

## New books on physics and related sciences

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**Marov M Ya** *Space: From the Solar System Deep into the Universe* (Moscow: Fizmatlit, 2016) 524 pp. ISBN 978-5-9221-1711-1.

The book presents in a rather compact and popular form modern concepts of space and the objects inhabiting it. This is first of all the Sun and the Solar System, planets of the Earth group and giant planets, and small bodies (comets, asteroids, meteoroids, and interplanetary dust). Also considered are the stars, exoplanets, galaxies, and galactic clusters and, finally, a general view of our Universe is given. Together with the discussion of the most typical physical features of celestial bodies, special attention in each of book's sections is paid to the evolutionary approach to the analysis of their natural properties. In particular, the origin of the Solar System and planetary systems of other stars (exoplanets) are considered in the context of the general problems of stellar and planetary evolution (cosmogony) and the problems of astrobiology. The origin, the evolution, and the fate of the Universe (cosmology) are discussed from the standpoint of synergism of macro- and microphysics, including the idea of a multitude of existing parallel universes, the occurrence of quantum oscillations, and the hypothetical topological features of space-time (wormholes). The book is written in a rigorous and simultaneously comprehensible language and will be of interest for both specialists and students, and at the same time for a wide circle of readers interested in modern problems of astrophysics and space science. (Fizmatlit Publishers: ul. Butlerova 17B, 117342 Moscow, Russian Federation; tel. +7 (495) 005-32-79, +7 (499) 968-92-28; e-mail: sale@fml.ru; URL: <http://www.fml.ru/>)

**Sil'chenko O K** *The Origin and Evolution of Galaxies* (Ed. V G Surdin) (Fryazino: Vek 2, 2017) 224 pp. ISBN 978-5-85099-196-8.

The book presents the modern state of our knowledge and personal views of the author on the formation and evolution of galaxies in the Universe. Galaxies comprise large formations consisting of billions of stars and of gas and dust, whose origination began about 13 billion years ago. According to astronomers' observations, the largest galaxies were the first to appear, and then it was the turn of dwarf galaxies in which stars have originated hitherto. The author explains how and why the structure of galaxies has changed with time and what methods are used to examine the properties of galaxies, whether close to us or remote, and why it is these views on the Universe that are now being rapidly developed and every day bring unexpected discoveries. The author of the book, Olga Kas'yanovna Sil'chenko, is Doctor of Phys.-Math.

Sciences, laureate of prestigious scientific prizes, Head of the Department of Physics of Emissive Stars and Galaxies in the Sternberg State Astronomical Institute of Moscow State University, and an eminent Russian specialist in the field of extragalactic astronomy, who has made a substantial contribution to advancing observations and theoretical analysis of galactic evolution (Vek 2 Publishers: pl. Vvedenskogo 1, 141195 Fryazino, Moscow region, Russian Federation; tel./fax +7 (496) 567-82-35; e-mail: vek2@vek2.ru; URL: <http://www.vek2.ru/>)

**Varshalovich D A, Khersonskii V K, Orlenko E V, Moskalev A N** *Quantum Theory of Angular Momentum and Its Applications* In two volumes. Vol. 1 (Moscow: Fizmatlit, 2017) 568 pp. ISBN 978-5-9221-1697-8.

The monograph considers the mathematical apparatus of quantum angular-momentum theory, collected and systematized as a unified system of definitions and designations. Together with basic theoretical concepts, the book contains a large number of formulas and relationships important for solving practical problems in the field of quantum chemistry, kinetics and plasma physics, quantum optics, microelectronics, and spintronics. Moreover, the monograph contains key applications to other fields of physics and chemistry. The book consists of two volumes. The first includes Wigner D-functions, ball tensors,  $3nj$ -symbols, and unified rules of the graph technique, including basic elements and graphic representation of standard functions and the main operations. The book is intended for specialists working in atomic, molecular, and nuclear physics, quantum chemistry, plasma physics and quantum optics, microelectronics, and spintronics. It can also be useful to senior and postgraduate students studying physics (Fizmatlit Publishers: ul. Butlerova 17B, 117342 Moscow, Russian Federation; tel. +7 (495) 005-32-79; +7 (499) 968-92-28; e-mail: sale@fml.ru; URL: <http://www.fml.ru/>)

**Bisnovatyi-Kogan G S** *Relativistic Astrophysics and Physical Cosmology* (Moscow: URSS, 2016) 376 pp. ISBN 978-5-396-00729-1.

