**PHYS 354 Project 6: Modeling Thermally Pulsing AGB Stars**

Due: Jan. 29

Our goal is to make distance and mass estimates for the long-period pulsating variables (LPVs) in the Luther data set. Treat the monoperiodic stars and doubly periodic stars as two distinct classes of objects and model them separately.

Begin by using WebDA to investigate open clusters near M23 in right ascension. You will have to decide how close – the closer the better but you need sufficient data to do the job well, Select only those clusters with a full set of data (*i.e.,* nearly completely filled-out boxes). You find the color excess, distance and age of each. Neglect any clusters with a latitude greater than 10º away from the center of the galactic plane. That is, only look at clusters closely associated with the plane of the galaxy. The data column “EB-V” is the color excess, “d” is the distance in parsecs (not “D”!) and “t” is the log of the age in years. The page you selected the cluster list from contains this information.

Graph both reddening as a function of distance and error in absolute magnitude from the distance modulus as a function of distance. In either graph, eliminate very young or very old clusters if they seem to be a problem. Your goal is to determine reddening as a function of distance and Merror as a function of distance.

Our goal is to find the absolute magnitude and intrinsic color of each of our stars, along the way you may need to convert from one color index (say R-I) to another (say B-V). Work on doing that with our data or with published data.

You can try to use the Baker One Zone (C&O Section 14.3) model as a simple model of stellar pulsation to determine the masses of our stars. To do this might require a mass/radius relationship for AGB stars. Find one as needed. The masses might then give us absolute magnitudes of our stars. Comparing that to apparent magnitude, factoring in extinction, will yield distance. Are these likely to be disk or bulge stars?

Another path to these things is through the color. The color of the star, again after correcting for reddening, should yield estimates for masses and absolute magnitudes.

Use the data stored on the drive to determine what you can about our pulsating stars. Where are they? What are their masses? Are the multiply periodic stars distinct in any way from the monoperiodic stars? Within the multiperiodic stars does the ratio of periods seems to matter?

Create a poster or posters to introduce your readers to:

1. A general overview of stellar evolution

2. A general overview of AGB stars and how they fit into your model of stellar evolution

3. A general overview of stellar pulsation

4. A general overview of the Galaxy and why such is important for this work

5. A synopsis of your findings in this study along with pertinent uncertainties and the limitations that arise from simplifications of the work you did.