

**SAS Honors Seminar 256:
Extraterrestrial Life**

9/27/2011

Reading for Thursday (9/29)

Bennett & Shostak 3.3, 3.5, 4.6 – background on solar system

Stevenson (2001) – background on Jupiter's moons

**Canup & Ward (2002) – proposed model for formation of
Jupiter's moons – read only abstract, §1, and §4**

**Canup & Ward (2006) – generalization of 2002 paper –
read only first page, figure captions, and last paragraph**

Next week

AJB out of town all week (conference in California + international advisory committee meeting in Virginia).

No office hours.

Guest teacher:

Professor Saurabh Jha

New Jersey native; expert on supernovae and exoplanets!



Reading for Tuesday (10/4)

Bennett & Shostak 11.2 – background on exoplanets

Noyes, Jha, et al. (1997) – early Doppler-detected exoplanet

(note: there is also an associated erratum)

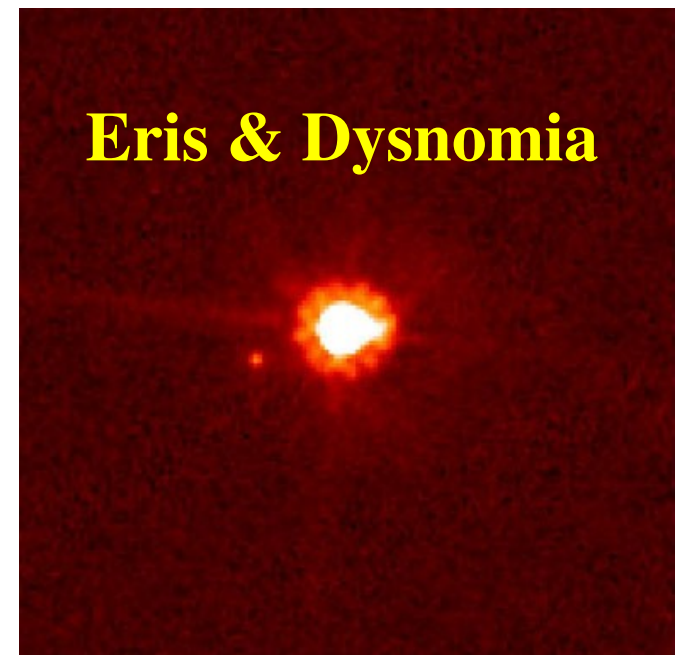
Charbonneau et al. (1999) – first detected exoplanet transit

Cheat sheet up Friday or Saturday.

Response paper for Monday (10/4)

The International Astronomical Union (IAU), the organization that expelled Pluto from the “planet club”, is responsible for choosing official names for minor solar system bodies... After reading the guidelines for naming minor planets, explain your views on whether and how you believe these rules... should be modified.