The book presents the problems of relativistic astrophysics and cosmology that are at the center of contemporary interests in studying the structure of the observed Universe. The origin and properties of relativistic objects, namely, white dwarfs, neutron stars, black holes, and relativistic star clusters, are considered. The theory of accretion onto relativistic objects and their observational properties are discussed. Friedmann solutions describing the properties of a homogeneous hot inflating Universe are considered with allowance for the cosmological constant and inflation. The results of observations of the microwave background that remained after the Big Bang are given, as are the results of the analysis of observed fluctuations, which suggested a conclu-

sion about the prevalence of dark energy and dark matter in current epoch. The book describes baryogenesis and nucleosynthesis, gravitational instability, the formation of a large-scale structure of the Universe and the properties of different material components of the contemporary Universe. The book will be useful for physicists, astrophysicists, and a wide range of readers who wish to have deeper insight into the structure of the surrounding world. (URSS Publishing Group: Nakhimovskii prosp. 56, 117335 Moscow, Russian Federation; tel./fax: +7 (499) 724-25-45; e-mail: urss@URSS.ru; URL: <http://urss.ru/>)

**Shilobreev B A, Lazurik V T, Yakovlev M V** *Boundary Effects in Elements of Spacecraft-Borne Equipment Under Ionizing Radiant Fluxes* (Moscow: Fizmatlit, 2017) 152 pp. ISBN 978-5-9221-1755-5.

The basic concepts and methods of computational and experimental examination of near-boundary distributions of absorbed energy and volume charge in constructional materials of the components of spacecraft-borne equipment under ionizing radiation are presented. The book describes the physical mechanisms of the formation of radiation-induced signals in insulator–metal constructions with allowance made for boundary effects and radiation-induced conductance of the dielectric materials. Methods are proposed to calculate and experimentally examine electric signals in elements of insulator–metal construction under static and pulsed gamma-ray radiation. Ionizing radiation detectors are described that are targeted on the measurement of electric signals in insulator–metal constructions that are induced due to the formation of near-boundary distributions of an absorbed dose of radiation and the volume charge. The monograph is intended for a wide range of practising specialists in the field of radiation physics and may be recommended as a learning and methodical manual for teachers and students of higher schools training future physicists. (Fizmatlit Publishers: ul. Butlerova 17B, 117342 Moscow, Russian Federation; tel. +7 (495) 005-32-79, +7 (499) 968-92-28; e-mail: [sale@fml.ru](mailto:sale@fml.ru); URL: <http://www.fml.ru/>)

**Zhang X-C, Xu J** *Terahertz Photonics* (Translated from English by A I Ritus, A A Sidorova-Biryukova; Eds S V Garnov, A P Shkurinov) (Moscow–Izhevsk: Institute for Computer Research, 2016) 334 pp. ISBN 978-5-4344-0341-2.

The book presents a review of the basic principles behind the generation of broadband THz radiation and the main methods of its registration and the analysis of latest achievements in the applications of THz radiation in materials science, biology, medicine, and security systems. Particular attention is paid to the utilization of nonlinear optical materials for transforming radiation of femtosecond visible-range lasers to the terahertz frequency band. The book is the Russian translation of *Introduction to THz Wave Photonics* by Zhang X-C, Xu J (New York: Springer Science + Business Media, 2010) and is meant for research workers and engineers engaged in THz photonics, and also students and postgraduates interested in advances in this area. ('Regular and Chaotic Dynamics' Scientific Publishing Center, Institute for Computer Research Publishing House of Technical Literature: ul. Universitetskaya 1, bld. 4, office 207, 426034

Izhevsk, Russian Federation; tel./fax +7 (3412) 500-295; e-mail: [mail@rcd.ru](mailto:mail@rcd.ru); URL: <http://shop.rcd.ru/>)

**Kotkin G L, Serbo V G, Chernykh A I** *Lectures in Analytical Mechanics* 2nd ed., revised ('University Textbooks and Tutorials' Series (Moscow–Izhevsk: RKhD. Institute for Computer Research, 2017) 236 pp. ISBN 978-5-4344-0427-3.

Analytical mechanics is presented as part of the course in theoretical physics to acquaint students with the set of methods and concepts which will be extremely useful in the field theory, quantum mechanics, and statistical physics. Particle motion in the central field and particle scattering are considered on the basis of Newtonian equations, while Lagrange equations for different systems, linear and nonlinear oscillations, the Hamiltonian formalism, and the motion of a solid body are introduced and studied in detail. Each topic was supplied with problems to be solved at seminars. The book is meant for students of physical faculties. The content corresponds to the course Analytical Mechanics. ('Regular and Chaotic Dynamics' Scientific Publishing Center, Institute for Computer Research Publishing House of Technical Literature, ul. Universitetskaya 1, bld. 4, office 207, 426034 Izhevsk, Russian Federation; tel./fax +7 (3412) 500-295; e-mail: [mail@rcd.ru](mailto:mail@rcd.ru); URL: <http://shop.rcd.ru/>)

**Newton Isaac** *Mathematical Principles of Natural Philosophy* ('Classics of Science' Series, No. 4, Translation from Latin and comments by A N Krylov) 4th ed. (Moscow: URSS, 2017) 704 pp. ISBN 978-5-9710-4231-0.

