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Atomic Diffusion in Stars

This book gives an overview of atomic diffusion, a fundamental physical process, as applied to all types of stars, from the main sequence to neutron stars. The superficial abundances of stars as well as their evolution can be significantly affected. The authors show where atomic diffusion plays an essential role and how it can be implemented in modelling. In Part I, the authors describe the tools that are required to include atomic diffusion in models of stellar interiors and atmospheres. An important role is played by the gradient of partial radiative pressure, or radiative acceleration, which is usually neglected in stellar evolution. In Part II, the authors systematically review the contribution of atomic diffusion to each evolutionary step. The dominant effects of atomic diffusion are accompanied by more subtle effects on a large number of structural properties throughout evolution. One of the goals of this book is to provide the means for the astrophysicist or graduate student to evaluate the importance of atomic diffusion in a given star.

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