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New books on physics and related sciences

Khalatnikov I M Dau, Centaur and Others. Top Non-Secret (Moscow: Fizmatlit, 2007) 192 pp. ISBN 978-5-9221-0877-5.

This book was written by the well-known physics theoretician Academician I M Khalatnikov, who narrates the story of the 'golden age' in the life of physicists when they competed with 'lyricists' for the position of standard bearers in the minds of their generation. The names of 'idols' that were heard most often were those of L D Landau and P L Kapitza. They were the subject of legends in their lifetimes. Khalatnikov worked with L D Landau at the Institute for Physical Problems headed by P L Kapitza. He was Landau's coauthor in a number of papers of decisive importance, and they worked together on the Soviet Atomic Project. After Landau's death, I M Khalatnikov founded the L D Landau Institute for Theoretical Physics in Chernogolovka. This Institute played the decisive role in the survival of the Landau scientific school and in the progress of theoretical physics in the world. The story of how the Institute was created and how it worked should help one to understand the secret of how a successful team could function under conditions of incomplete freedom: by maintaining the atmosphere of intellectual and scientific freedom inside the team. The reader may ask about the secret behind the apparent contradiction. The answer is: there is no secret. This is the subject of the book. (The Publishing Comp. Fiziko-matematicheskaya Literatura: MAIK Nauka/Interperiodika: 117997 Moskva, 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/)

Klyatskin V I Stochastic Equations: The Theory and Its Applications to Acoustics, Hydrodynamics, and Radiophysics, in two volumes. Vol. 1: Fundamentals, Exact Results, and Asymptotic Approximations Monograph (Moscow: Fizmatlit, 2008) 320 pp. ISBN 978-5-9221- 0814-0. RFBR Projects 07-05-0006a, and 05-05-64745a.

This monograph is an extended and revised reprinting of the author's monograph *Stochastic Equations Through the Eyes of a Physicist (Fundamentals, Exact Results, and Asymptotic Approximations)* (Moscow: Fizmatlit, 2001). For convenience, the material is grouped into two very nearly independent volumes. Volume 1 presents the theory of stochastic equations using the functional approach (ordinary differential equations, partial differential equations, boundary value problems, and integral equations). The approach developed in the book makes it possible to obtain exact solutions of stochastic problems for models with fluctuating parameters (telegraph process, generalized telegraph process, Markovian processes with a finite number of states, the Gaussian Markovian process, and functions of these processes). Also

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outlined are asymptotic methods of analyzing stochastic dynamical systems, such as the approximation of deltacorrelated random process (field) and the diffusion approximation. Sections were added devoted to dynamic and statistical descriptions of very simple systems of the hydrodynamic type. The book is intended for specialists wishing to master those areas of acoustics, hydrodynamics, radio physics, and applied mathematics, as well as theoretical and mathematical physics, who work with stochastic dynamical systems; it will also be useful for students in their last years at university and for postgraduates. (The Publishing Comp. Fiziko-matematicheskaya Literatura: MAIK Nauka/Interperiodika: 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/)

Larkin A I, Yuu F T S *Coherent Photonics* (Moscow: BINOM — Laboratoriya Znanii, 2007) 319 pp.

The first textbook of photonics prepared jointly by Russian and American professors. The book is devoted to one of the most promising fields of informatics. The reader will receive a physical justification of the feasibility and expediency of replacing electric current in a number of problems in informatics by a flux of coherent photons. The book contains a full set of the required material, but even so provides an extensive bibliography that can be used for profound studies of individual topics. This textbook is based on lecture courses on informatics, quantum electronics, and photonics that the authors gave to students at Pennsylvania State University and MIFI State University. It is intended for teachers and students of physics specialities (photonics, quantum electronics) of higher education institutions and universities. (The Publishing Comp. BINOM — Laboratoriya Znanii: 125167 Moscow, proezd Aeroporta 3; tel. (7-499) 157-52-72, (7-499) 157-79-77; URL: http://www.lbz.ru/)

Rudenko O V, Gurbatov S N, Khedberg K M Nonlinear Acoustics in Problems and Examples (Moscow: Fizmatlit, 2007) 176 pp. ISBN 5-9221-0761-5.

The book presents fundamentals of nonlinear acoustics in the form of problems with solutions, explanations, and answers. In contrast to available textbooks, this book helps the reader not only to get acquainted with nonlinear wave processes and methods of describing them, but also to master computation procedures and to obtain numerical estimates of most important parameters. This helps to accumulate the knowhow required for independent research in this field. The textbook will be useful for undergraduate and postgraduate students and research workers specializing in the physics of nonlinear waves and acoustics. Recommended by the RF Education and Methodology Association (UMO) on classical university education as a textbook for students of higher education establishments majoring in specialities 010701 — Physics, 010710 — Physics of open nonlinear systems, and

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010802 — Fundamental radiophysics and physical electronics. Received the certification stamp of UMO. (The Publishing Comp. Fiziko-matematicheskaya Literatura: MAIK Nauka/ Interperiodika: 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/)

Timashev S F Flicker Noise Spectroscopy: Information in Random Signals (Moscow: Fizmatlit, 2007) 248 pp. ISBN 5-9221-0878-2.

The book is devoted to the principles of flicker noise spectroscopy (FNS) — the general phenomenological approach to analyzing signals of very dissimilar natures (time series, surface asperity profiles, random spectra, etc.) and to extracting information contained in mixed 'resonance' and 'random' components of signals to be studied. A detailed description is given of the FNS approach based on irreversibility of the spatial and temporal evolutionary dynamics of open complex systems at all levels of the hierarchy. The potentiality of the method is demonstrated using as examples the applications to problems in physics, radiophysics, astrophysics, geophysics, physical chemistry, and the medical sciences. The book is intended for specialists in physics, chemistry, and biology who are interested in the problems of dynamics of complex systems and in analyzing the information content of chaotic signals. (The Publishing Comp. Fiziko-matematicheskaya Literatura: MAIK Nauka/Interperiodika: 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/)

Gel'fand B E, Popov O E, Chaivanov B B Hydrogen: Parameters of Combustion and Explosion (Moscow: Fizmatlit, 2008) 288 pp. ISBN 5-9221-0898-0.

The book presents the generalized results of predominantly experimental studies on the processes of combustion, ignition/self-ignition, rapid deflagration, and detonation in hydrogen-containing combustible systems. Analysis is carried out with studies at initial conditions that hold practical interest for problems of hydrogen energetics and for solving safety problems in the deliberate utilization of hydrogen or in cases of its accidental leakage in technical devices. Possible modes of explosive transformation, their concentration, pressure, temperature, and geometric conditions of implementation, and possible limitations are discussed. Probable scenarios of using hydrogen as fuel are evaluated. The book discusses aspects related to the combustion of pre-nonmixed and partially pre-mixed hydrogen-containing mixtures, and the consequences of explosion for ignitable clouds of hydrogen-containing systems in the atmosphere and for gasfilled cavities immersed in a liquid. (The Publishing Comp. Fiziko-matematicheskaya Literatura: MAIK Nauka/Interperiodika: 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/)

Bauer S M, Smirnov A L, Tovstik P E, Filippov S B Asymptotic Methods in The Mechanics of Solids (Moscow-Izhevsk: Institute for Computer Studies-RKhD, 2007) 360 pp. ISBN 5-93972-475-2. This textbook presents the main asymptotic methods utilized in theoretical mechanics and in the mechanics of deformable solids. Special attention is paid to the mechanics of thin-wall constructions. The presentation is illustrated with a large number of examples and problems reducible to solving algebraic, transcendental, and ordinary differential equations. In addition to regularly perturbed equations, solutions are given for singularly perturbed sets of equations, as well as for linear and nonlinear eigenvalue boundary problems. The book is intended for students in their senior years and postgraduates who specialize in mechanics. (Scientific Publications Center 'Regular and Chaotic Dynamics': 426034 Izhevsk, ul. Universitetskaya 1, Udmurtia State University; tel. (7-3412) 50-02-95, (7-495) 332-48-92; e-mail: subscribe@rcd.ru; URL: http://shop.rcd.ru/)

Regulation-Related Problems in Biological Systems: Biophysical Aspects ('Biophysics. Mathematical biology' Series, Ed. by A B Rubin) (Moscow–Izhevsk: RKhD, 2007) 480 pp. ISBN 978-5-93972-567-5.

The book is a collection of recent publications by Russian specialists in regulation-related problems in biological and pre-biological processes. These processes are treated in biological systems at the level of macromolecules and subcellular systems, at the levels of cells, tissues, and organs, as well as populations and ecosystems. The book discusses the fundamental aspects of the problem and its possible applications to physiology, the medical sciences and ecology. By its structure and the range of problems presented, the book constitutes a collective monograph composed of individual chapters written by leading specialists in the field; it is not intended exclusively for biophysicists but also for a wider range of biologists.

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