

Background for the Course

- My background
- My perspective on “observational” astro

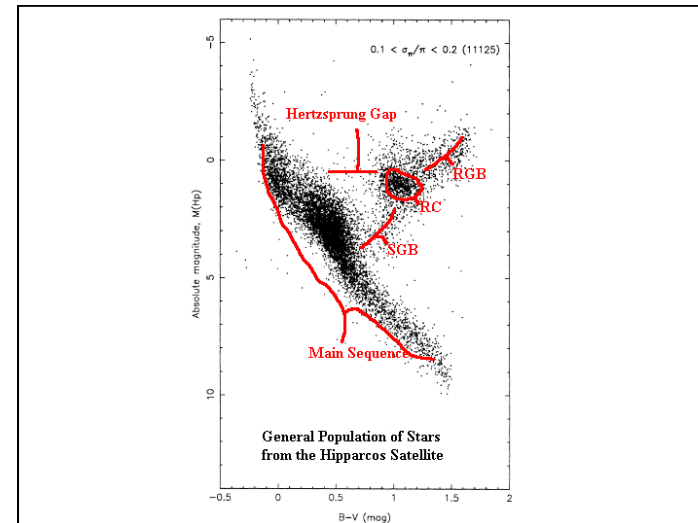
Plan for the Course

- discuss syllabus, expectations, grading, etc.

Begin first Group Project

- color-magnitude diagrams
- group assignment - proposal draft!
- begin background work

While I'm Gone: Introduction to Computer Network & Unix

Determining Stellar Ages

- In general, it is NOT possible to measure “age”
- For young stars, activity $\sim t^{-1/2}$ (e.g. f_x)
 - rotating rapidly; spin down on this timescale
 - eventually no disk to produce drag, so spindown stops
- HR diagram fits to theoretical models
- Clusters:
 - assume all stars born at same time
 - position in HR diagram depends on mass AND time
 - main sequence “turn off” gives age of cluster
 - clusters tend to disperse (become unbound)
 - some clusters don't stand out (e.g. moving groups)

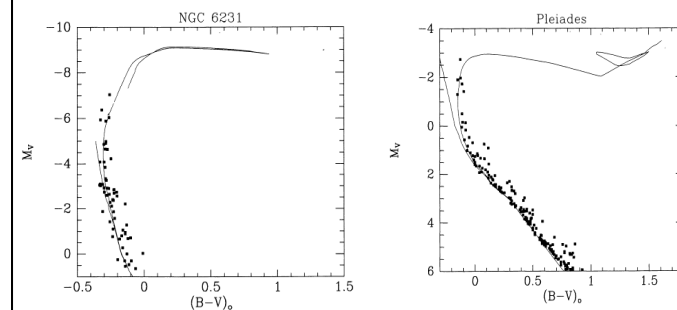
Examples of young clusters...

Fig. 10. Same as in Fig. 9 for NGC 6231, $m - M = 12.50$, $E(B - V) = 0.46$, $\log \text{age} = 6.71$ Fig. 20. Same as in Fig. 9 for the Pleiades, $m - M = 5.60$, $E(B - V) = 0.04$, $\log \text{age} = 8.00$

NGC 6231 (Open Cluster)
Age $\sim 6\text{Myr}$

Pleiades (Open Cluster)
Age $\sim 100\text{Myr}$

Examples of old clusters...

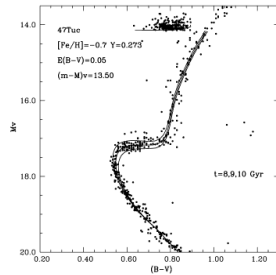
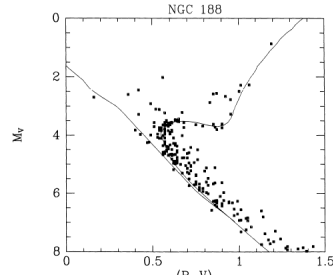


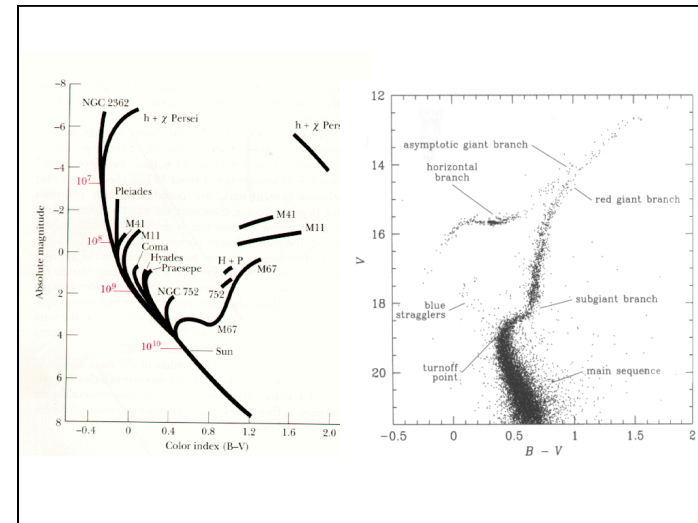
Fig. 1. Isochrones of 8-10 Gyr for the composition $(Y, Z) = (0.273, 0.008)$ (α -enhanced) applied to 47 Tuc. The data are from Hesser et al. (1987)

47 Tuc (Globular Cluster) Age = 8-10 GYr



in Fig. 36 for NGC 188, $m - M = 11.35$, $E(B - V) = 0.12$, $\log \text{age} = 9.82$. Same comments as for Fig. 1.

NGC188 (Open Cluster) Age = 7 GYr



First Group Project

- Each team will observe a different cluster (of your choice) in B & V using the 16" telescope.
 - you'll need to obtain necessary calibration observations, too
 - clusters should span wide range of ages
- Each of you will use IRAF to reduce your images, and calculate the magnitudes.
- You'll then use a plotting routine (probably IDL) to make color-magnitude plots.
- Put them together in a class? report.
- **BUT FIRST:** put together a 2 page "proposal" outlining what you need to do, who will do what, what you need to learn, and whatever else you will need to complete the project (in the next 3 or 4 weeks).