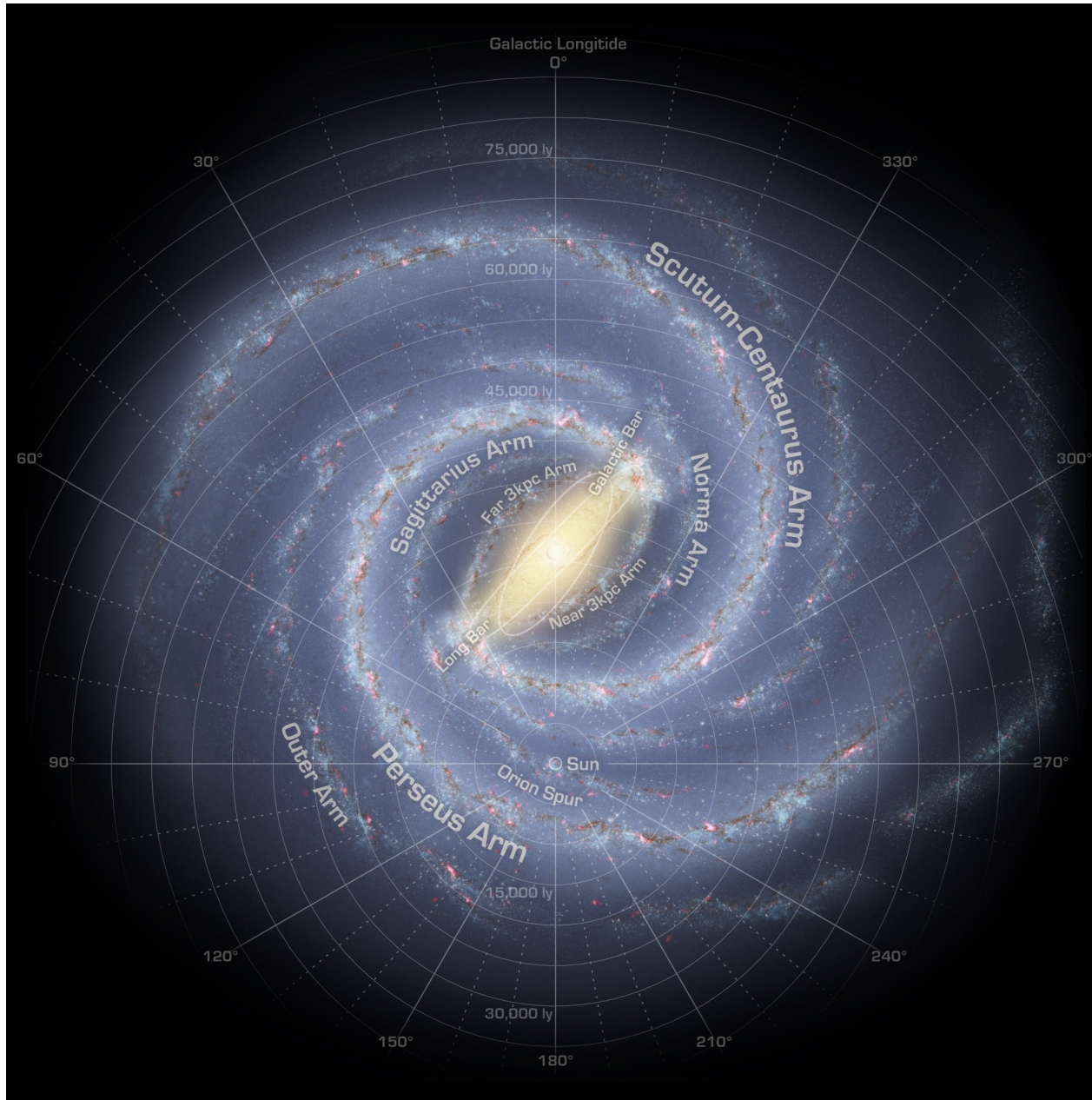
**the planet formerly known as “Xena” &
the moon formerly known as “Gabrielle”**



