

BIBLIOGRAPHY

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New books on physics and related sciences: October 2025

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Rubakov V.A., Belokurov V.V., Levkov D.G., Libanov M.V., Martynenko N.S., Troitskii S.V. ***From particles to the Universe*: *A trip from subatomic sizes to the boundary of observed space*.** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Science for Everyone! Masterpieces of popular scientific literature (physics)) (Moscow: URSS, 2025) 264 pp.

The book is intended for a wide range of readers: from senior schoolchildren interested in modern science to professional researchers. The reader will get acquainted with smaller- to larger-scale physics currently accessible for investigation and come to know how close these two extremes are. The emphasis will be on quantum physics and elementary particle physics in the context of astrophysics and cosmology. Discussed separately is black hole radiation (Hawking radiation). The last chapter attempts to answer the question: why is our world the way it is? https://urss.ru/cgi-bin/db.pl?lang=Ru&blang=ru&page=Book&id=328603

Kolmogorov A.N. ***The basic concepts of the probability theory*.** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2025) 120 pp.

First and foremost, this book is of interest for those engaged seriously in the probability theory. The book is aimed at an axiomatic substantiation of the probability theory, and the scheme of such a substantiation, proposed by the author, made the probability theory an independent part of pure mathematics. The book will be useful for mathematical students, researchers applying probabilistic methods and models in various areas of science, and those interested in problems of probability theory. https://urss.ru/cgi-bin/db.pl?lang=Ru&blang=ru&page=Book&id=328171

Kapitonov I.M. ***Introduction to the physics of the nucleus and particles*.** 6th edition revised and updated. (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2025) 544 pp.

The book contains material from the concluding section of the general course of physics, devoted to atomic nuclei and elementary particles. It is represented by 15 lectures summarizing the long-term experience of teaching this area of physics to students in the Physics Department of Moscow State University. The last lectures consider cosmological aspects of the physics of particles and nuclei. The book contains the latest information and has a large number of applications. This edition is intended both for physics students in their first systematic acquaintance with the physics of nuclei and particles and for students specialized in this field of physics. It is also useful to teachers and postgraduate students in physics departments of higher education institutions. https://urss.ru/cgi-bin/db.pl?lang=Ru&blang=ru&page=Book&id=325591

Kapitonov I.M. ***Lectures on the physics of particles and atomic nuclei*.** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2024) 424 pp.

The book is the concluding section of the general course of physics, devoted to elementary particles and atomic nuclei. The material is represented by 15 lectures delivered by the author to students in the Physics Department of Moscow State University. They represent the most up-to-date view of this area of physics and contain the latest experimental information. The necessary information on quantum physics is presented simultaneously with the main material. The concluding lectures consider the cosmological aspects of particle and nucleus physics. The fundamental role of microworld laws in the formation of the structure of the Universe is shown. The book is intended first of all for physics students making their first acquaintance with the physics of particles and nuclei. It will also be useful for a wider range of readers, from physics teachers at secondary schools to specialists in the field of natural sciences. https://urss.ru/cgi-bin/db.pl?lang=Ru&blang=ru&page=Book&id=302448

Ishkhanov B.S., Kapitonov I.M., Yudin N.P. ***Particles and atomic nuclei. The most complete and updated textbook on microworld physics*.** 5th edition revised and updated. (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2025) 672 pp.

The book summarizes the many years of experience in teaching the general course on the atomic nucleus and elementary particle physics at the Physics Department of Moscow State University. The basic principles and the formalism of quantum physics are given simultaneously. The presentation of the material differs from traditional ones. It begins with the most fundamental components of matter, i.e., quarks and leptons, and passes gradually to larger objects — hadrons and atomic nuclei. This chain ends with a consideration of the cosmological aspects of particle and nucleus physics. The fundamental role of microworld laws in the formation of the Universe's structure is shown. The book contains a description of the most important experiments and a large number of examples. It contains state-of-

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the-art factual material and can be used as a reference book. The book is written for physics students, masters and postgraduate students, teachers, and researchers. https://urss.ru/cgi-bin/db.pl?lang=Ru&blang=ru&page=Book&id=323537

Kononovich E.V., Moroz V.I. ***General course of astronomy.*** 8th edition revised. (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2025) 544 pp.

