

Preface

In the space between the stars, there is a large diversity of objects, where fundamental physical processes for galaxy structure and evolution are taking place. This book aims to describe the main processes and to give, besides a simple description, numerical estimates of the most relevant quantities for interstellar astrophysics.

The principal objects that permeate the interstellar regions are described and analyzed according to their physical properties, but the main focus of the book are the physical processes taking place within these objects. These processes can also occur in other astrophysical contexts, such as stellar physics, galactic astronomy, and in regions like active galactic nuclei. For this reason, the book, besides being an introduction course on astrophysics of the interstellar medium, may also be a useful tool for students of astrophysics and researchers interested in these fields of knowledge.

The text of this book is based on lecture notes of the postgraduation course on interstellar medium that has been lectured by the Astronomy Department of the Astronomical and Geophysical Institute, São Paulo University, for about twenty years. The main part of the course is found in Chaps. 2 to 11, where the principal physical processes involved are described. There is not—yet—a general theory for the interstellar medium; thus, the various processes still represent open problems in this area of expertise, for which answers are presently being sought.

The units used in astrophysics are deeply embedded in everyday life, making the full use of a system such as the International System of Units (SI) virtually impossible. Besides some unusual units, like the parsec, the stellar magnitudes, and the solar units, we mainly use the cgs system complemented with atomic units, such as electron volt (eV) and ångström (Å). In this book, we maintain the traditional units, the ones the reader will find in every specialized paper. However, in the end, we provide a table with the principal physical and astronomical constants in their usual units and also converted to SI units. For a better memorization of the numerical values of the most important quantities, each chapter includes some exercises, which must be taken as integral parts of the text. There is also basic bibliography for each chapter, where the reader will find a wide variety of materials for a more detailed study.

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