Components of a galaxy



A (possible) bird's eye view of the Milky Way



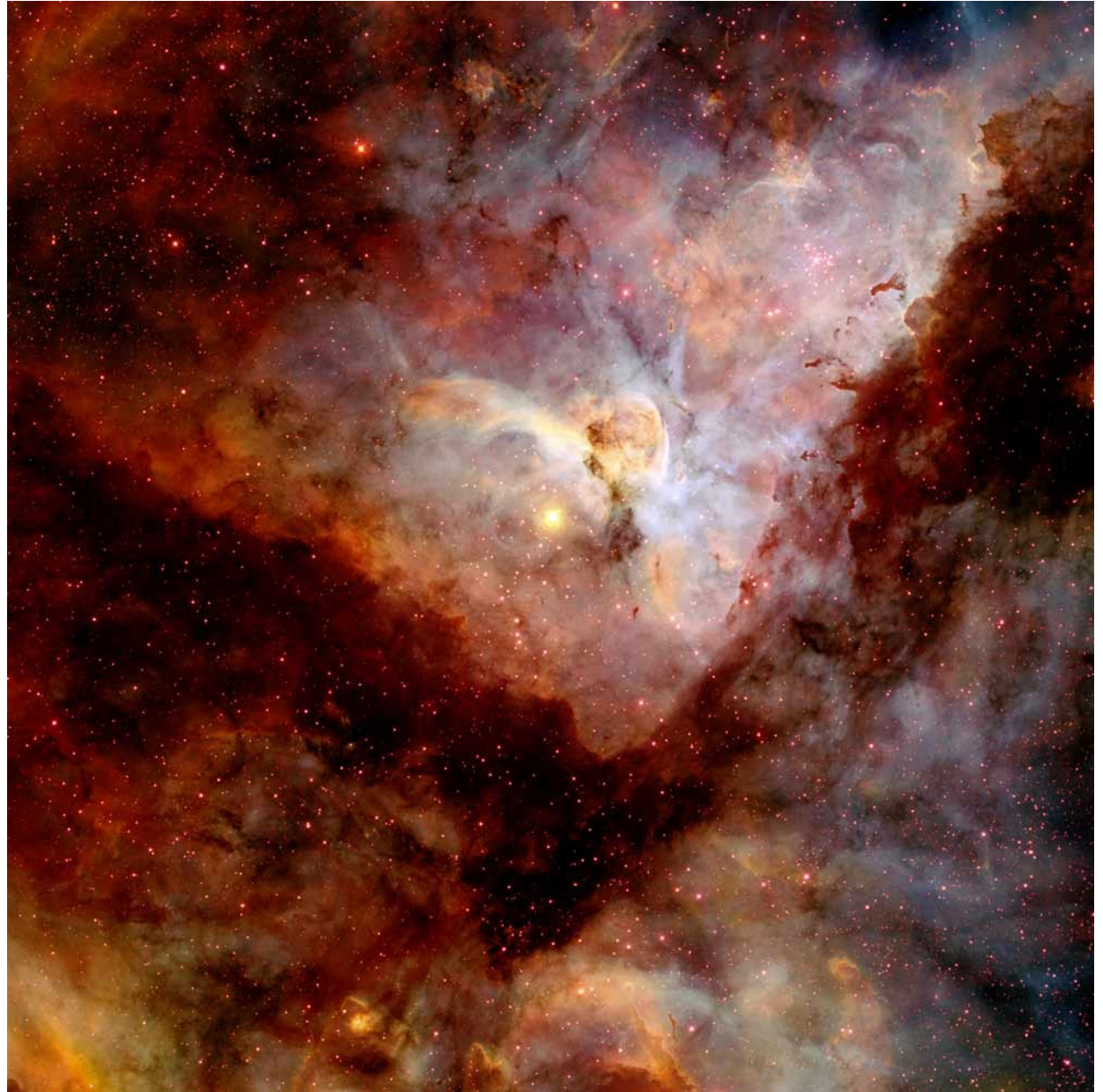
Star formation in the Carina Nebula

sulfur

hydrogen

oxygen

***D* ~ 7500 light-years**



Center of the Carina Nebula

Carina Nebula



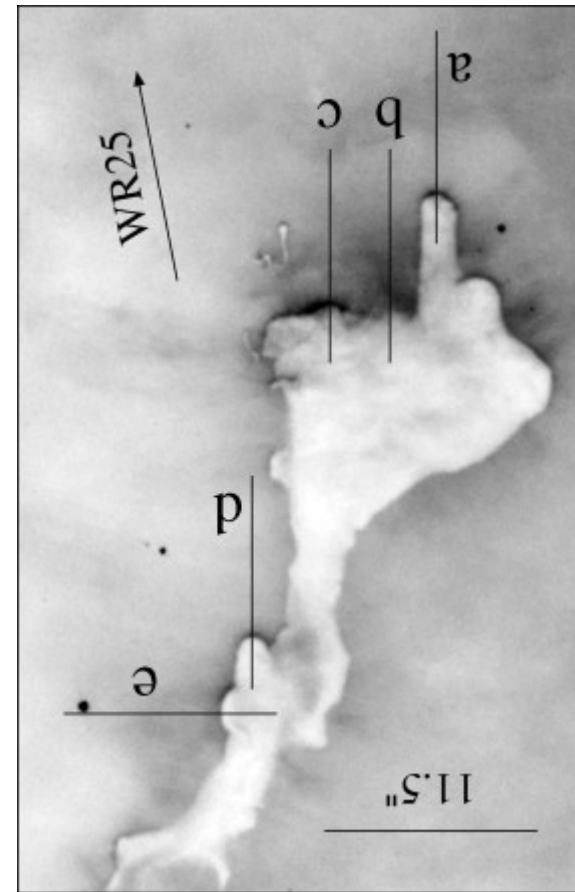
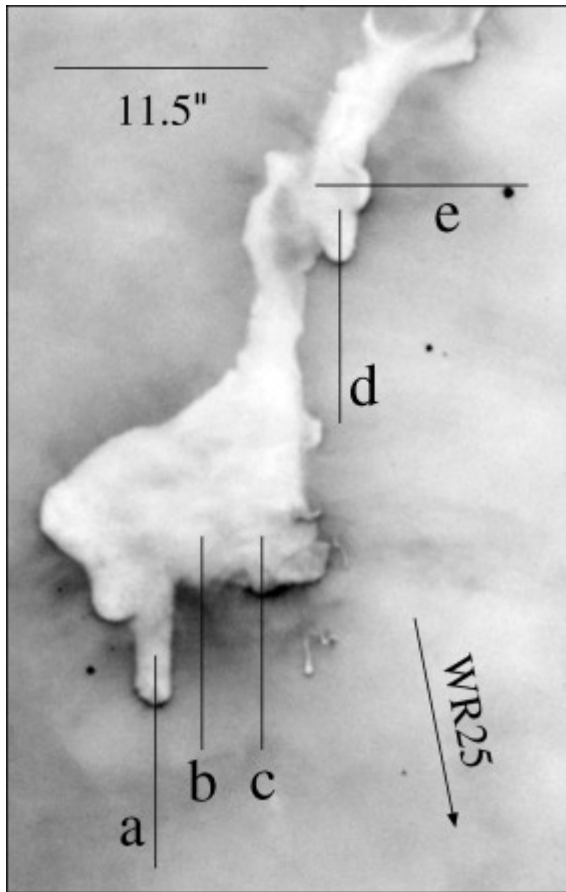
Hubble
Heritage