The book is written according to the syllabus of the course of general astronomy adopted for students learning astronomy. The focus is on the development of the most important concepts of astronomy and the latest achievements in this science. An overview is provided of various sections and methods of modern astronomical science, united by the common goal of a comprehensive study of the nature of the Universe. The manual is intended for students in astronomical departments at universities and pedagogical institutes; it can also be used by astronomy teachers. https://urss.ru/cgi-bin/db.pl?lang=Ru&blang=ru&page=Book&id=336787

Chernin A.D. ***Physics of time.*** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Science for Everyone! Masterpieces of popular scientific literature (physics)) (Moscow: URSS, 2025) 230 pp.

The book analyzes the concept of time, one of the most fundamental concepts in our system of knowledge. In a simple and visual form, without the use of mathematical formulas, the author talks about the development of scientific ideas of time and the modern physical concept of time. An outline of the most important issues of physics related to the nature of time is given: the homogeneity of time and the energy conservation law, the relativity of simultaneity, the light cone and causality, time near a black hole, the past and future of the Universe, time in the microworld, and the arrow of time. The book is intended for a wide range of interested readers. https://urss.ru/cgi-bin/db.pl?lang=Ru&blang=ru&page=Book&id=324377

Tamm I.E. ***Fundamentals of electricity theory.*** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2025) 512 pp.

This is a textbook on electricity and magnetism, a classical course of electrodynamics written by one of the most prominent Soviet physicists, Igor' Evgen'evich Tamm. During the author's life, the book went through eight editions and to date is still being used effectively by a rather wide range of readers. The main focus in the book, which gives a systematic presentation of the theory of electric phenomena, is on the physical content of the theory. The course is aimed at a clarification of the physical meaning and the content of the basic principles of the theory of electricity. The author dwells in detail on the theory of dielectrics and magnets. The final sections analyze the macroscopic field theory, as well as the consequences of this theory and electromagnetic phenomena in moving media. The course is intended for students in physical and technical specialties at institutes. It will be useful to physicists, engineers, and researchers. https://urss.ru/cgi-bin/db.pl?lang=Ru&blang=ru&page=Book&id=319925

Lipunov V.M. ***An Extreme Universe.*** 3rd edition, suppl. (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Science for Everyone! Masterpieces of Popular Scientific Literature (Physics)) (Moscow: URSS, 2024). Book 1. In the world of binary stars. 266 pp. Book 2. About new discoveries, ideas, and hypotheses in the study of binary stars 232 pp.

This book presents a popular account of new discoveries, ideas, and hypotheses in the study of binary stars. The sequence of presentation corresponds to successive stages of the life (evolution) of binary stars. But the story of each stage is told using an example of an observed binary system with a description of a living story of its discovery and examination. The essence of the main astrophysical methods for studying binary systems is revealed. The book is written for everyone interested in astronomy, including schoolchildren, students, and teachers. https://urss.ru/cgi-bin/db.pl?lang=Ru&blang=ru&page=Book&id=305255

Stepanyants K.V. ***Classical field theory.*** 2nd edition, revised and updated. (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2024) 584 pp.

The book is based on lectures on classical field theory, as well as a number of other specialized courses given at the Department of Theoretical Physics of the MSU Physics Faculty for third- and fourth-year students. It is devoted to the fundamental issues of field theory and is a modern introduction to the physics of fundamental interactions. It considers both basic information on the classical field theory and the simplest models of elementary particle physics. In particular, the Standard Model of strong and electroweak interactions, as well as the field theory in curved space-time and the general relativity theory are discussed in detail. Furthermore, a number of more specialized topics are covered. In the second edition, some errors and typos found in the first editions are corrected. It also updates the experimental data, and a number of changes are made related to recent discoveries of the Higgs boson and gravitational waves. For convenience of reading, the technical details of calculations are presented as thoroughly considered problems. This structure of the book allows it to be used not only as a textbook for students, but also as a reference book that may be useful to senior students, postgraduates, and researchers specialized in high-energy physics. https://urss.ru/cgi-bin/db.pl?lang=Ru&blang=ru&page=Book&id=303978

Arnold V.I. ***Catastrophe theory.*** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Synergetics: from Past to Future) (Moscow: URSS, 2025) 136 pp.

