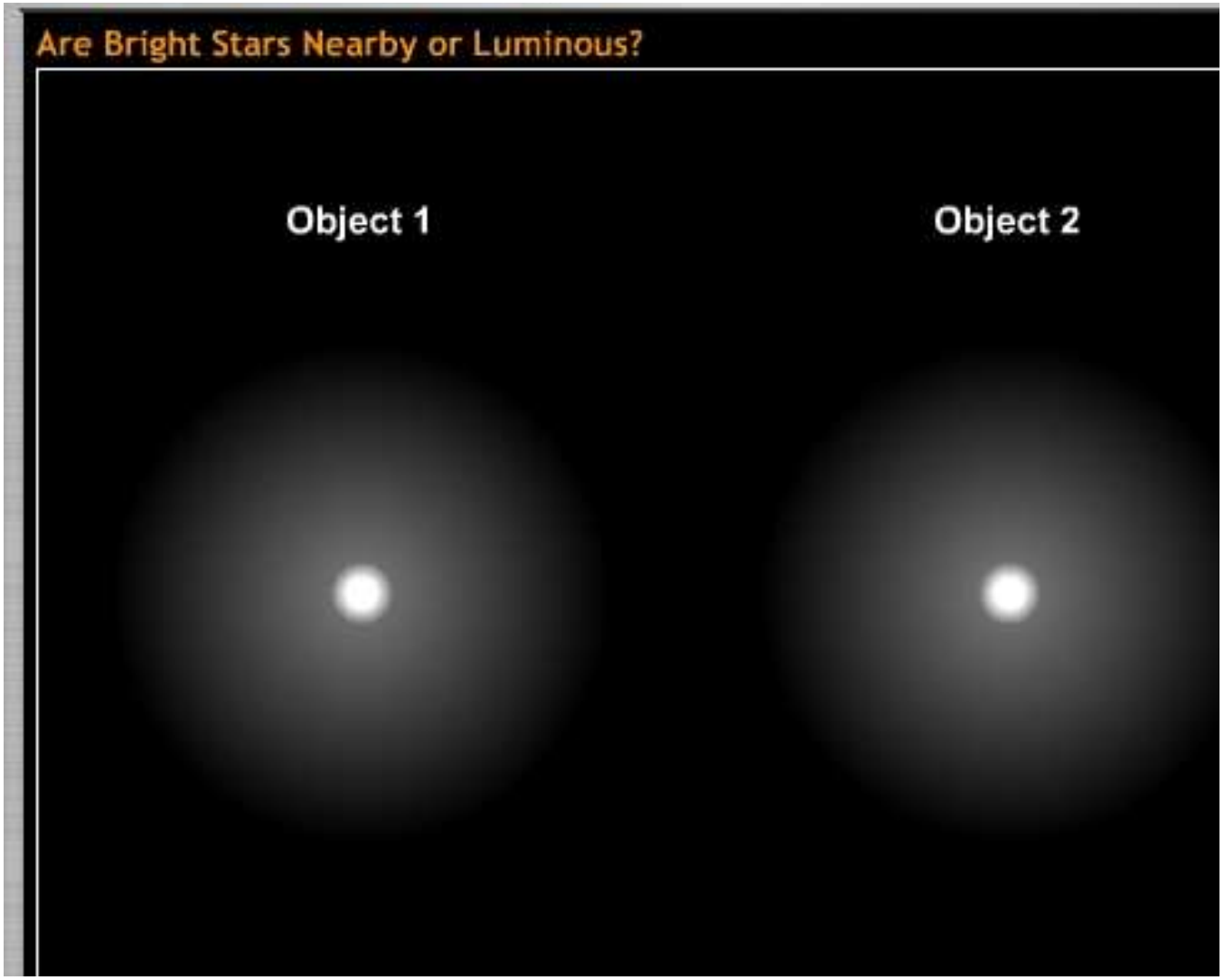
Lecture 28: Astronomy Picture of the Day



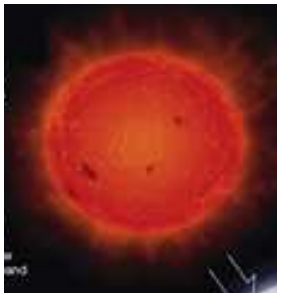
Which of these stars has a higher luminosity?

