

PACS number: 01.30.Tt

New books on physics and related sciences

Zuev V E, Belov V V, Veretennikov V V ***Theory of Systems in the Optics of Dispersion Media*** (Tomsk: 'Spectr' Publ., Institute of Atmospheric Optics, Sib. Branch of RAS, 1997) 402 pp. Bibliography: 415 refs. RFBR Grant No 95-02-07209.

The book examines the fundamental ideas underlying the theory of systems in the optics of dispersion media and shows how the Monte Carlo method and approximate methods for solving radiation transfer equations can be applied to scattering channels in opto-electronic components of laser probing, location, communication, and vision systems. The book gives particular attention to the effect microphysical properties of dispersion media have on the characteristics of scattering channels.

Izraèl Yu A ***Radioactive Fallout after Nuclear Explosions and Accidents*** (St. Petersburg: Progress-Pogoda, 1996) 356 pp. Bibliography: 333 refs.

The monograph summarizes years of work on radioactive fallout following nuclear explosions (atmospheric and soil-ejecting underground) and accidents. It analyzes the formation of radioactive aerosol particles as well as the composition of radionuclides and their fractionation on nuclear explosion traces. A large part of the book is devoted to the ten-year studies of the Chernobyl fallout. The book is based on data obtained by the author himself or with his participation, but it also includes material of other studies, both from Russia and elsewhere.

Limits of Predictability (Ed. by Yu A Kravtsov) (Moscow: TsentrKom, 1997) 256 pp. RFBR Grant No 96-05-78127.

The volume addresses the predictability of a wide variety of phenomena, both physical (weather, climate, earthquakes, biological environment, dynamical chaos) and social (election outcomes, ethnogeny laws, etc.). The contributors are well-known international authorities: A S Monin, L I Piterbarg, G R Ivanitskiĭ, G G Malinetskiĭ, V A Lisichkin, M A Sadovskiĭ, V F Pisarenko, Yu A Kravtsov, G R Bestuzhev-Lada, V I Keĭlis-Borok, A J Lichtman, L N Gumilev, and V Yu Ermolaev. The book was originally published in English in 1993 (Berlin, Heidelberg: Springer-Verlag, 1993).

Kobzarev I Yu, Manin Yu I ***Elementary Particles. Dialogues between a Physicist and a Mathematician*** (Moscow: Fazis, 1997) 208 pp. RFBR Project No 97-02-30001.

The history of the development and the current state of the theory of elementary particles are presented in the form of a conversation between four people: a theoretical and an experimental physicist, a mathematician, and a philosopher. The book was first published in English as *Elementary Particles: Mathematics, Physics and Philosophy* (International Book Series on the Fundamental Theories of Physics: Their Clarification, Development and Application) (Dordrecht: Kluwer Academic Publishers, 1989). This edition is appended by Yu I Manin's article 'Strings' written for the journal 'Math. Intelligencer' in 1987.

Yakovlev O I ***Space Radiophysics*** (Moscow: Nauchnaya Kniga, 1998) 432 pp. Bibliography: 825 refs. RFBR Project No 95-02-07235-B.

Professor Yakovlev addresses radio wave propagation, communication with Earth satellites and interplanetary probes, radiophysical techniques, and space-based studies of various media. The book also includes research on radio eclipse monitoring of planetary atmospheres and ionospheres; radio probe studies on near-solar and interplanetary plasma; and radiophysics involved in the radar and radiometry studies of the Earth and other planets.

Rabinovich M I, Ezerskiĭ A B ***Dynamical Theory of Form-Building*** (Moscow: Yanus-K, 1998) 192 pp. Bibliography: 154 refs. RFBR Project No 97-02-30044.

How do crystalline and quasi-crystalline spatial structures develop at the uniform surface of a horizontal liquid layer in an oscillating gravitational field? How is it that helices are the concentration objects most likely to form in a two-dimensional autocatalysis chemical reactor? What does the term defect self-organization mean? Based on visual experiments involving hydrodynamic, chemical, and biological systems, the authors answer these and other questions associated with the emergence of various spatial forms. The book is intended for a broad scientific readership.

Kucherenko M G ***Kinetics of Nonlinear Photoprocesses in Condensed Molecular Systems*** (Orenburg: Orenburg State University Press, 1997) 386 pp. Bibliography: 235 refs.

The monograph is concerned with physical processes occurring in systems with interacting electron-excited molecules. It provides a detailed analysis of nonlinear kinetic phenomena based on the multiparticle partition function formalism. Coverage also includes the kinetics of photoreactions in homogeneous and structured media and prospects for using external physical fields to control the kinetics of photoprocesses.

The Physics and Technology of Ion Sources (Ed. by I G Brown) (Moscow: Mir, 1998) 496 pp. [Translated from English (New York: John Wiley & Sons, 1989)] RFBR Project No 97-02-30052.