A mathematical description of catastrophes, i.e., jump-like changes occurring as a sudden system's response to a smooth variation of external conditions, is given by the theories of singularities and bifurcations. Their application to concrete problems in various fields of science led to many arguments. The book answers the question of what the catastrophe theory is and why it leads to such arguments. The results of mathematical theories of singularities and bifurcations are given. The edition is supplemented by a review of recent achievements of the surgery theory, a

bibliography, and a set of problems. The book is intended for researchers, teachers, students, and all those interested in modern mathematics. https://urss.ru/cgi-bin/db.pl?lang = Rublang = rupage = Bookid = 325049

Silin V.P., Rukhadze A.A. ***Electromagnetic properties of plasma and plasma-like media.*** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2025) 248 pp.

The book is devoted to the physics of plasma-like media; it reflects the state of physical science in the field of study of electrodynamics of material media in the second half of the 20th century. The fundamentals of electrodynamics of media with spatial dispersion are given in the first chapter. The next chapters are devoted to a consideration of the properties of isotropic plasma, anisotropic plasma, and electron gas in metals, as well as quantum plasma and a description of spatial dispersion in molecular crystals. The book is recommended to a wide range of physicists — students, teachers, and researchers. https://urss.ru/cgi-bin/db.pl?lang = Ru&blang = ru&page = Book&id = 328739

Artsimovich L.A. ***Elementary plasma physics.*** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Science for Everyone! Masterpieces of Popular Scientific Literature (Physics)) (Moscow: URSS, 2025) 200 pp.

The book presents the plasma theory in a popular way and shows the fascinating properties of using plasma to generate thermonuclear energy and directly convert heat into electricity, as well as its applications in many areas of science and technology. Written in a lively, figurative style, it is accessible to a wide range of readers. The material presented here can also be used by graduate students and applicants in preparation for defending their candidate thesis in plasma physics. https://urss.ru/cgi-bin/db.pl?lang = Ru&blang = ru&page = Book&id = 326562

Kuzelev M.V. ***Wave-wave and wave-particle interactions in plasma.*** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2025) 600 pp.

The monograph is devoted to a consistent presentation of the theory of resonant interaction of waves and charged particles in plasma. The presentation is based on the electrodynamics of material media with temporal and spatial dispersion and the general wave theory in dispersive media. The main attention is paid to wave-wave and wave-particle interactions in nonequilibrium plasma, in which such interactions result in the development of instabilities. Investigated is the Cherenkov interaction of waves and particles in plasma, underlying the Cherenkov beam-plasma instabilities (one-particle and collective Cherenkov effects) and collisionless processes (direct and inverse Landau damping). Nonlinear phenomena and stabilizing Cherenkov instabilities in plasma (capture, self-trapping, and nonlinear frequency shift) are considered. The interactions of waves and particles under anomalous and normal Doppler effects and resonant cyclotron interactions are examined. The general theory of resonant interaction of waves in media with spatial dispersion, in particular, the general theory of three-wave interactions, is presented. Induced scattering of electromagnetic waves in plasma, a two-plasmon decay, and induced Mandelshtam–Brillouin scattering are discussed. Induced scattering of electromagnetic waves by thermal plasma electrons is analyzed. The quantum theory of the induced Cherenkov effect in plasma and in a dielectric medium, the quantum theory of Langmuir wave damping, and the quantum theory of induced scattering of electromagnetic waves by plasma electrons and by a relativistic electron beam are presented. The monograph is intended for specialists engaged in plasma electrodynamics, wave theory, radiophysics, and physical electronics and also for students and postgraduates in corresponding specialties. https://urss.ru/cgi-bin/db.pl?lang = Ru&blang = ru&page = Book&id = 327562

Bochkarev N.G. ***Basic elements of physics of the interstellar medium.*** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2025) 352 pp.

