. Near peak light what element do you expect to see in the spectrum?

A) HydrogenB) HeliumC) SiliconD) Iron

