

New books on physics and related sciences

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Newton Isaac *Mathematical Principles of Natural Philosophy* ('Classics of Science' Series. Translation from the Latin and comments by A N Krylov) Stereotype ed. (Moscow: Izd. URSS, 2014) 704 pp. ISBN 978-5-382-01487-6.

Principia by Sir Isaac Newton (Isaac Newton, *Philosophiæ Naturalis Principia Mathematica*) is one of the greatest works in the history of natural science. This composition laid the bases of mechanics, physics, and astronomy. It formulated the program of development of these fields of science which remained definitive for over a century and a half. The present issue is a facsimile reproduction of Newton's book translated from the Latin and commented by Academician A N Krylov. The book also includes a Subject Index prepared by Newton and first published in Russian in the second edition. The book is intended for a wide range of researchers engaged in natural sciences and also for the readers interested in the history of science. (Publishing group URSS: 117335 Moscow, Nakhimovskii prospekt 56; tel./fax: +7 (499) 724-25-45; e-mail: urss@URSS.ru; URL: <http://urss.ru/>)

Ginzburg V L *On the Theory of Relativity* 2nd ed. (Moscow: Izd. URSS, 2014) 248 pp. ISBN 978-5-9710-1317-4.

This book comprises a collection of papers by the Laureate of Nobel Prize in Physics 2003, Academician Vitaly Lazarevich Ginzburg. It is devoted to the relativity theory and related issues. The first edition of this collection (Moscow: Nauka, 1979) was timed for the 100th anniversary of the birth of Albert Einstein. Special and general relativity take one of the central places in modern physics, as well as in astrophysics and cosmology. The papers included in the collection are devoted either directly to the theory of relativity or to problems closely related to it. For example, the paper "How is the Universe organized and how does it evolve in time?" is a rather elementary introduction to relativistic cosmology. The paper "On superluminal radiation sources", intended for more advanced readers, considers radiation sources moving at superluminal speeds. Another paper describes the state-of-the-art of experimental verification of the general relativity. In several papers, attention is drawn to the history of creation of the relativity theory and its foundations. (Publishing group URSS: 117335 Moscow, Nakhimovskii prospekt 56; tel./fax: +7 (499) 724-25-45; e-mail: urss@URSS.ru; URL: <http://urss.ru/>)

Rubakov V A *Classical Gauge Fields: Theories with Fermions and Noncommutative Theories* 5th ed. (Moscow: Izd. URSS, 2014) 248 pp. ISBN 978-5-9710-1108-8.

This book is based on the lecture course delivered to third- and fourth-year students of the Faculty of Physics of Lomonosov Moscow State University engaged in theoretical physics. Various effects due to the interaction of fermions

with topological objects emerging in the theories of scalar and gauge fields — solitons, instantons, and sphalerons — are considered in the first part of the book. The second part presents less traditional material concerning classical field theories on noncommutative spaces and solitons in such theories. This part is based on the lecture courses delivered at the Institute for Nuclear Research of Russian Academy of Sciences (Moscow), the Institute for Theoretical and Experimental Physics (Moscow), and the University of Lausanne. The book contains a Supplement discussing briefly the role of instantons as saddle points of the Euclidean functional integral in quantum field theory and some related issues. The material presented can be examined in parallel with the study of quantum mechanics and then quantum field theory. In this connection, the book should be useful to both research workers and postgraduate students, as well as senior university students. According to the author's intention, the book must be accessible to senior students engaged in theoretical physics. Accordingly, the reader of this book need not necessarily have profound knowledge of quantum field theory. At the same time, acquaintance with classical and quantum mechanics, special relativity, classical electrodynamics, and results concerning the classical theory of boson (scalar and gauge) fields is assumed from the very beginning. In particular, the reader is supposed to know such objects of boson theories as domain walls, vortices, monopoles, Euclidean bubbles, and instantons. These objects are considered in detail in another book by the same author titled *Classical Gauge Fields: Boson Theories* (Publishing group URSS: 117335 Moscow, Nakhimovskii prospekt 56; tel./fax: +7 (499) 724-25-45; e-mail: urss@URSS.ru; URL: <http://urss.ru/>)

Nigmatulin R I *Mechanics of Continuous Media: Kinematics, Dynamics, Thermodynamics, Statistical Dynamics*. Textbook for students (Moscow: Izd. IGEOTAR-Media, 2014) 639 pp. ISBN 978-5-9704-2898-6.

This textbook presents the basic principles of kinematics, deformation theory, dynamics, and thermodynamics of continuous media. The derivation of integral and differential conservation equations and equations on discontinuity surfaces are discussed. The foundations of tensor calculus and of the dimensional and similarity theories are also given. The theoretical notions are used to derive basic equations of hydrodynamics, elasticity and plasticity theory, the theory of turbulence, and multiphase media. The kinetic theory of rarefied gases is discussed in detail. The textbook is intended for students and postgraduates of mechanico-mathematical, physical, and physico-technical faculties of universities and researchers working in the fields of physics, mechanics, power engineering systems, and the development of new technologies. (Publishing group GEOTAR-Media: 115035 Moscow, ul. Sadovnicheskaya 9, building 4; tel. +7 (495) 921-39-07; URL: <http://www.geotar.ru/pages/>)

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