The textbook fits with the program of the course Theoretical Astrophysics and contains information on the observational method theory and the physical processes in regions of neutral hydrogen of the interstellar medium, molecules in interstellar space, cosmic masers, the structure of the interstellar medium, and interstellar dust. The textbook is intended for students in physical departments of institutes learning astronomy, for teachers, and also for researchers in physics and astronomy. https://urss.ru/cgi-bin/db.pl?lang = Ru&blang = ru&page = Book&id = 328280

Korpusov M.O. ***Analytical geometry for physicists*: *Theorems and problems. A lecture course.*** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. Classical MSU Textbook) (Moscow: URSS, 2024) 384 pp.

The textbook presents the lecture course on analytical geometry, which the author delivers to first-year physics students in the first semester. Moreover, solutions to problems of varying difficulty are given. This course is part of the curriculum of the MSU Physics Department and is of significant interest for a wide range of physics students, as well as for teachers conducting seminars on analytical geometry. https://urss.ru/cgi-bin/db.pl?lang = Ru&blang = ru&page = Book&id = 317433

Korpusov M.O. ***Destruction in nonclassical wave equations.*** (Ser. Foundation for the Future: The Jubilee Series in Honor of the 270th Anniversary of M.V. Lomonosov MSU) (Ser. The Golden Fund of Monographs) (Moscow: URSS, 2024) 240 pp.

The monograph is devoted to current problems of global solvability and the destruction of solutions to nonlinear nonclassical wave equations in partial derivatives. In particular, nonlinear equations of internal gravitational and gravitationally gyroscopic waves, as well as various equations of ion-sound waves, are considered. Furthermore, A.P. Oskolkov's sets of equations and problems with non-

linear boundary conditions are described. For all the considered problems, sufficient conditions for destruction of their solutions within a finite time are obtained and it is proved that the time of solution destruction coincides with the time of existence of a weak solution. The book is intended for postgraduate students and specialists in nonlinear differential equations in partial derivatives. https://urss.ru/cgi-bin/db.pl?lang= Ru&blang = ru&page = Book&id = 301430

Berdichevskii M.N., Bulychev A.A., Dmitriev V.I., Pushkarev P.Yu. ***Theory of geophysical fields.*** (Classical University Textbook) (Moscow: Moscow University Press, 2024) 194 pp.

The book covers the basic principles of the theory of geophysical methods applied for studying Earth's deep structure, searching for and prospecting for minerals, and solving problems of shallow geophysics. It examines the mathematical apparatus of geophysical field theory, including the algebra of physical quantities, differentiation and integration of physical fields, and curvilinear coordinates of systems. It examines exciters, field equations and potentials, graphic field representations, and models of irrotational and vortex fields. Analyzed is an electromagnetic field in a vacuum and matter, equations of an electromagnetic field and its potentials, and electromagnetic field models. The textbook is intended for university students studying geophysics. It may also be useful for graduate students, teachers, researchers, and engineers engaged in geophysics. https://msupress.com/catalogue/books/book/teoriya-geofizicheskikh-poley/

Morozov V.M., Kalenova V.I. ***Linear nonstationary systems and stabilization of satellite motion near the center of mass in a geomagnetic field.*** (Classical University Textbook) (Moscow: Moscow University Press, 2023). 174 pp. ISBN 978-5-19-011883-4.

The book is devoted to the application of the theory of linear nonstationary systems to problems of stabilization of stationary satellite motions near the center of mass under the action of magnetic moments of different origins. An original rigorous analytical approach to the study of a special class of linear nonstationary systems is proposed. Solutions to a number of particular stabilization problems based on the described approach are presented. The book will be useful for postgraduate students and MSU students, as well as for teachers and researchers engaged in issues of dynamics and management. https://msupress.com/catalogue/books/book/lineynye-nestatsionarnye-sistemy-i-stabilizatsiya-dvizheniya-sputnika-okolo-tsentra-mass-v-geomagnit/

Ozhigov Yu.I. ***Quantum computer.*** Textbook. 2nd edition revised and updated (Library of CMC Department, MSU) (Moscow: Moscow University Press, 2023) 326 pp. ISBN 978-5-19-011914-5. Electronic edition of the network distribution.

