



Astro 301/ Spring 2005 (46690)



Introduction to Astronomy

Instructor: Professor Shardha Jogee

TAs: Nick Sterling & Nairn Baliber

MWF 12-1 Welch 3.502

Lecture 26,27,28 ; MWF Apr 4,6,8

Lecture 26: Announcements

- 1) Homework 4 due today at start of class
- 2) Pick up homework 5, due Monday Apr 11.
This may be a challenging homework but all you need is in the lectures
Read through and ask for help before the weekend.
- 3) Quiz on Wed Apr 6 based on reading assignment
Ch 17, Properties of Stars (Cosmic Perspectives, 3rd Ed)
Main ideas in “Summary of Key Concepts” at end of chapter.

Lecture 26: Astronomy Picture of the Day



NC 1316 : unusual jumbles of stars, gas, and dust! Elliptical or spiral?

à an enormous elliptical galaxy that includes dark dust lanes usually found in a spiral

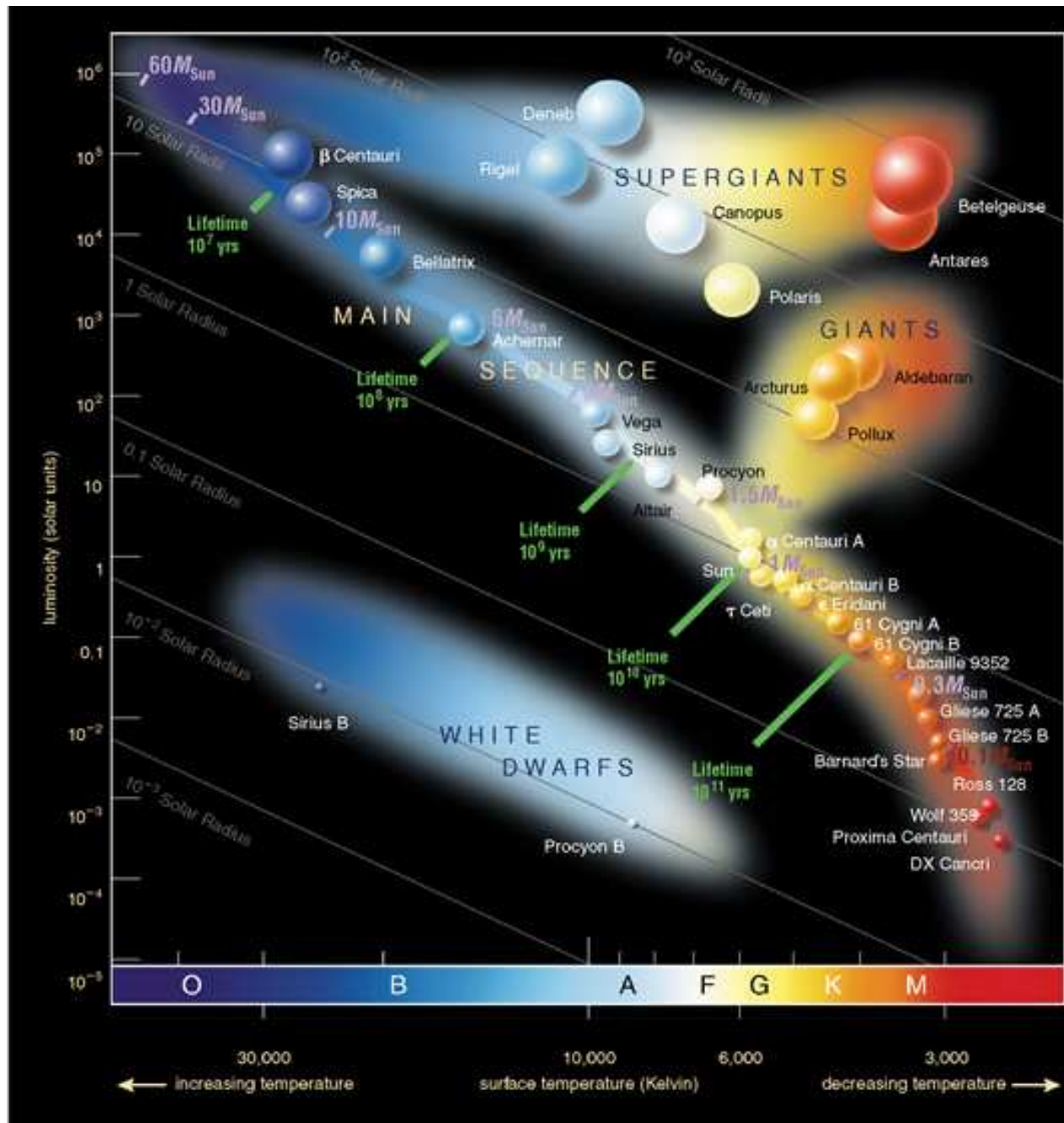
à dark lanes of dust indicate that one or more of the devoured galaxies were spiral galaxies