This collection of contributed papers by workers from the USA, Germany, Britain, Belgium, Japan, and Russia is concerned with plasma physics applications in the field of ion sources. Specific topics covered include the ion extraction

problem, ion focusing and transportation; computer modelling methods; heavy current gas sources; injector sources for particle accelerators; sources for electromagnetic isotope separators and industrial implanters; electron cyclotron resonance sources; multiple-ion sources using extended electron beam ionization; laser and microwave ion sources; metal-vapor arc discharge sources of ions; negative ion sources, and pulsed light-ion sources for thermonuclear systems with magnetic plasma confinement.

Strength and Shock Waves. Research work at Russian nuclear centres, No 4. (Ed. by S A Novikov) (Sarov: RFYaTs-VNIIÈF, 1996) 573 pp.

A collection of 64 papers by the leading specialists of the Russian Federal Nuclear Research Centre – Institute of Experimental Physics (Russ. abbr. VNIIÈF) on various aspects of the rheology of solids under high-speed deformation conditions in shock waves and expansion waves. The contributions present the results of original, mainly experimental, studies on shock wave structure in metals, the dynamic strength of materials, and the response of a material to shock wave loading. They were obtained within the span of thirty two years, starting in 1960.

Vlasov S N, Talanov V I ***Wave Self-Focusing*** (Nizhniĭ Novgorod: IPF RAN, 1997) 220 pp. Bibliography: 224 refs.

The book presents a systematic exposition of the theory of wave focusing. The authors examine nonlinearity mechanisms leading to self-focusing. They apply the method of the parabolic equation to the solution of self-focusing problems and describe various manifestations of the phenomenon.

Physics of Microwaves. A collection of 1997 reports issued under the aegis of the Ministry of Scientific and Technical Policy of the Russian Federation (Nizhniĭ Novgorod: IPF RAN, 1998) 224 pp.

The collection of abstracts of 1997 reports on 53 projects being carried out under the Interindustry Scientific and Technological Program 'Physics of Microwaves'. The reports present results on four major microwave research directions: (i) microwave radiation sources; (ii) propagation of microwave radiation and environment monitoring; (iii) microwave spectroscopy and metrology and the microwave radiation receivers, and (iv) interaction of microwave radiation with matter.

Zuev V E, Titov G A ***Atmospheric Optics and Climate*** (Current problems in atmospheric optics, vol. 9) (Tomsk: 'Spectr' Publ., Institute of Atmospheric Optics, Sib. Branch of RAS, 1996) 272 pp. Bibliography: 420 refs. Supported by DOE's ARM Program, contract No 350114-A-Q1.

The book discusses the fundamental ideas underlying the theoretical modelling of climate and radiative 'atmosphere – surface' systems. The authors provide a brief analysis of the effect of variations in the optical properties of the atmosphere and focus attention on how the radiation regime of random-geometry mesoscale cloud fields can be parameterized when numerically modelling general atmospheric circulation.

Current Problems in Nuclear Physics. On the 70th birthday of V G Solov'ev (Dubna: OIYaI Press, 1995) 282 pp.

This collection, a homage to Vadim Georgievich Solov'ev's scientific services, brings together the works of many prominent scientists from Russia and elsewhere, presents a brief scientific biography of V G Solov'ev, and lists over 300 of his publications.

Shklovskiĭ I ***Intelligence, Life, Universe*** (Moscow: TOO 'Yanus', 1996) 432 pp. Supported by the RFBR, project No 95-02-240226.

The collection marks the 80th birthday of the renowned astrophysicist Iosif Samuilovich Shklovskiĭ. A list of I S Shklovskiĭ's 353 publications is presented.

Kapitza, Tamm, and Semenov in Essays and Letters (Ed. by A F Andreev) (Moscow: Vagrius, 'Priroda', 1998) 576 pp. Supported by the RFBR.

This book is largely based on three issues of the journal 'Priroda' (Nature) (1994, No 4; 1995, No 7; 1996, No 3/4) marking the centenaries of P L Kapitza, I E Tamm, and N N Semenov, respectively. The material collected is strictly documentary. Many of the texts, among them archive documents and letters, are published and commented for the first time in a book version.

Isaak Konstantinovich Kikoin in the Remembrances of Contemporaries. 2nd ed., revised and enlarged (Moscow: Nauka, 1998) 255 pp.

Drawing on the memories of his colleagues, disciples, friends, and relatives, this is a fascinating portrait of Academician Isaak Konstantinovich Kikoin, a prominent atomic science and solid-state researcher, an inspiring teacher and a talented organizer and leader, Twice Hero of Socialist Labour, and Lenin and State Prizes winner. The first edition, 'Memoirs about Academician Isaak Konstantinovich Kikoin,' was published by 'Nauka' in 1991. The second edition includes new articles and previously unpublished facts of I K Kikoin's life and career.

Compiled by *E V Zakharova*