Lecture 28: Announcements

1) Quiz on Wed Apr 13 based on reading assignment
   Ch 20, Galaxies: From Here to the Horizon (Cosmic Perspectives, 3rd Ed)
   Main ideas in “Summary of Key Concepts” at end of chapter.

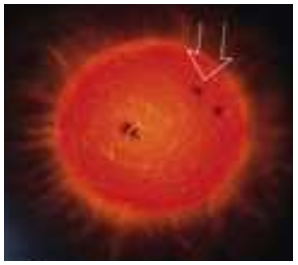
Evolution of high-mass ($M>8M_o$) stars

Blue main sequence star. H fusion in core via CNO cycle

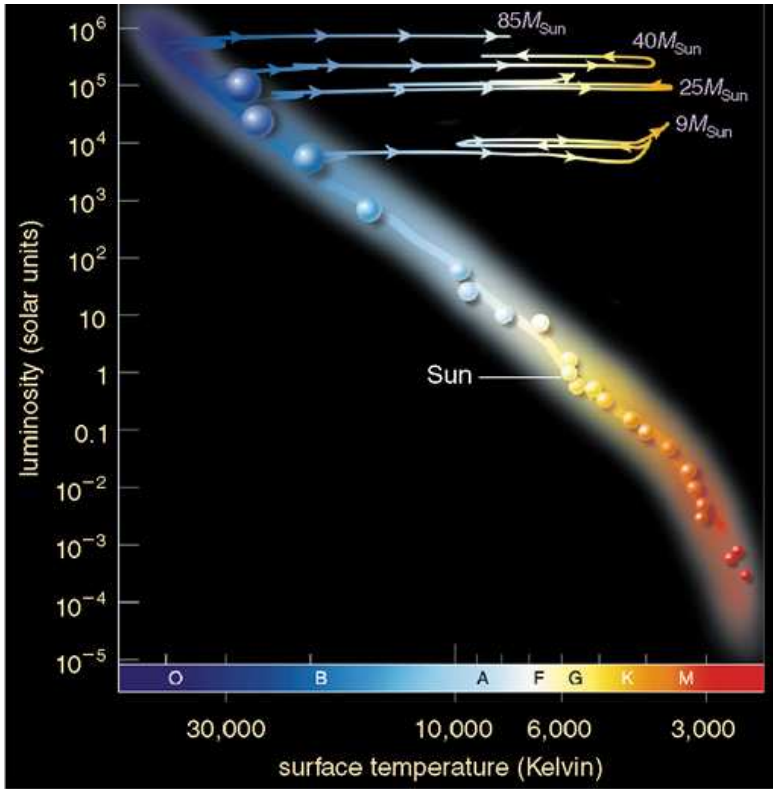


Red supergiant:
Inert He core
