

High Energy Cosmic Rays

This book on high-energy cosmic rays deals in its first part with the standard model of cosmic rays, describing how they are born in a wide range of cosmic processes, how they are accelerated and how they interact with matter, magnetic fields and radiation during their journey across the Galaxy. In its second part the book presents contemporary challenges in very high energy cosmic rays, with focus on their detection in the Earth's atmosphere and underground, as well as new developments in gamma-ray and neutrino astronomy.

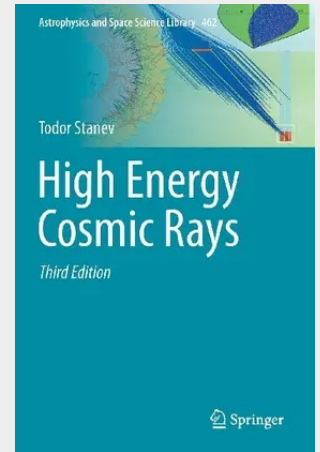
A decade after the publication of the second edition of this book, there are many new experimental results in the fields of high energy neutrino astronomy and in the whole energy range of detection of gamma-rays. There have also been many attempts for studies for multi-messenger events in these and all other fields. These new experimental efforts and their results are covered in this third edition. This is accompanied by a general analysis of these new results and the additional knowledge that they bring to our understanding of cosmic rays and their propagation in our Galaxy and extragalactic space.

A large part of the interpretation of these new findings is related to the development of the hadronic interaction models that we use to understand and describe the experimental results. The author describes the relation between the new high energy physics experiments and such models.

In addition to the discussion of new research, descriptions and graphs of the previous edition have been updated where appropriate. The third edition ends with a discussion of some possible and already planned experiments for future observations and an explanation of their importance for the better understanding of all processes that lead to the increase of our knowledge of high energy cosmic rays.

Students and lecturers of advanced undergraduate courses on cosmic rays and astroparticle physics as well as post-graduates and researchers will continue to find this book a valuable source of learning and reference.

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128,39 €

119,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9783030715694

Medium: Buch

ISBN: 978-3-030-71569-4

Verlag: Springer

Erscheinungstermin: 03.06.2022

Sprache(n): Englisch

Auflage: Third Auflage 2021

Serie: Astrophysics and Space Science Library

Produktform: Kartoniert

Gewicht: 546 g

Seiten: 342

Format (B x H): 155 x 235 mm