Properties and Evolution of Stars

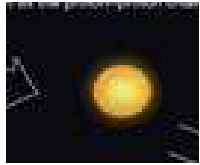
Topics for last week and this week

- Why do stars look different in the sky?
- Properties of stars: Luminosity, Flux, Temperature, Radius, Color
- The Hertzsprung Russell (H-R) diagram....a surprise for astronomers!
How does a star's luminosity depend on its radius and temperature?
Different stars on H-R diagram : Main sequence, Giants, Supergiants, White Dwarfs
- Properties of stars on main sequence. The main sequence lifetime
- Energy generation by fission and fusion of elements heavier than H
- 2 important principles for understanding fusion in cores of stars
- Evolution of stars off the main sequence: radically different for high and low M star
- How mass determines the lifetime, evolution, destiny, and (L,R,T) of a star!
- Age-dating the Universe with an H-R diagram !
- How do we measure distance, luminosity, temperature, mass, radius of stars?

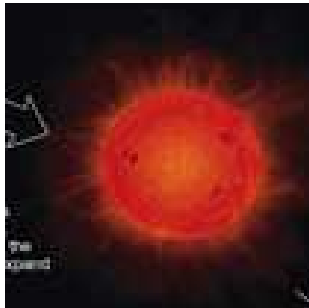
Hertzsprung-Russell (H-R) diagram



Evolution of low-mass stars



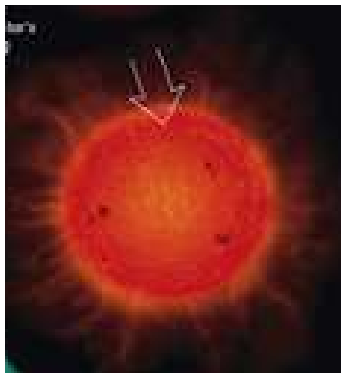
Yellow main sequence star.
H fusion in core via pp cycle