H-burning shell

'Blue' supergiant:
He-burning core +
reduced H-burning
in shell



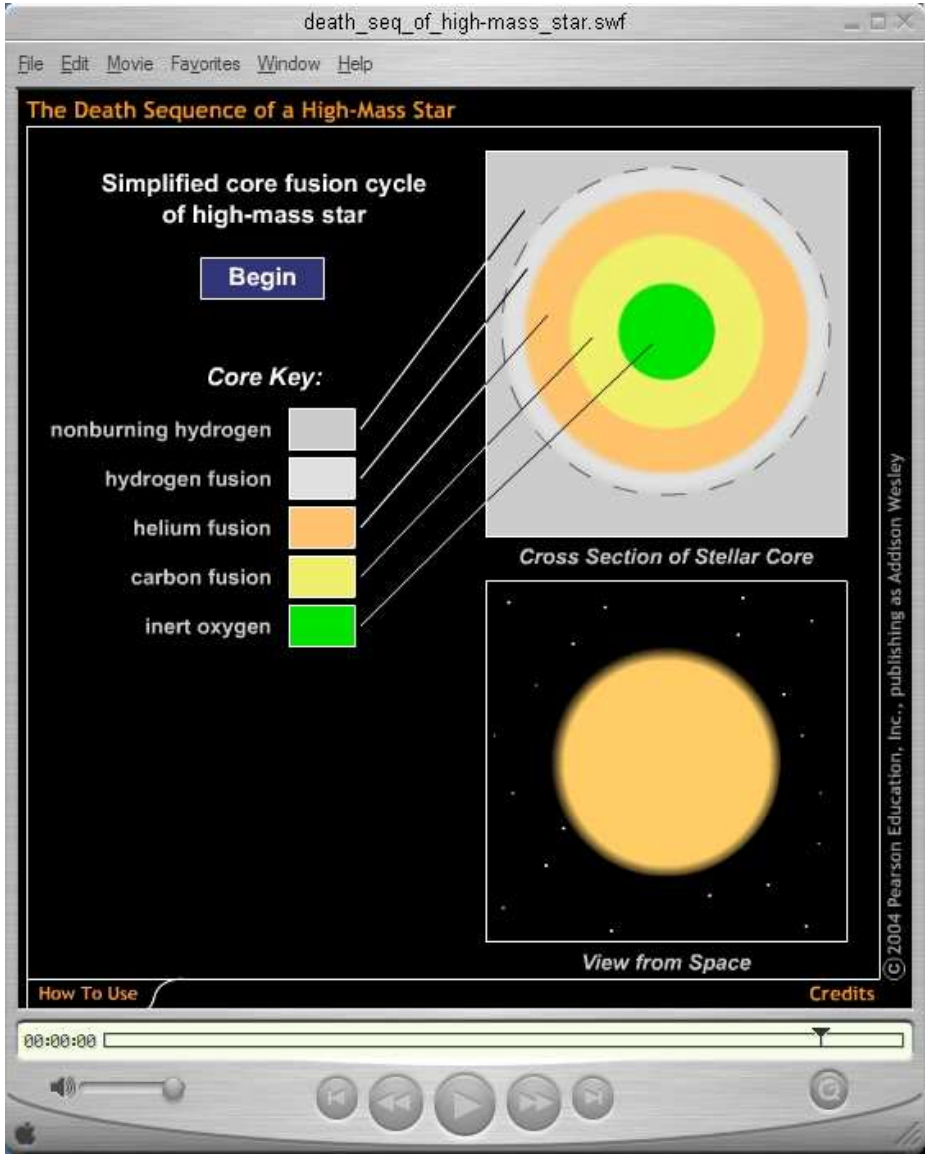
Supergiant phases.
Inert C core shrinks till fusion of C starts, then of O, then…of Si until iron collects in core.
Multiple shells burning C, O, He, H



When it is no longer supported by deg-pressure, iron core collapses, and e- p+ combine to form a neutron star or BH. Star explodes outer layers into SN