NASA, ESA, N. Smith (University of California, Berkeley), and The Hubble Heritage Team (STScI/AURA)
Hubble Space Telescope ACS/WFC • STScI-PRC07-16a

Protostellar jets in the Carina Nebula



Carina's "Defiant Finger"



Star formation in Eagle Nebula



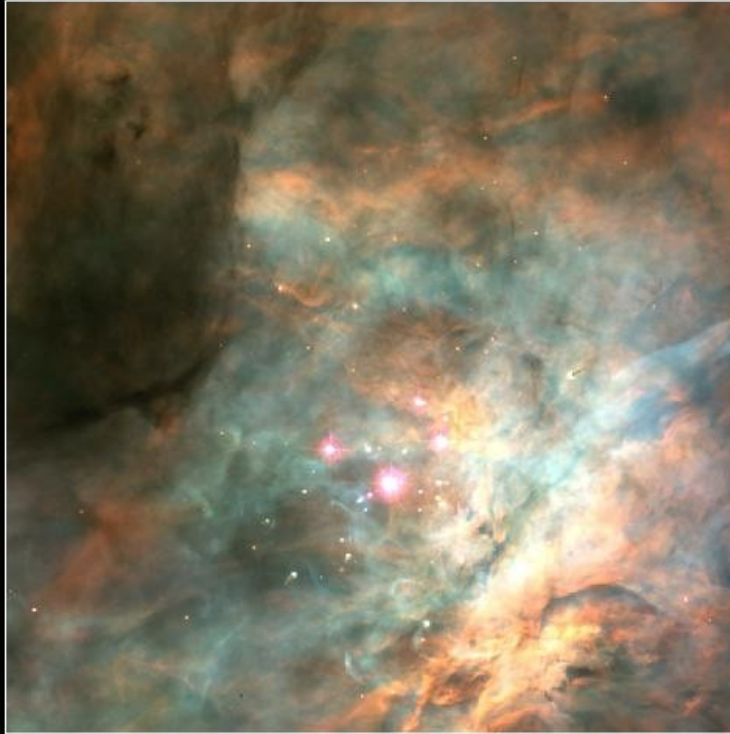
Star-Birth Clouds · M16

HST · WFPC2

PRC95-44b · ST ScI OPO · November 2, 1995
J. Hester and P. Scowen (AZ State Univ.), NASA

