

Springer

1st
edition

2013, XVI, 332 p.

Printed book

Hardcover

Printed book

Hardcover

ISBN 978-3-642-30969-4

\$ 109,00

Available

Discount group

Professional Books (2)

Product category

Monograph

Series

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Physics : Astrophysics and Astroparticles

Courvoisier, Thierry J.-L.

High Energy Astrophysics

An Introduction

- Based on observational examples this book reveals and explains high-energy astrophysical processes
- Presents the theory of astrophysical processes in a didactic approach by deriving equations step by step
- With several attractive astronomical pictures

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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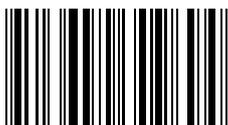
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ISBN 978-3-642-30969-4 / BIC: PHVB / SPRINGER NATURE: SCP22022

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