Chapter 6: Stars, Stellar Spectra, and Classification
Some corrections and changes

1. page 97, The paragraph 'The spectra originates ...' should read as follows:

   The absorption lines originate when the continuum radiation from a hot body passes through a cooler diffuse gas. In the case of stars the continuum is the blackbody radiation produced by the stellar surface and the cooler medium is the stellar atmosphere. The atom or ions in the atmosphere absorb photons corresponding to some characteristic frequencies and make a transition to a higher energy state. The different quantum states of the hydrogen atom are shown in Figure 6.5. The lowest or ground state has energy equal to -13.6 eV. An electron in the ground state can absorb an incident photon and jump to one of the excited states. Similarly, an electron in one of the excited states can absorb a photon and jump to states of higher energy. All these transitions lead to an absorption line spectrum. The energy E of the photon absorbed is given by $E = E_2 - E_1$, where E_1 and E_2 are the energies of the two states participating in the transition. This transition leads to an absorption line at frequency ν, given by

   $$h\nu = E_2 - E_1 \,, \tag{6.1}$$

   where we have used Equation 2.5. In the case of hydrogen, the Balmer lines lie at visible frequencies and hence play a special role in astronomy.

   The emission lines are formed when electrons in excited states make a transition to lower energy states by emitting photons. These are formed in a gaseous medium whose temperature is sufficiently high so that a significant fraction of the atoms exist in an excited state.

   The formation of spectral lines is nicely summarized by the Kirchoff's laws which state that:

   (i) A hot solid object or a dense gas emits radiation with a continuum spectra.

   (ii) A hot diffuse gas produces emission line spectra.

   (iii) Continuum radiation from a hot object passing through a cool diffuse gas produces an absorption line spectra.

2. page 102 middle: remove the line 'Let's assume that the atmosphere consists of pure hydrogen'.

   Furthermore the text starting from 'The pressure of the free electron gas ...' till the end of the paragraph should be replaced by:

In order to compute the relative abundance of these species we also require n_e. If we assume that the atmosphere consists of pure hydrogen, then n_e would be equal to N_{II}, the number density of hydrogen ions. In general n_e gets contributions from several different atoms. Here we ignore these complications and use the known value of the pressure P_e of free electron gas at the solar surface, which is roughly 200 dynes/cm^2. We can now obtain n_e by using the ideal gas law: