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New books on physics and related sciences

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Landau L D ***Collected Works*** In 2 volumes. Vol. 1 (Moscow: Fizmatlit, 2008) 496 pp. ISBN 5-9221-0985-7.
Landau L D ***Collected Works*** In 2 volumes. Vol. 2 (Moscow: Fizmatlit, 2008) 408 pp. ISBN 5-9221-0984-0.

The collected works of the outstanding physicist L D Landau, the founder of the world-renowned school of theoretical physics, comprise nearly all his research papers published in different years in Russian and foreign languages. It is a reproduction of the earlier publication prepared by E M Lifshitz and I M Khalatnikov in 1969. The volumes are of considerable interest for physics researchers, university teachers and students of universities. (Fiziko-Matematicheskaya Literatura MAIK 'Nauka/Interperiodika' Publ.: 117997 Moscow, ul. Profsoyuznaya 90; tel. (7-495) 334-74-21; fax (7-495) 334-76-20; e-mail: fizmat@maik.ru; URL: http://www. fml.ru/)

Zheltikov A M ***Microstructured Fiber-Optic Waveguides in Optical Technologies*** (Moscow: Fizmatlit, 2009) 192 pp. ISBN 5-9221-1031-5.

The progress in the technology of microstructured fiber-optic waveguides lead to the emergence of a new generation of fiber-optic devices and systems, such as optical frequency converters, generators of broadband radiation, sources of ultrashort light pulses, and new sensor systems. Microstructured light guides of this type have already resulted in a revolutionary breakthrough in optical metrology. They made possible the development and construction of new compact high-efficiency sources of ultrashort pulses, frequency converters, new laser microscopes, endoscopes, and systems for optical coherent tomography. This book is devoted to studying physical mechanisms of high-efficiency spectral and temporal transformation of laser radiation in microstructured fiber-optic waveguides and to discussing methods of developing new radiation sources and radiation frequency converters based on them. A review is given of the more significant recent achievements in optical physics and optical technologies involving microstructured light guides. (Fiziko-Matematicheskaya Literatura MAIK 'Nauka/Interperiodika' Publ.: 117997 Moscow, ul. Profsoyuznaya 90; tel. (7-495) 334-74-21; fax (7-495) 334-76-20; e-mail: fizmat@ maik.ru; URL: http://www.fml.ru/)

Plasma Heliogeophysics 1 (Ed. L M Zelenyi) (Moscow: Fizmatlit, 2008) 672 pp. ISBN 5-9221-1040-2.
Plasma Heliogeophysics 2 (Ed. L M Zelenyi) (Moscow: Fizmatlit, 2008) 560 pp. ISBN 5-9221-1041-2.

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Plasma heliogeophysics deals with problems stemming from processes taking place in cosmic space and described in terms of electrodynamics and plasma physics. The book was written by leading Russian specialists and is a monograph presenting the current level of research, the main achievements, problems and unanswered questions in the field. Volume 1 is concerned with the physics of the Sun, solar wind, heliosphere, and terrestrial magnetosphere. Volume 2 is composed of chapters dealing with the ionosphere of the Earth and other solar planets, solar–terrestrial relations, interaction between the solar wind and various objects of the Solar system, the dust plasma, and the fundamental concepts of plasma physics. The book is intended for specialists in plasma physics and space physics, for students of high schools and universities. Several parts of the book content may prove useful to a wider audience as reference and teaching material. (Fiziko-Matematicheskaya Literatura MAIK 'Nauka/Interperiodika' Publ.: 117997 Moscow, ul. Profsoyuznaya 90; tel. (7-495) 334-74-21; fax (7-495) 334-76-20; e-mail: fizmat@maik.ru; URL: http://www. fml.ru/)

Zhdanov V M ***Transfer Processes in Multicomponent Plasma*** (Moscow: Fizmatlit, 2009) 280 pp. ISBN 5-9221-1052-5.