Red giant:
Inert He core
H-burning shell

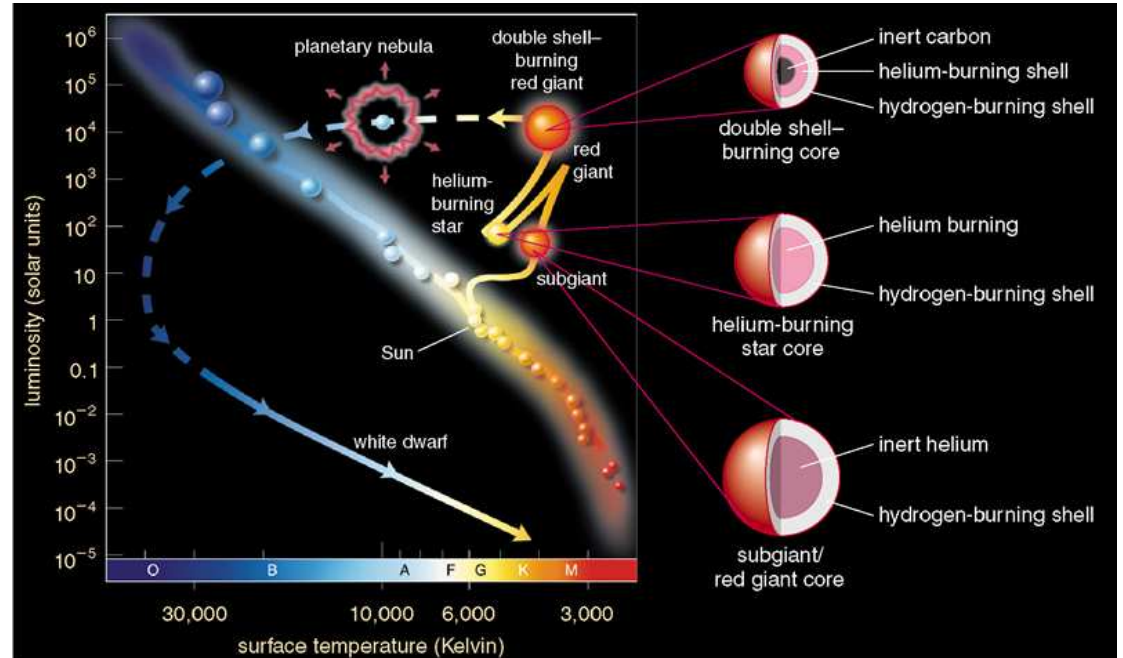


He-burning core
+ some reduced
H-burning in shell



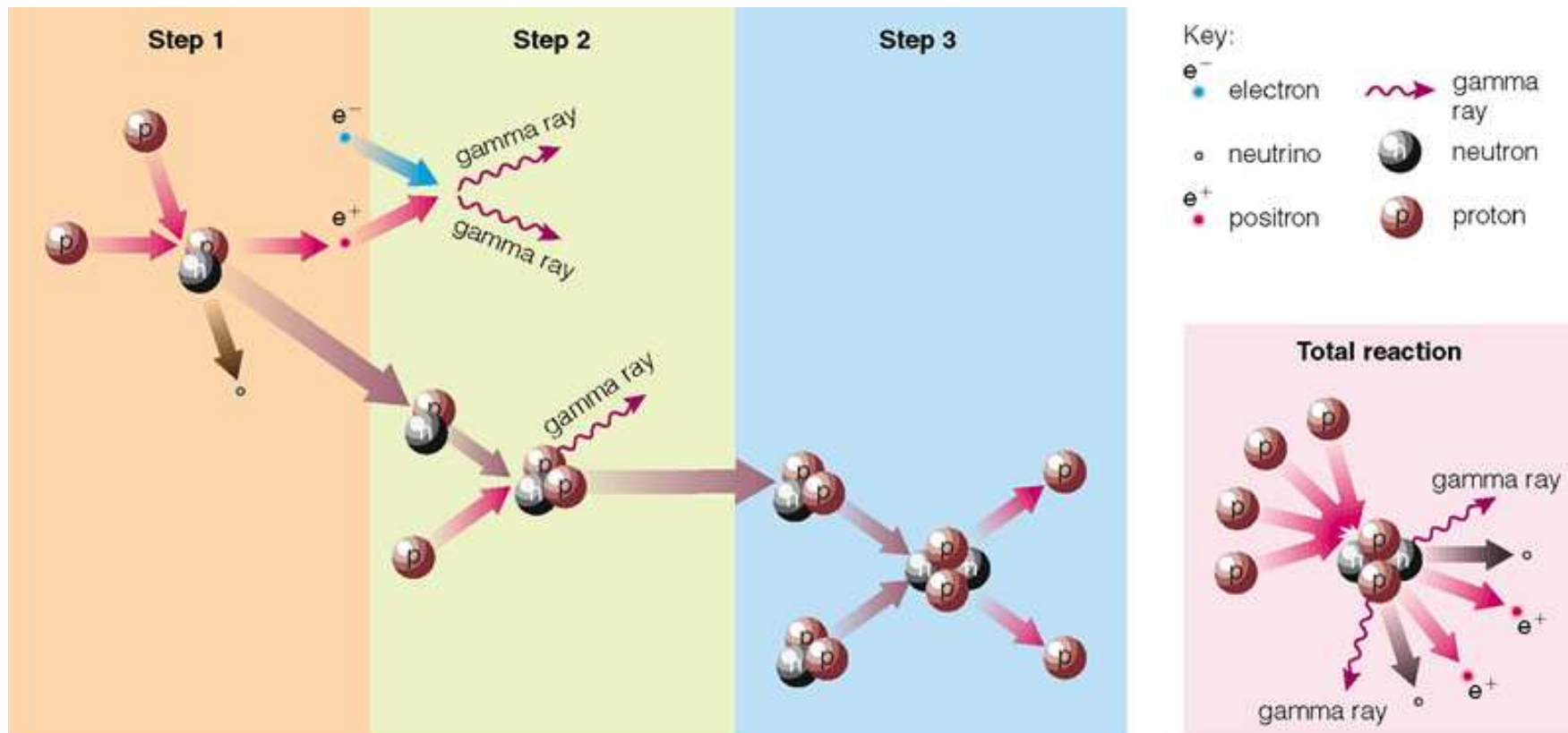
Second red giant phase.
Inert C core +
double shells
burning He, H

