

Foreword

This volume is a collection of lectures presented during the third GRETA (GRoupE Tranfert en Astrophysique) meeting which takes place at Fréjus, on May 11–13, 2005 and was focussed on the radiative transfer and its applications to very large telescopes observations. Through 18 contributions the reader will find answers regarding fundamental questions as why is it so difficult to solve the radiative transfer equation, how to obtain solutions for non-LTE radiative transfer problems or how to use the finite rank approximation method to solve the transfer equation?

He will also find state of the art of including all the lines in spectrum synthesis calculations in order to determine the properties of stars as well as new algorithms to solve 3D radiative transfer problems using Monte-Carlo methods. Moreover, all these methods are developed in order to interpret the huge amount of data coming from the new large telescopes facilities as the Very Large Telescope Interferometer (VLTI) in the near-infrared or the forthcoming Atacama Large Millimeter Array (ALMA) at millimeter and submillimeter wavelengths. These new instruments will allow to study stellar structure surfaces or circumstellar disks dynamics with unprecedented sensitivity, angular and spectral resolutions.

The GRETA is a group of more than 60 researchers and doctoral or postdoctoral students mostly from France but also from European countries as Germany, Poland, Czech Republic, Portugal, Spain, Italy or the United-States and Japan working in the field of radiative transfer. More details about the GRETA activities can be found at URL: <http://www.obs-nice.fr/stee/transfert/transfert.html/>.

We hope that the reader will enjoy and appreciate these proceedings as it was a pleasure for the 35 participants to spend these three days in the Villa Clythia at Fréjus. I also want to thank the lecturers for the great quality of their talks as well as the excellent quality of their contributions to these proceedings.

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