

Ugeseddel 1 (week 35)

In the first lectures, Monday 29 August and Thursday 1 September I give an introduction to the course. Also, the plan is to cover Chapters 1 – 6 of *Kippenhahn, Weigert & Weiss* (skipping §2.6 and §2.7 on hydrostatic equilibrium in General Relativity, and the piston model). Since this is largely a repetition of material covered in introductory courses on stellar evolution (such as *Stars*), the emphasis is on aspects that have not been covered before. I shall assume that you remind yourselves of the earlier material, to the extent that it is needed.

In the lectures the following week, 5 and 8 September, I expect that we shall cover *Kippenhahn, Weigert & Weiss*, Chapters 7 – 10.

The exercise classes for the course, Wednesdays 10:15 - 12, are in room 1520-616; these will be conducted by Remo Collet. The exercise classes will be used to discuss more technical aspects, partly illustrated by problems. I will also use problems from *Lecture Notes on Stellar Structure and Evolution*, which I hope that you all have. It can also be found at http://astro.phys.au.dk/~jcd/evolnotes/LN_stellar_structure.pdf

The first class, on 7 September, will consider:

- i) Go through the derivation of general thermodynamic relations in *Kippenhahn, Weigert & Weiss*, §4.1, making sure that you follow all the steps;¹ in particular show that these relations hold for the simple case of an ideal gas. The first equality in Eq. (4.13) reflects a very useful, and somewhat surprising, relation: the triple product rule. For proofs, see http://en.wikipedia.org/wiki/Triple_product_rule.
- ii) *Lecture Notes on Stellar Structure and Evolution*, Exercise 3.1
- iii) Go through the steps in the verification of energy conservation (neglecting the kinetic energy) in *Kippenhahn, Weigert & Weiss*, Section 4.5
- iv) *Lecture Notes on Stellar Structure and Evolution*, Exercise 5.2, verifying the relation between cross section and mean free path. Note that this shows that κ is closely related to the physical properties of the atoms etc. in the gas, and hence a convenient measure of the radiation properties of the gas.

¹Remember that a book like this should be read with paper and pencil to hand!

I maintain a Web page for the course at

<http://astro.phys.au.dk/~jcd/stel-struct/>

This will contain the Ugesedler, and possibly other relevant material.

Corrections to *Kippenhahn, Weigert & Weiss*:

- p. 25, Eq. (4.1): replace $d\nu$ by dv
- p. 43, Eq. (5.29): replace π^6 by π^2 in the second equation.
- p. 55, line above Eq. (6.22): replace 'V' by 'S'

25 August 2016

Jørgen Christensen-Dalsgaard