Book Review

High Energy Astrophysical Techniques by Rosa Poggiani, UNITEXT for Physics, Springer, 2017; ISBN: 978-3-319-44728-5, DOI: 10.1007/978-3-319-44729-2

ALICJA WIERZCHOLSKA¹

The book entitled “High Energy Astrophysical Techniques”, written by Rosa Poggiani, aims to be a textbook presenting ultraviolet, X-ray and gamma-ray astronomy, cosmic rays, neutrino astronomy, and gravitational waves. The volume is presented as bridge between the reference books and the specialized literature, which make this item very interesting for students and scientists interested in observational techniques that can be relevant to high energy astronomy.

Nowadays high and very high energy astrophysics is a discipline which often surprises us with new discoveries. Being up to date with them and understand why they are very important for modern astronomy is essential for young students interested in the topic and also for other astro-enthusiasts.

The material in the book is presented in 18 chapters in 160 pages. The book is well organized and divided in a very intuitive way.

While looking for the first time on the manuscript’s content I was surprised by a large number of scientific topics, which are listed in the book content. Three major parts of the book presented the following material.

Part I include basics, such like details on electromagnetic spectrum, cosmic rays neutrinos, radiation processes, interactions of photons, and particles. Part II focuses on detectors: different types including ionization and scintillation detectors, calorimeters, and Cherenkov detectors. Final, part III is dedicated

to high energy astronomy, starting from ultraviolet range up to gamma-ray and cosmic rays energies. In this part of the book the neutrino and gravitational waves astronomy are also presented.

Each chapter of the book is summarized with questions to the reader, which is very nice and helps check, if all material is well understood. There are no answers to the questions, but in most cases solution can be easily found in the book.

All figures presented in the book are black/white ones. This is a big disadvantage, since colors in some graphs and 3D figures would definitely help to understand and remember the messages given in the plots. Furthermore, the content of part III could be supplemented with color figures presenting different instruments introduced in chapters, examples of maps, and other results that can be obtained with different instruments.

Part I of the book, dedicated to basics, is really well written and should be easily understood by everybody with basics of nuclear physics. The number of equations included in the text is ideal, sufficient to understand the subject, and not being overloaded with mathematics.

Part II of the work focuses on detectors. Basic properties of large number of different instruments are presented there. Again, here material is well presented and can be easily understood by the reader.

The final part—part III, is the weakest point of the book. This is a section, where ultraviolet, X-ray and gamma-ray instruments and observational techniques are presented. Unfortunately, observational possibilities of instruments mentioned in this section are completely ignored. An ultraviolet, X-ray and especially gamma-ray astronomy are very recent and fast

¹ Institute of Nuclear Physics, Polish Academy of Sciences, 152 Radzikowskiego Street, 31-342 Kraków, Poland. E-mail: alicja.wierzcholska@ifj.edu.pl

developing fields of science, but observations in these regimes are very challenging for astronomers. This is mainly due to low statistics of photons emitted, different activity states of sources, visibility of the sky, and other aspects of observations that are possible and reasonable are usually highly debatable. For this reason, it would be nice to have at least basic information on which sources, how and when can be observed with current generation of instruments listed in the book.

Additionally, what would add to the book is if observational limits, and possibilities, for all ground and space observatories mentioned in the text would be discussed in the book.

To summarize, the material is presented in the book in a very clear way, but since 160 pages are dedicated to so many, so different aspects of high energy astrophysical techniques, it is impossible to characterize them in much detail.

It is clear that the book is dedicated to students as a supplement to the lecture, but still I found several

topics purely reported, especially properties of X-ray and gamma-ray observations.

The idea of writing a book linking the world of professional specialized literature and specialized books is very good. And it is obvious that such a book cannot be a specialized manuscript, but in the case of “High Energy Astrophysical Techniques” by Rosa Poggiani some topics still could have been reported in more detail. It would be also very valuable for the book if, at least in some cases, more recent references would be listed.

Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.