

Preface

The CNRS astrophysics schools gather professional astronomers several times per year to discuss hot scientific topics. Since 2003 and every 3 years, at Oléron and then at La Rochelle, a CNRS astrophysics school welcomes, for the first time, amateur astronomers. That is how about 15 professionals and 35 amateurs, with already a good practice of astronomy, meet to exchange on topics and methods of observations. The goal is to have the passion for astronomy of amateurs converge with useful objectives for the scientific community.

This book is the result of lectures given during the first CNRS school gathering professional and amateur astronomers, held in Oléron (France) from May 6 to 11, 2003, and which was entitled¹:

“Outils de l’astrophysique pour une coopération entre astronomes professionnels et amateurs.”

During this meeting the contribution of professional to amateur work was mainly focused towards observing techniques, various possible common programmes or studies, scientific resources and methodology. The school was particularly focused on spectroscopy, a method to analyse light which allows a better knowledge of the physics of astronomical bodies. A cornerstone of professional astrophysics, spectroscopy now tends to develop among amateurs.

The goal of professional-amateur schools is to guide amateurs by proposing on one hand an update on astrophysics and on the knowledge of professional scientific needs, and on the other hand to define together a methodology for observing programmes. Moreover, professionals can realize during these schools what amateurs can bring to their studies and propose federative scientific programmes.¹

Indeed, in spite of the means put together by professionals, with an increasing complexity, the sky remains vast. A number of observations can be executed by amateurs with small instruments and become part of larger professional campaigns. Compared to powerful professional telescopes, the instruments of amateurs are of course modest, but they have recording and measuring equipments with the same technology as professionals. In addition, size is not always a handicap if the observations are frequent and regularly scheduled. Finally, amateurs have a much bigger reactivity to follow a sudden and unexpected astronomical event than professionals who have to follow a long procedure before pointing a telescope to a chosen object.

Nowadays a large number of amateur astronomers are equipped with an instrumentation allowing to produce measurements likely to interest the community of professional astronomers. In particular, the use of CCD cameras has widely spread

¹See <http://www.astrosurf.com/aude/oleron>

among amateurs and opened the road to already fruitful exchanges in domains as various as the discovery of supernovae, photometric follow-up of variable stars, meteorology of planets, occultations of stars by asteroids, mutual phenomena of Jupiter's satellites, etc. It is worth pointing out, in addition, that nowadays amateurs can access numerous 600 mm-class telescopes or telescopes that are smaller but highly automatised, which are very efficient for sky survey programmes.

In this context, the observation by amateurs takes a new dimension: from a simple hobby it becomes useful and contributes to a better knowledge of astronomy. Moreover, with this school, the astrophysics scientific community shows its willingness to open up and share science with a broad audience. The successive editions of the schools, in 2003, 2006 and 2009, have all been strikingly successful, and a forthcoming school is planned in 2012.

The successive chapters of this book will provide, to all those who have a true passion for astronomy, an idea of the state of the art in the various domains it tackles: the first chapter exposes the basics of physics of light. The following two chapters present respectively the spectrographs used in amateur astronomy and the treatment of the data obtained with these instruments. The following chapters (4 to 7) show examples of spectroscopic applications to the Sun, Be stars, planetary nebulae, and comets. This book will thus be useful for all, from the enlightened amateur to the professional.