The book is devoted to the grandiose project conventionally called the quantum computer. The limitation of the apparatus of standard quantum mechanics by the relation 'the complexity of a quantum state is the precision of its description' is formulated. Attention is given to the role of quantum computers in the theory of biological evolution and to a quantum approach to social processes. The second edition is supplemented with chapters devoted to the new mathematical apparatus for the quantum computer based on algorithms and using biological heuristics. Problems for independent work are given. The book is intended for baccalaureate and specialty students and postgraduates studying in specialty 1.2.2, Mathematical Modeling, Numerical Methods, and Program Complexes, and also for readers interested in the exact theory of the microworld and becoming acquainted with the modern approach to the physics of complex processes. https://msupress.com/catalogue/books/book/kvantovyy-kompyuter-pdf/

Marchenko A.L. ***Python*: *a big book of examples.*** (Moscow: Moscow University Press, 2023) 361 pp. ISBN 978-5-19-011853-7. Electronic edition of the network distribution.

The big book of examples is based on a description of the Python programming language (https://docs.python.org/) and extensive material from different Internet sources. The main goal of the book is the formation of the idea of the language on the basis of its description and examples of its use. The book may serve as a tutorial. https://msupress.com/catalogue/books/book/python-bolshaya-kniga-primerov-pdf.

Tatarinov Ya.V. ***Lectures on classical dynamics.*** 3rd edition, revised and updated. (Classical University Textbook). (Moscow: Moscow University Press, 2024) 379 pp. ISBN 978-5-19-011978-7.

The textbook, whose first edition appeared in 1984, is aimed at presenting, whenever possible, a compact introduction to the subject, including both its physical bases and the differentially geometric aspects. The book covers a number of topics in an unconventional way: kinematics, general theorems of dynamics, derivation of Lagrange equations, and the Hamilton–Jacobi equation. Part of the material goes beyond the scope of the university course: elements of the theory of linear integrals quadratic in velocities, the application of variational principles, and a new proof of the Darboux theorem on canonical coordinates. The textbook includes problems illustrating and supplementing the theoretical material and provides methodological guidelines for them. It is recommended for students at higher institutions studying in the fields of Mechanics and Mathematical Simulation, Applied Mathematics, and Fundamental Mathematics and Mechanics, and also for postgraduate students in mechanical-mathematics and physics departments of universities and high-school teachers. https://msupress.com/catalogue/books/book/lektsii-po-klassicheskoy-dinamike/

Matorin D.N., Yakovleva O.V. ***Theory and practice of using plant photoluminescence in ecological research.*** Tutorial. 2nd edition (Proceedings of outstanding scientists of MSU) (Moscow: Moscow University Press, 2024) 279 pp. ISBN 978-5-19-011925-1.

The book presents the theoretical foundations and technique for studying pigment photoluminescence. The key definitions and formulations of laws are followed by explanations and examples. The nature and fundamental patterns of fast and delayed chlorophyll fluorescence in higher plants and algae are examined. Information is provided on devices produced in different countries and at the MSU Biophysics Department of the Biological Faculty. Changes in fluorescence parameters in

photo-storing processes of photosynthesis under the influence of unfavorable factors and toxicants are presented. Specific examples of the use of fluorescence methods for assessing the state of higher plants and algae under different ecological conditions and in biomonitoring are given. The book is intended for students, postgraduate students, teachers, and researchers specializing in ecology, physiology, hydrobiology, and biophysics, and for those interested in these fields. https://msupress.com/catalogue/books/book/teoriya-i-praktika-ispolzovaniya-fotoluminestsentsii-rasteniy-v-ekologicheskikh-issledovaniyakh/

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