Star formation in Orion

Visible • WFPC2

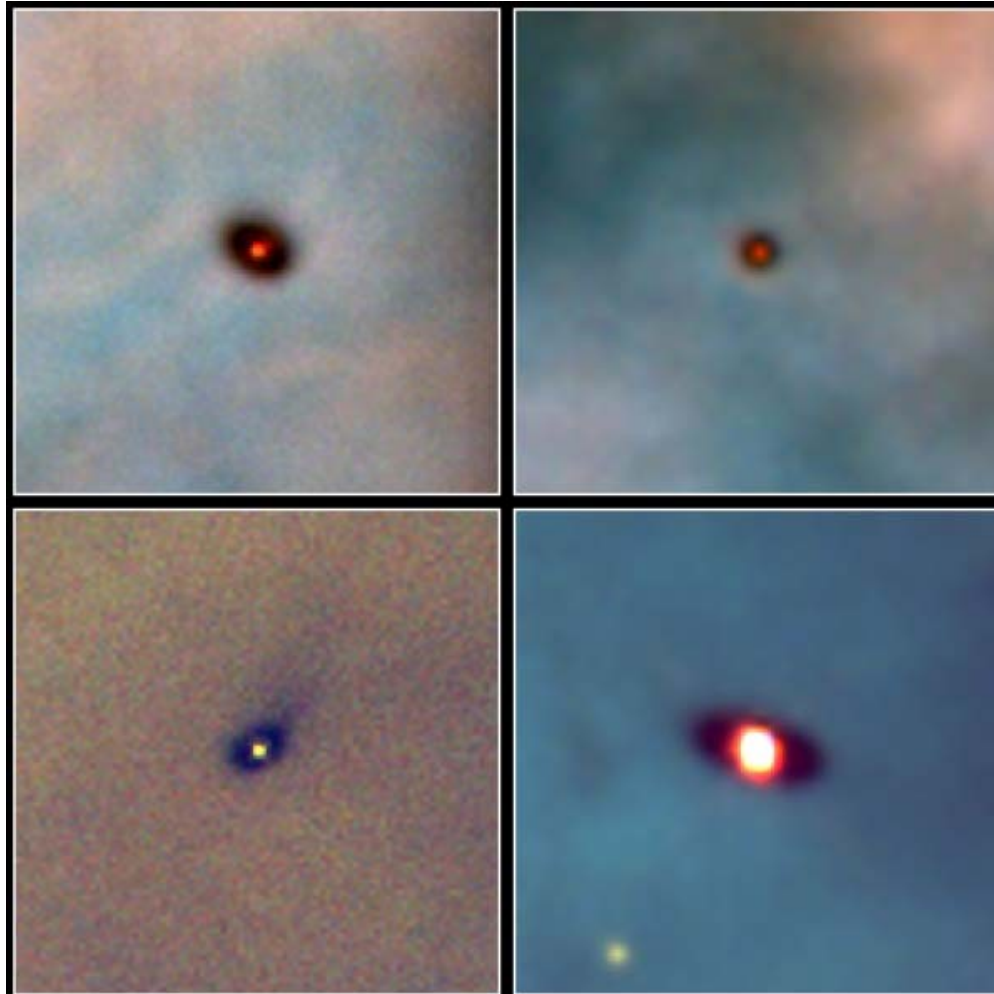


Infrared • NICMOS



Trapezium Cluster • Orion Nebula
WFPC2 • Hubble Space Telescope • NICMOS

“Proplyds” in Orion

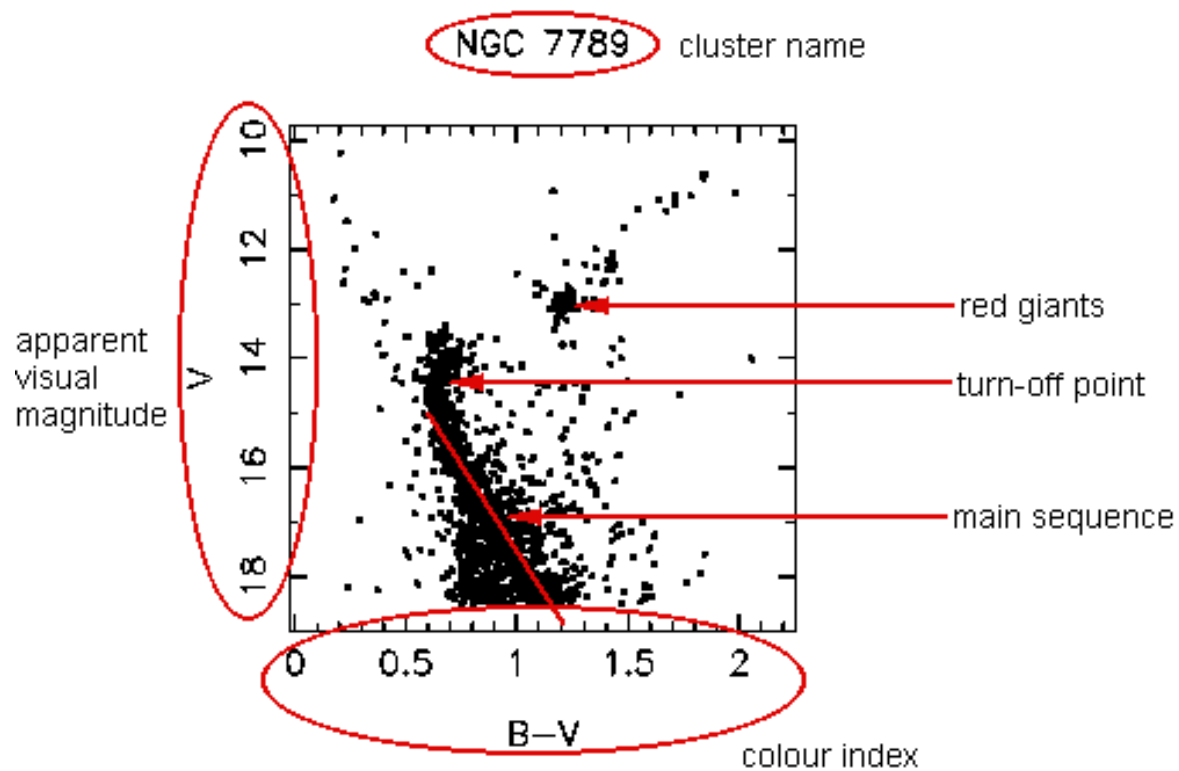


**Protoplanetary Disks
Orion Nebula**

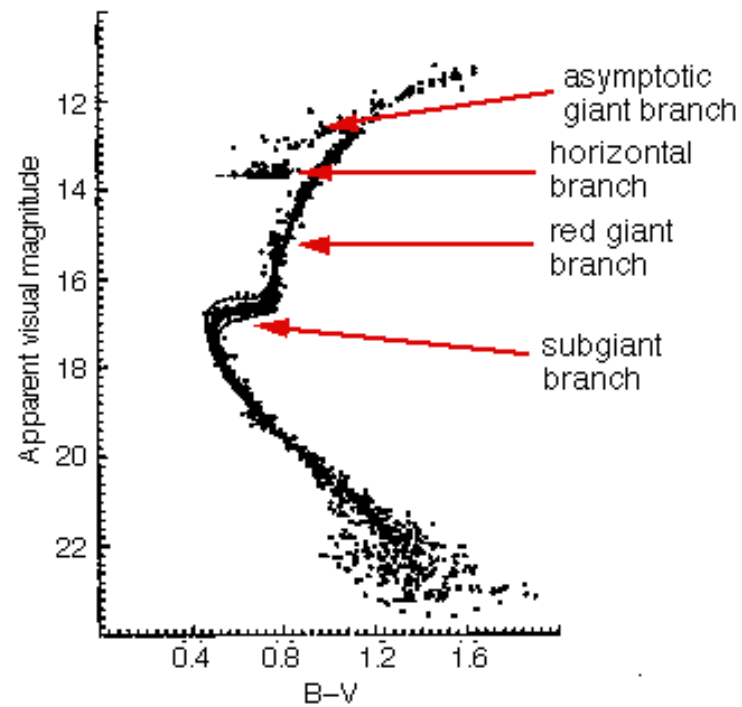
HST · WFPC2

PRC95-45b · ST ScI OPO · November 20, 1995
M. J. McCaughrean (MPIA), C. R. O'Dell (Rice University), NASA

HR diagrams



NGC 7789



47 Tuc

Two kinds of supernovae

Type I: a white dwarf in a binary system is pushed “over the edge” (Chandrasekhar limit = 1.4 solar masses) by the addition of just a bit too much mass from a companion, or from another white dwarf. These produce lots of Fe.

Type II: a very massive star undergoes core collapse when it is unable to derive any more energy from nuclear fusion. These produce lots of “alpha elements” (Ca, Mg, etc.).