The monograph treats the classical kinetic theory of transfer processes in a multicomponent plasma. The author considers methods of deriving transport equations and expressions for transport coefficients in nonisothermal multicomponent plasma placed in external electric and magnetic fields. The book systematically operates with the Grad method of moments, which is generalized to the cases of multitemperature multicomponent plasma and molecular gas. Certain advantages of applying this method are illustrated in comparison with the frequently employed Chapman–Enskog method. The possibility is demonstrated of going beyond the conventionally utilized 13-moment approximation, so that the necessary accuracy of calculating transport coefficients is achieved. Examples are given of practical use of the results obtained: electric conductivity and Hall effect in MHD generators, plasma diffusion across strong magnetic fields, neoclassical transport of particles and heat in toroidal systems of magnetic plasma confinement. The monograph is intended for specialists working on practical implementations of low-temperature gas-discharge plasma, highly ionized plasma facilities of thermonuclear fusion, and also doing research into ionospheric plasma. The structuring and content of the volume allow using it as textbook for studies of plasma physics by senior-year students and postgraduates of the appropriate specialties. (Fiziko-Matematicheskaya Literatura MAIK 'Nauka/Interperiodika' Publ.: 117997 Moscow, ul. Profsoyuznaya 90; tel. (7-495) 334-74-21; fax (7-495) 334-76-20; e-mail: fizmat@ maik.ru;; URL: http:// www.fml.ru/)

Anishchenko V S, Astakhov V V, Vadivasova T E, Strelkova G I *Synchronization of Regular, Chaotic and Stochastic Oscillations* (Izhevsk: RKhD, 2008) 144 pp. ISBN 978-5-93972-701-3.

The book concentrates on systematic presentation of the results of theoretical, numerical and experimental analysis of the synchronization effects for periodical, quasiperiodical, chaotic and stochastic oscillations. The classical theory of synchronization is given in detail and the limits on its applicability to studying the synchronization effects for quasiperiodical and nonperiodical oscillations are discussed. The book can be recommended as a textbook for the course of 'Nonlinear theory of oscillations' delivered to students of physics and mathematics specialties at the universities. The book is also intended for undergraduates and postgraduates, young researchers and teachers. The volume comprises 78 figures and a list of references (133 entries). (Scientific Publishing Center 'Regular and Chaotic Dynamics': 426034 Izhevsk, ul. Universitetskaya 1, Udmurt State University; tel. (7-3412) 50-02-95; (7-495) 332-48-92; e-mail: subscribe@rcd.ru; URL: http://shop.rcd.ru/)

Irkhin V Yu, Irkhin Yu P *Electronic Structure, Physical Properties and Correlation Effects in d- and f-Metals and Their Compounds* (Izhevsk: RKhD, 2008) 476 pp. ISBN 978-5-93972-684-9.

The monograph discusses all basic properties of d- and f-transition metals and outlines all relevant theoretical concepts. It discusses in detail some nontraditional aspects: the influence of the peculiarities of the density of states on electronic properties; multielectron description of strong collectivized magnetism; mechanisms of magnetic anisotropy, and microscopic theory of anomalous kinetic phenomena in ferromagnets. In addition to classical problems of solid state physics, as applied to transition metals, current achievements in the theory of electron correlations of d- and f-systems are discussed in the framework of multielectron models. The book is intended for a wide range of solid state physicists, both theoreticians and experimenters. (Scientific Publishing Center 'Regular and Chaotic Dynamics': 426034 Izhevsk, ul. Universitetskaya 1, Udmurt State University; tel. (7-3412) 50-02-95, (7-495) 332-48-92; e-mail: subscribe@rcd.ru; URL: http://shop.rcd.ru/)

Koshel' K V, Prants S V *Chaotic Advection in the Ocean* (Izhevsk: RKhD, 2008) 364 pp. ISBN 978-5-93972-655-9.

The book presents to the reader the results of studying a new phenomenon in the ocean: chaotic advection, mixing and transfer of passive impurities. The authors use systematically analytical and numerical methods of the theory of dynamical systems and Hamiltonian chaos to study chaotic advection in kinematic and dynamic models of ocean currents and the manifestations of this advection in the ocean. A review of laboratory experiments on chaotic advection and mixing in liquids is included. The book is written in simple style; it gives visually clear explanations of chaotic effects using 140 figures. The monograph is intended for researchers and teachers of oceanology, hydrophysics, hydrodynamics and theory of dynamical systems, as well as for undergraduates and postgraduates of the appropriate specialties. (Scientific Publishing Center 'Regular and Chaotic Dynamics': 426034 Izhevsk, ul. Universitetskaya 1, Udmurt State University; tel. (7-3412) 50-02-95, (7-495) 332-48-92; e-mail: subsc-ribe@rcd.ru; URL: http://shop.rcd.ru/)

Zegrya G G, Perel' V I *Fundamentals of the Semiconductor Physics* (Moscow: Fizmatlit, 2009) 336 pp. ISBN 5-9221-1005-4.