Evolution of high-mass star

In class-movie
Stages of evolution
of high-mass star

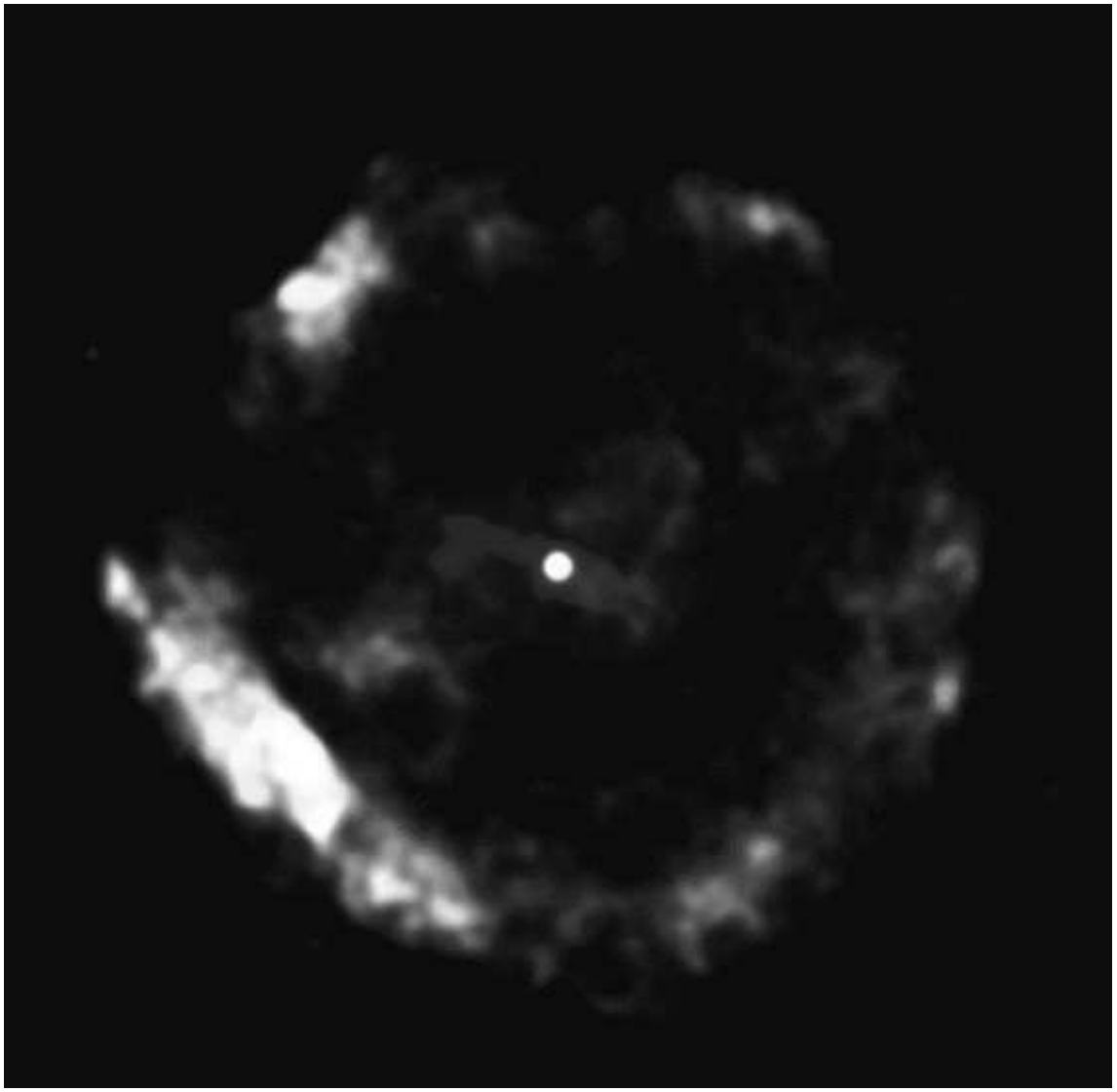


Evolution of high-mass stars

Visible image of the Crab nebula Snova remnant in constellation Taurus

Expanding shock-heated gas ejected during a supernova explosion, away from the collapsed core of a massive star. Spinning neutron star at center seen in radio images

Evolution of high-mass stars



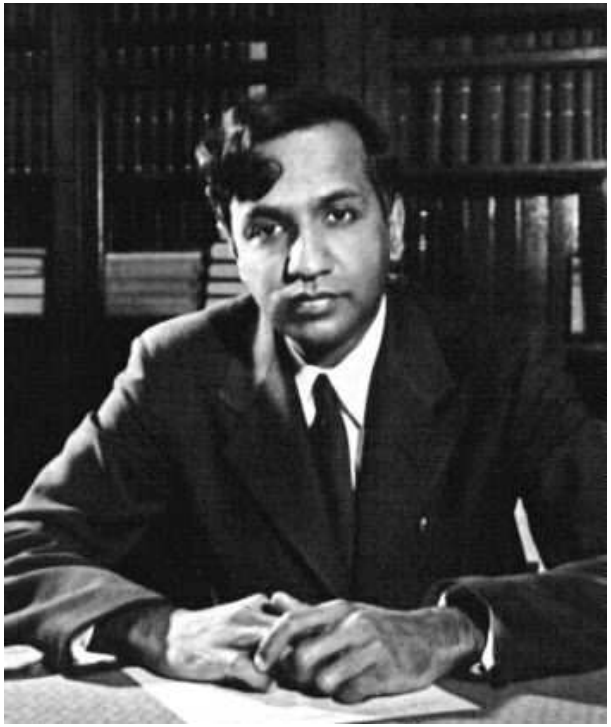
X-ray image from CXO of a neutron star at center of old supernova remnant

before

after

Visible image of
Supernova
1987A in LMC

Mass Limit for White Dwarfs



Chandrasekhar computed mass limit for a white dwarf in 1931 at age 19!. Ridiculed by Eddington at Cambridge. Awarded Nobel prize 30 years later in 1962

Neutron Stars

Fritz Zwicky ; 1934: suggested supernova forms when star collapses into neutron star

Jocelyn Bell . Discovered first rotating neutron star or plusar in 1967.