

Foreword

This book is the result of a collaboration between specialists of various areas of astronomy to summarise what we understand of the production and distribution of oxygen in the Universe. A large part is devoted to the methods of oxygen abundance determination in various media, as those are the fundamentals on which our knowledge is built.

Why concentrate on oxygen? Oxygen is the most abundant of the metals, its abundance can be measured in many sites and with a variety of techniques, its formation process is now rather well understood: yet there are many unsolved questions. We believe that it is by showing the problems and facing them that progress is better made.

Following the thread of oxygen, the reader can gain a view of the Universe which is quite different from the perspective usually adopted in manuals, and therefore hopefully rewarding. We believe that this book is suitable for students, provided that they have sufficient background knowledge in astrophysics.

This volume contains a lot of original material in the form of figures and tables as well as an extensive list of references. However, since this book took about 4 years to get assembled, and its parts were written at different epochs, not all the references have been updated. The field is progressing so fast that any update would have quickly become obsolete anyway. As a matter of fact, the major aim of this book is not to describe the latest results, but rather to provide the reader with tools for a deeper understanding of how these results are obtained. This is why this book not only provides a careful mapping of oxygen in the Universe but also introduces some fundamental astronomical concepts (*e.g.* theory of line formation, stellar evolution principles, basic equations for chemical evolution of galaxies), and discusses the methods to derive the chemical composition of astronomical bodies (stars, nebulae, cosmic rays, meteorites, etc.) and their uncertainties. The reliability of the atomic and nuclear data is also addressed.

We undertook this collective endeavour so that the reader could benefit from the best of our experience in our respective fields, perhaps at the expense of homogeneity in style or notation. We hope that the usefulness of this book will overcome its imperfections.

We warmly thank the Laboratory Universe and Theories of the Paris Observatory for the financial support which made this project feasible.

The authors

