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New books on physics and related sciences

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Kudryavtsev A A, Smirnov A S, Tsendin L D *The Physics of Glow Discharge* (St. Petersburg–Moscow–Krasnodar: Lan', 2010) 512 pp. ISBN 978-5-8114-1037-8.

The book gives a systematic presentation of the up-to-date physics of glow discharges, i.e., relatively low-current discharges at low and medium pressures in highly nonequilibrium plasma. Since the electron subsystem is the most nonequilibrium component, the analysis of discharges is based (for the first time in the world literature) on consistent analysis of the electron kinetics. This makes it possible to a give self-consistent description of the main processes and parameters of gas-discharge plasma. A consistent kinetic picture of the phenomena in a positive column, in the cathode region, including the Faraday dark space, and in the anode region has been constructed for DC discharges. The book considers inductive and capacitive RF discharges and shows that no adequate description of many phenomena in them is possible without taking into account the electron kinetics. The book is intended for researchers, undergraduates, and postgraduates specializing in plasma physics, the physics of gas discharges, and their technological applications. Recommended by the Training Methodological Association for Polytechnical University Education as a textbook for students of higher educational establishments, who major and train in 'Technical Physics'. (Lan' Publishing House: 192029, St. Petersburg, Obshchestvennyi per., d. 5; tel./fax (7-812) 336-25-09; e-mail: fml@lpbl.spb.ru; URL: http:// www.lanbook.com/)

Landa P S *Nonlinear Oscillations and Waves* (Series 'Synergetics: From the Past Toward the Future') 2nd ed., revised and enlarged (Moscow: URSS, 2010) 552 pp. ISBN 978-5-397-01296-6.

The book presents the state-of-the-art in the theory of nonlinear oscillations and waves. Oscillatory and wave processes, both periodic and chaotic, in systems of very different physical natures are treated from a unified standpoint. It is shown that such popular sciences as nonlinear dynamics, the theory of solitons, and synergetics, which have rapidly progressed in recent years and are often studied independently of one another, are in fact components of the theory of oscillations and waves. A number of examples demonstrate that this theory reflects the most general laws of nature that hold for systems which constitute subjects of study for various sciences: physics, chemistry, biology, etc. The unity of vibrational laws allows the construction of simple models of complex systems, which, in turn, allow

Uspekhi Fizicheskikh Nauk **180** (9) 1007 (2010) DOI: 10.3367/UFNr.0180.201009m.1007 Translated by V I Kisin clarifying the general properties of systems under study and to predict their behavior in specific conditions. In addition to classical oscillatory and wave phenomena, the book treats unconventional problems of noise-induced fluctuations and turbulence. The book will be of interest and value to experts in the theory of nonlinear oscillations and waves, scientists and engineers whose work involves the study of oscillatory and wave processes, and postgraduate and undergraduate students to support a profound mastering of the general laws of the theory of vibrations and waves and their application to specific systems. (URSS Publishing Group: 117312 Moscow, prosp. 60-letiya Oktyabrya 9, office 203 at the Institute of System Analysis, RAS; tel./fax (7-499) 135-44-23; e-mail: urss@URSS.ru; URL: http://www.urss.ru/)

Barabanov A L Symmetries and Spin-Angular Correlations in Reactions and Decays (Moscow: Fizmatlit, 2010) 520 pp. ISBN 978-5-9221-1226-0.

This monograph shows, using a large number of examples, how new knowledge about the mechanisms of reactions and decays can be obtained invoking the effect of spin orientation of particles and measuring spin-angular correlations. Particular attention is paid to the possibility of studying fundamental symmetries — nonconservation of spatial (P) parity, and violation of time reversal invariance (T). The book focuses mostly on problems related to the physics of interaction of neutrons and muons with nuclei at low energies. However, the spectrum of these problems is quite broad: colliding particles undergoing elastic and inelastic scattering, decays (including fission of nuclei) into two and three particles, emission of gamma quanta, nuclear decays due to the weak current which occurs when a muon transforms into a muon neutrino. The presentation in all sections begins at the level of standard university courses on field theory and quantum mechanics; this makes the monograph suitable for both newly qualified and experienced practitioners working in related fields. (Publishing Company Fiziko-Matematicheskaya Literatura MAIK Nauka/Interperiodika: 117997 Moscow, ul. Profsoyuznaya, d. 90; tel. (7-495) 334-74-21; fax: (7-495) 334-76-20; e-mail: fizmat@maik.ru; URL: http:// www.fml.ru/)

Hawking S, Thorne K S, Novikov I, Ferris T, Lightman A, Price R *The Future of Spacetime* (Translated from English by M Varlamova) (St. Petersburg: Amfora, 2009) 256 pp. ISBN 978-5-367-01085-5.

This collection is based on talks delivered by well-known scientists and science popularizers on June 3, 2000 in honor of the 60th anniversary of Kip S Thorn. The talks discuss the fundamental issues relating to the nature of spacetime, including the possibility of time travel, and also provide predictions about future discoveries. Contents: Richard

Price "An introduction to Spacetime Physics", Igor' Novikov "Can We Change the Past?", Stephen Hawking "Chronology Protection. How to Make the World Safe for Historians", Kip S Thorne "Straining Spacetime and the Quantum World. Speculations About the Future", Timothy Ferris "On the Popularization of Science", Alan Lightman "The Physicist As Novelist". (Amfora Trade-Publishing House: 197110 St. Petersburg, naberezhnaya Admirala Lazareva, d. 20; tel./fax (7-812) 331-16-91; e-mail: sales@spb.club366.ru; URL: http://www.amphora.ru/)

Chernin A D *The Physics of Time* (Series 'Science for Everyone! Masterpieces of Popular Science Literature') 2nd ed., revised and enlarged. (Moscow: URSS, 2010) 232 pp. ISBN 978-5-382-01222-3.

The book discusses the concept of time-one of the most fundamental in our knowledge system. The author chose a simple and descriptive form, using no mathematical formulas, to weave a story of the evolution of scientific concepts of time, of the main ideas in the modern physical concept of time. He outlines the fundamental aspects of physics related to the nature of time, such as the uniformity of time and the law of energy conservation, the relative nature of simultaneity, the light cone and causality, time in the vicinity of 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 circle of interested readers. (URSS Publishing Group: 117312 Moscow, prosp. 60-letiya Oktyabrya 9, office 203 at the Institute of System Analysis, RAS; tel./fax (7-499) 135-44-23; e-mail: urss@URSS.ru; URL: http:// www.urss.ru/)

Compiled by *E V Zakharova* (e-mail: zaharova@ufn.ru)