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Utrecht Radiative Transfer Courses

Robert J. Rutten
Sterrekundig Instituut, Postbus 80 000, NL 3508 TA Utrecht, The Netherlands

Abstract. I summarize the radiative transfer courses and exercises taught to astronomy students at Utrecht University. Part of this material is web-available at `http://www.astro.uu.nl/~rutten`.

The Utrecht course *"The Generation and Transport of Radiation"* teaches basic radiative transfer to second-year students. It is a much-expanded version of the first chapter of Rybicki & Lightman's *"Radiative Processes in Astrophysics"*. After this course, students understand why intensity is measured per steradian, have an Eddington-Barbier feel for optically thick line formation, and know that scattering upsets LTE. The text is a computer-aided translation by Ruth C. Peterson of my 1992 Dutch-language version. My aim is to rewrite this course in non-computer English and make it web-available at some time. In the meantime, copies of the Peterson translation are made yearly at Uppsala – ask them, not me, for one. Eventually it should become a textbook.

The Utrecht course *"Radiative Transfer in Stellar Atmospheres"* is a 30-hour course for third-year students. It treats NLTE line formation in plane-parallel stellar atmospheres at a level intermediate between the books by Novotny and Boehm-Vitense, and Mihalas' *"Stellar Atmospheres"*. After this course, students appreciate that epsilon is small, that radiation can heat or cool, and that computers have changed the field. This course is web-available since 1995 and is regularly improved. Eventually it should become a textbook.

The three Utrecht exercise sets *"Stellar Spectra A: Basic Line Formation"*, *"Stellar Spectra B: LTE Line Formation"*, and *"Stellar Spectra C: NLTE Line Formation"* are IDL-based computer exercises for first-year, second-year, and third-year students, respectively. They treat spectral classification, Saha-Boltzmann population statistics, the curve of growth, the FAL-C solar atmosphere model, the role of H^- in the solar continuum, LTE formation of Fraunhofer lines, inversion tactics, the Feautrier method, classical lambda iteration, and ALI computation. The first two sets are web-available since 1998. The third should follow sometime this century.

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Reverse acknowledgement. Users of this free material are most welcome to refer to this summary and so boost my citation standing. Corrections are also very welcome.