# Stellar Evolution 2016 Q2

## Ugeseddel 7 (week 45)

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We start Q2 with the lectures Monday 7 November. Here I plan to discuss the contents of the quarter, including the possibility that some of you take on the lectures on specific topics. In particular, I have in mind the evolution of stars on close binary systems. In addition, I shall go through some aspects of physics that were not properly dealt with in Q1: crystallization, neutronization and real gas effects (*Kippenhahn, Weigert & Weiss*, Sections 16.4 - 16.6, and notes to be handed out); electron screening of nuclear reactions (*Kippenhahn, Weigert & Weiss*, Section 18.4); and neutrino energy loss (*Kippenhahn, Weigert & Weiss*, Section 18.7). In the lectures Thursday 10 November Remo discusses detailed hydrodynamical simulations of convection; a good overview of the subject is provided in an online review by Nordlund et al. (2009; *Living Reviews in Solar Physics*), which will be linked from the website.

In the following week Günter will present a simple way to approximate the properties of stellar structure in terms of homology relations (*Kippenhahn, Weigert & Weiss*, Chapter 20) and start the presentation of star formation and early stellar evolution (*Kippenhahn, Weigert & Weiss*, Chapters 26 and 27).

In the exercise class on 16 November Jakob Mosumgaard will introduce the MESA stellar evolution code. This is a user-friendly code which we shall use for projects to compute stellar evolution, including possibly some of the final projects for the evaluation of the course. For an introduction to MESA, see `http://mesa.sourceforge.net/`. This will require either that you have a Mac or Linux laptop (or a Linux emulator), or that you get an account on our servers. If you need an account, please come and see me.

**Additional material:**
*Consistent approximate equations of state*, to be handed out.

**Corrections to** *Kippenhahn, Weigert & Weiss***:**

- **p. 301, equation just below Eq. (26.12)**: replace '$\rho$0' by '$\rho_0$'.
- **p. 330, Table 29.1**: Here the line 'Depth of conv. env.' actually gives the fractional radius at the base of the convective envelope. Thus the depth is $0.287 \pm 0.001\, R_\odot$.
- **p. 335, Fig. 29.3**: The rightmost label on the abscissa should obviously be '1.0'.

7 November 2016 Jørgen Christensen-Dalsgaard