PHY 474/374 **Spring 2021**

Class Summary—Week 1, Day 1—Monday, March 29

Welcome to Stellar Astrophysics!

Since we are using a textbook in this course, the class summaries will be very concise and will primarily point you to relevant parts of the textbook. The exception will be whenever something in the textbook is covered at a very high level or at a level that is too deep for us, in which case I will use this class summary to write up all the essential material.

Stellar Timescales

You must know **Section 1.1** in *Dalsgaard* (**pages 2-4**) thoroughly. Of particular interest are the following timescales:

- the **dynamical timescale**, $t_{\rm dyn}$, in equation (1.2),
- the **Kelvin-Helmholtz timescale**, $t_{\rm KH}$, in equation (1.5), and
- the **nuclear timescale**, $t_{\rm nuc}$, in equation (1.7).

All equation number references above are to the *Dalsgaard* text posted in D2L for this course. *You worked with the timescales mentioned above in Questions 1-3 of today's worksheet.*

Distance Measures

You must be familiar with the following frequently used distance measures:

- the **Astronomical Unit (AU)**,
- the **parsec (pc)**, and
- the **Light Year (Ly)**.

We discussed these in class today (see the posted video if you didn't take notes; *also see Question 4 on today's worksheet*). You should read through **Sections 2.1-2.2** in *Dalsgaard* (**pages 13-15**).

Stellar Brightnesses

The magnitude scale is used by optical astronomers, historically magnitude 0 to magnitude 6, with a drop of a factor of 2.5 in brightness for each successive level. Remember that magnitude drops as you go up in numbers, so zeroth magnitude is brighter than 1st magnitude, and a 1st magnitude object is brighter than a 2nd magnitude object, and so on; this can sometimes be confusing. This scale has been expanded to fainter objects in modern times, and the Hubble Space Telescope can spot objects as faint as about 30th magnitude. See **Section 2.3** in *Dalsgaard* (**pages 15-19**) for a host of useful relations; *you used some of these in Question 5 of today's worksheet.*