Planetary
nebula



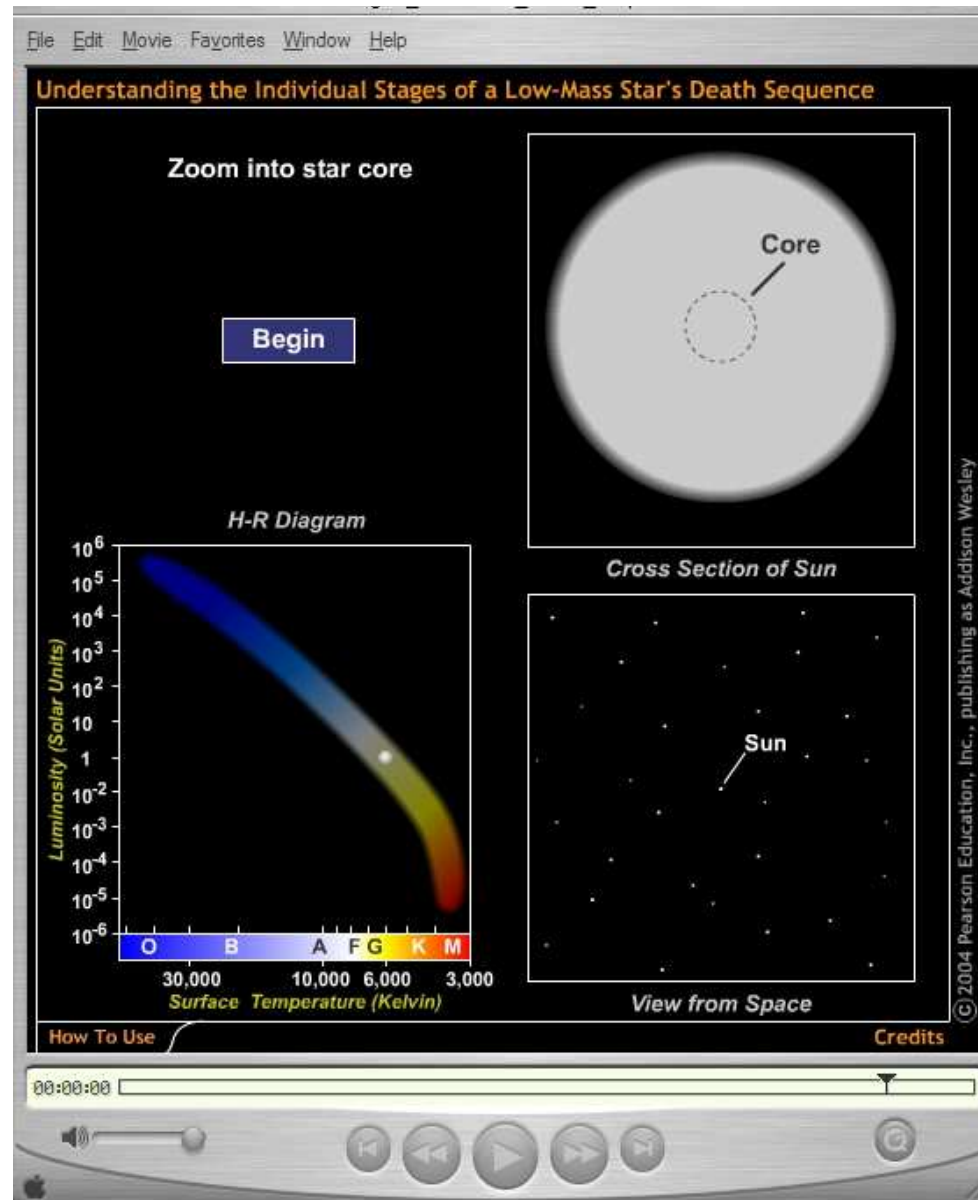
White
dwarf

Fusion of proton into Helium nuclei: The proton-proton chain



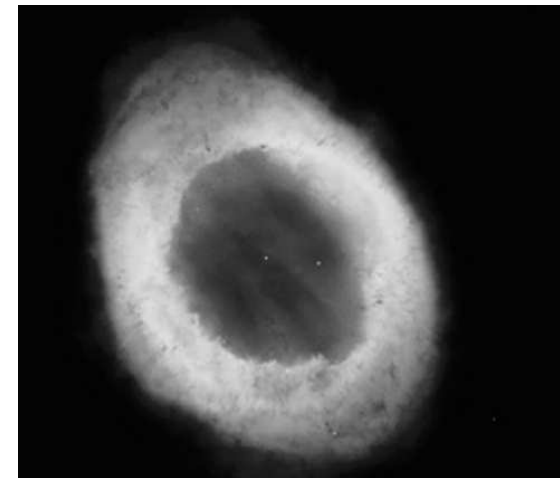
Evolution of low-mass star

In class-movie
Stages of evolution
of low mass star



Evolution of low-mass star

In class-movie: Formation of planetary nebula, the Helix Nebula



Evolution of low-mass stars: Planetary Nebulae

