



# High Energy Astrophysics: An Introduction (Astronomy and Astrophysics Library)

By Thierry J.-L. Courvoisier

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**High Energy Astrophysics: An Introduction (Astronomy and Astrophysics Library)** By Thierry J.-L. Courvoisier

High-energy astrophysics has unveiled a Universe very different from that only known from optical observations. It has revealed many types of objects in which typical variability timescales are as short as years, months, days, and hours (in quasars, X-ray binaries, etc), and even down to milli-seconds in gamma ray bursts. The sources of energy that are encountered are only very seldom nuclear fusion, and most of the time gravitation, a paradox when one thinks that gravitation is, by many orders of magnitude, the weakest of the fundamental interactions. The understanding of these objects' physical conditions and the processes revealed by high-energy astrophysics in the last decades is nowadays part of astrophysicists' culture, even of those active in other domains of astronomy.

This book evolved from lectures given to master and PhD students at the University of Geneva since the early 1990s. It aims at providing astronomers and physicists intending to be active in high-energy astrophysics a broad basis on which they should be able to build the more specific knowledge they will need. While in the first part of the book the physical processes are described and derived in detail, the second part studies astrophysical objects in which high-energy astrophysics processes are crucial. This two-pronged approach will help students recognise physical processes by their observational signatures in contexts that may differ widely from those presented here.

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**High Energy Astrophysics: An Introduction (Astronomy and Astrophysics Library) By Thierry J.-L. Courvoisier Bibliography**

- Sales Rank: #2378848 in Books
- Published on: 2012-10-03
- Original language: English
- Number of items: 1
- Dimensions: 9.20" h x 1.00" w x 6.20" l, 1.35 pounds
- Binding: Hardcover
- 332 pages



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### Editorial Review

#### Review

From the reviews:

“The aim of this new book is to present the objects revealed by high-energy astrophysical observation, to discuss the physical conditions met by these objects, and to explain the physical processes at work under these conditions. ... The text of the present work is intended for readers close to the end of a master’s course or early in a PhD programme in physics or astronomy, but it may also be useful for specialists in astrophysics and astronomy as reference book.” (Claudia-Veronika Meister, *Zentralblatt MATH*, Vol. 1257, 2013)

#### From the Back Cover

High-energy astrophysics has unveiled a Universe very different from that only known from optical observations. It has revealed many types of objects in which typical variability timescales are as short as years, months, days, and hours (in quasars, X-ray binaries, and other objects), and even down to milliseconds in gamma ray bursts. The sources of energy that are encountered are only very seldom nuclear fusion, and most of the time gravitation, a paradox when one thinks that gravitation is, by many orders of magnitude, the weakest of the fundamental interactions. The understanding of these objects' physical conditions and the processes revealed by high-energy astrophysics in the last decades is nowadays part of astrophysicists' culture, even of those active in other domains of astronomy.

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#### About the Author

Thierry Courvoisier is professor for astronomy at the Department of Astronomy of the University of Geneva and director of the ISDC, Data Centre for Astrophysics. He made pioneering contributions to the research on quasars and their accretion flows, most notably on 3C 273.

Prof. Courvoisier is the President of the European Astronomical Society, President of the Swiss Academy of Sciences, and Editor-in-Chief of the journal “The Astronomy and Astrophysics Review”. He has been teaching courses on high-energy astrophysics at the University of Geneva since the the early 1990s.

Thierry is a keen sailor and crossed the Atlantic twice on his boat Cérès.

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