Bibliography

(Rutten-Script “Radiative Transfer in Stellar Atmospheres“)

There is a long list of books treating topics discussed here that are worth to have, to study, or to have a look at. I frequently refer to the first four of these books in the text; in various places, the treatment follows the cited book in detail.

The first group consists of the books quoted most:

Mihalas (1978): *Stellar Atmospheres*.
The bible on NLTE spectral line formation in stellar atmospheres. Comprehensive, highly authorative, well written. The _rst edition (Mihalas 1970) is somewhat less formal and sometimes clearer on classical topics than the 1978 edition; the latter has been expanded with the theory of expanding atmospheres, in particular the Sobolev approximation. The level is for US graduate students and researchers, higher than this course. Various sections of these lecture notes follow Mihalas closely, but are in principle self-contained. You should study this book if you start graduate research into stellar atmospheres. Out of print, but a new version is being prepared by Mihalas and Huben_y.

Rybicki and Lightman (1979): *Radiative Processes in Astrophysics*.
Excellent general introduction to radiative processes, in particular high-energy ones. Chapter 2 below gives an equation summary of the 1st chapter, with the same notation. In the context of the other material treated here, Chapters 9 (Atomic Structure), 10 (Radiative Transitions) and 11 (Molecular Structure) are of interest. Worth having.

Gray (1992): *Observation and Analysis of Stellar Photospheres*.
Worth buying and using as complement to these lecture notes. It does not cover NLTE radiative transfer, but it adds much observational flavor which falls outside the scope of this course. It is clearly written, contains many easy-to-use formulae and recipes, and has good references to the literature.

Novotny (1973): *Introduction to Stellar Atmospheres and Interiors*.
A bit oldfashioned, but still of interest for its clear and extensive low-level explanations of atomic structure, atom-photon interactions, extinction coe_cients and classical atmosphere modeling. Out of print.

Böhm-Vitense (1989): *Introduction to stellar astrophysics II. Stellar Atmospheres*.
An easy to read textbook on a lower level than this course. Good on Saha-Boltzmann statistics, extinction processes, curve of growth diagnostics and observational contexts. It also discusses coronae and winds.

Then some general textbooks that also include radiative transfer:

Shu (1991): *The Physics of Astrophysics. I. Radiation*.
Excellent general textbook on astrophysical processes, including radiative ones and

atomic and molecular quantum theory. Emphasizes the underlying physics. Comparable to Rybicki & Lightman but putting more emphasis on low-energy rather than high-energy processes. Worth buying in general but not speci_cally needed for this course.

Osterbrock (1974): *Astrophysics of gaseous nebulae*.
About nebulae rather than about stellar atmospheres, but containing an excellent description of the physics of non-equilibrium radiative transfer.

Aller (1952): *The Atmospheres of the Sun and Stars*.
Very readable textbook on the physics of stellar atmospheres and stellar spectra, with a good introduction to the physics of atomic and molecular spectral line formation.

Schatzman and Praderie (1993): *The Stars*.
Excellent general introduction to stellar astrophysics including solar and stellar activity.

Harwit (1988): *Astrophysical Concepts*.
A good basic astrophysics source in general, not speci_cally for stellar atmospheres.

Bowers and Deeming (1984): *Astrophysics I*.
The two books of Bowers and Deeming are useful in that they cover a wide range of subjects in substantial detail. However, I don't like their sections on radiative transfer, nor their tendency to present results rather than explain principles. They are worth buying if you choose to possess just two books on astronomy.
The next three are compendia rather than textbooks:

Allen (1976): *Astrophysical Quantities*.
An authorative collection of numbers, units, data and formulae. A book to have and carry with you when you are a practising astrophysicist. The emphasis is on astronomy and astronomical spectrometry. It is getting out of date in places, especially in its references; nevertheless, it remains the book to look up the Planck constant, the distance to the nearest star, the size of Jupiter and of the Galaxy, the de_nition of oscillator strength, the abundance of iron, the refraction of the atmosphere, and lots more.

Lang (1974): *Astrophysical formulae*.
Intended as the equation counterpart to the previous book, specifying all formulae that an astrophysicist might need. Useful, but usually you want to know more about the equation you are using. Good references to the original literature.

Baschek and Scholz (1982): *Physics of Stellar Atmospheres*.
Part of the Landolt-B¨ornstein reference series giving concise but authorative summaries of whole areas of physics. This 60-page chapter represents a *gr¨undliches* equation summary of the classical theory of stellar atmospheres including radiative transfer. It is particularly good in specifying equation validity limits. It also contains useful tables of various quantities.

The following group concerns books detailing radiative transfer:

Menzel (1966): *Selected Papers on the Transfer of Radiation*.
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