Sir Isaac Newton's *Principles* is one of the greatest works in the history of the natural sciences. This composition laid the foundations of mechanics, physics, and astronomy. Therein formulated the program of development of these fields of science and it remained determinative for over a century and a half. The present edition is a facsimile reproduction of Newton's book (Isaac Newton. *Philosophiae Naturalise Principia Mathematica*), translated from Latin with comments made by Academician A N Krylov. The book also contains the Subject Index composed by Newton and first published in the Russian language in the second edition. The book is intended for a wide circle of specialists in the natural sciences and readers interested in the history of science. (URSS Publishers: Nakhimovskii prosp. 56, 117335 Moscow, Russian Federation; tel./fax +7 (499) 724-25-45; e-mail: [urss@URSS.ru](mailto:urss@URSS.ru); URL: <http://urss.ru/>)

**Levich V G** *Physico-chemical Hydrodynamics* 3rd ed., revised ('Oil-and-Gas Engineering' Series) (Moscow–Izhevsk: RKhD, Institute for Computer Research, 2016) 686 pp. ISBN 978-5-4344-0386-3.

The book is based on the previous edition published in 1959: Levich V G *Physico-chemical Hydrodynamics* 2nd ed., revised and enlarged (Moscow: GIFML, 1959) 700 pp. In the present edition, misprints are corrected, and the text is adapted according to the rules of modern Russian language and today's metric standards; in particular, mistakes concerning abbreviated designations of some units of measurement are eliminated. As an area of research, physico-chemical hydrodynamics studies the range of questions associated in the first place with the effect of the motion of liquids on chemical or

physico-chemical transformations, and the influence of physico-chemical factors on the motion of liquids. The book is intended for research workers and postgraduates (physicists, physical chemists, and chemists) and senior students specializing in theoretical physics and physical chemistry. It should be noted that a detailed review by M P Volarovich of the very first edition of this book was published in *Usp. Fiz. Nauk* (see *Usp. Fiz. Nauk* **51** 155 (1953)). ('Regular and Chaotic Dynamics' Scientific Publishing Center, Institute for Computer Research Publishing House of Technical Literature, ul. Universitetskaya 1, bld. 4, office 207, 426034 Izhevsk, Russian Federation; tel./fax +7 (3412) 500-295; e-mail: mail@rcd.ru; URL: <http://shop.rcd.ru/>)

**Kulikovskii P G** *Handbook for Amateur Astronomers* 7th ed., revised (Moscow: URSS, 2017) 704 pp. ISBN 978-5-9710-4291-4

The handbook presents problems and methods of modern astronomy and describes stars, planets, comets, and other celestial objects. Techniques to make astronomical observations accessible to amateurs of modest means are described. The extensive reference material is completely renewed and reflects recent achievements. The book begins with a brief review of the history of astronomy. The development of science will quickly make some information outdated. Readers can always enrich their knowledge by acquainting themselves with new literature. Sometimes brief references are given to journal papers and to topical collections describing in detail a given question. The Subject Index is more or less complete and contains no repetition, as far as is possible. Petr Grigor'evich Kulikovskii (1910–2003) taught at MSU at the Subfaculty of Stellar Astronomy for many years and was engaged in research work at the Sternberg State Astronomical Institute of MSU. The reference book is meant for amateur astronomers, secondary-school teachers of astronomy, participants in astronomical discussion groups, and lecturers. It will also be useful for professional astronomers and for research workers at observation stations for artificial Earth satellites, and researchers in related fields of science. (URSS Publishing Group: Nakhimovskii prosp. 56, 117335 Moscow, Russian Federation; tel./fax: +7 (499) 724-25-45; e-mail: urss@URSS.ru; URL: <http://urss.ru/>)

**Vitaly Lazarevich Ginzburg. On the Centenary of His Birth** (Authors-Comp.: V M Berezanskaya, M A Lukichev, N M Shaul'skaya) (Moscow: FIAN, 2017) 200 pp. ISBN 978-5-91597-077-8.

The album book is devoted to the centenary of the birth of the world renowned scientist, the founder of many key areas of modern physics, the Nobel Prize laureate in Physics 2003, and the Editor-in-Chief of the journal *Uspekhi Fizicheskikh Nauk* (*Physics–Uspekhi*) (1998–2009), who left an ineffaceable mark not only on science but also on our community. The album presents V L Ginzburg's biography in photographs and documents from the first to the last days of his life. The texts accompanying the photographs and documents are parts of the books and articles listed at the end of the album. These are for the most part stories about V L Ginzburg told by his relatives, disciples, colleagues, and friends, and also those written by Vitaly Lazarevich himself in different periods of life. The album is meant for a wide range of readers interested in the development of modern sciences. (Lebedev

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