The following topics are considered in this textbook: symmetry of crystals and crystal lattice vibrations; band structure of semiconductors; kinetic phenomena in semiconductors, and optical properties of semiconductors. The modern concept of quantum Hall effect, one of the wonderful phenomena in semiconductor physics of the 20th century, is presented. Much attention is devoted to comparing physical models with experimental results. The book is intended for students of universities and technical colleges, postgraduates, teachers and researchers familiar with quantum mechanics and statistical physics. It is recommended by the Educational Methodological Association of the Russian Federation Higher Education Institutions specialized in radioengineering, electronics, biomedical devices and automation as a textbook for students of higher education establishments training for the specialty 210100 'Electronics and Microelectronics'. (Fiziko-Matematicheskaya Literatura MAIK 'Nauka/Interperiodika' Publ.: 117997 Moscow, ul. Profsoyuznaya 90; tel. (7-495) 334-74-21; fax (7-495) 334-76-20; e-mail: fizmat@maik.ru; URL: http:// www.fml.ru/)

Chukbar K V *Lectures on Transport Phenomena in Plasmas* (Dolgoprudnyi: Intellekt, 2008) 256 pp. ISBN 978-5-91559-015-0.

The course introduces the reader to the basics of modern electron magnetohydrodynamics, local diffusion approximation and 'nontrivial stochastic transport' (also known as 'strange kinetics'). Two self-contained parts of the book deal with collective hydrodynamic phenomena and with propagation of radiation through plasma, covering the entire range of problems in collective and radiative transfer. The discussion of the key problems of laboratory-based and space plasma physics is mostly based on the author's original research. The book is intended for students and teachers in physics and engineering physics specialties, as well as research workers. ('Intellekt' Publ.: 141700 Dolgoprudnyi, Moscow region, Promyshlennyi proezd 14; tel. (7-495) 408-76-81; e-mail: lfs@id-intellect.ru; URL: http://www. id-intellect.ru/)

Gol'din S V *Seismic Waves in Anisotropic Media* (Novosibirsk: Izd. SO RAN, 2008) 375 pp. ISBN 978-5-7692-0989-5.

The volume is devoted to the theory of propagation of seismic waves in anisotropic media, to physical properties of anisotropic media, and the roots of anisotropy. It presents the current status in the problem of mathematical modeling of propagation of elastic waves through anisotropic media. The book is based on the course of lectures given by the author to students in geophysics at Novosibirsk State University and generalizes the theoretical and experimental results of investigation of anisotropic media. Part I of the book treats the anisotropy of abstract mathematical and natural objects, elastic media, interconnections of symmetry of media and physical phenomena, special features in the propagation of bulk and surface waves in layered anisotropic

media, the geometry of indicatrices of wave characteristics, specifics of behavior of wave characteristics in domains with singularities. Considerable attention is paid to problem formulation, to describing the physical peculiarities of the wave process, to setting the physical experiment and identifying the main physical characteristics that provide the most comprehensive description of the elastic medium. Part II of the book is concerned with the physical and efficient models of anisotropic media, the effect of stressed state on the elastic properties of the medium and on anisotropy. The anisotropy of a medium may be caused by the internal structure of the material (atomic structures at the level of chemical bonds) and may also be a result of ordering of microscopic inhomogeneities of the medium in response to external forces. The author discusses approaches to designing efficient anisotropic media of different symmetries and calculates their elastic moduli. Wave characteristics and elastic moduli are analyzed in crystals of different symmetries, in layered and fissured media, and in media with regularly packed spheres. The author wished to create the main methodological, teaching and reference textbook on all anisotropy topics for students and experts in seismic prospecting and seismology. The advanced mathematical level of presentation and only infrequent use of esoteric seismological terminology make the book also appealing for specialists in crystal optics, crystal acoustics and mechanics of continuous media. (Published by the Siberian Branch of RAS: 630090, PBox 187, Novosibirsk, Morskoi pr. 2; tel. (7-3832) 30-84-66; fax (7-3832) 33-37-55; URL: http://www.sibran.ru/)

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