

Astronomy 100, Fall 2006

Name:

Weekly assignment 9: Galactic evolution

Due: December 5, 2006 at 11 a.m.

Distinguish:

Open cluster versus globular cluster

Cepheid variable stars versus RR Lyrae stars

Population I star versus Population II star

H II regions versus diffuse interstellar clouds

Spiral galaxy versus elliptical galaxy

What did Harvard astronomer Harlow Shapley discover during the 1920's that had to do with the distribution of **globular clusters** in this galaxy?

Two models for how stars orbit a galactic center: the "record" model, in which the stars all revolve at the same angular rate around the center, like they were stuck on a record on a turntable, and the "swirling taffy" model, in which stars at a certain distance from the center all move at the same angular rate, but stars at different distances move at different and not predictable rates, like the motion of taffy being swirled in a mixer. Which model is more consistent with observations, and what is the significance of these results concerning the distribution of matter in the galaxy?

How do we know that our galaxy is spiral-shaped, given that we can't look "top-down" on us? Name **two lines** of evidence.

We are also said to be a "**barred** spiral". What is the "bar" and where does it come from?

Draw a galaxy showing its **bulge**, its **halo** and its **disk**. Give a rough scale in light-years for diameter and thickness.

Describe the **density-wave theory** of the persistence of loosely-wound spiral arms.

In the 1920's, Caltech astronomer Edwin Hubble proposed the "tuning-fork" model of galaxies. Briefly describe why it looks like a tuning fork (in other words, why did Hubble organize it to look like a tuning fork) and whether it is an accepted model today.

So give a theory as to where the Milky Way galaxy came from (in other words, what is the origin of our galaxy).