

## New books on physics and related sciences

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**Akhmanov S A, Nikitin S Yu** *Physical Optics* 2nd ed. (Moscow: Izd-vo MGU, 2004) 656 pp. ISBN 5-211-04858-X.

Based on the authors' lecture course given at the Physics Department of Moscow State University, this book covers the electromagnetic theory of light, the physics of light radiation, interference and diffraction, the coherence of light, and the interaction of radiation with matter. The current problems in optics that are addressed in the book include such subjects as lasers, nonlinear optics, supershort light pulses, superstrong light fields, new optical spectroscopy techniques, Fourier optics, holography, optical levitation, and laser fusion. Special supplements focus on theoretical topics, including electrodynamics of radiation, the two-level quantum system, spectral decomposition method, and stochastic processes. Information about the history of physical optics is also provided. It will be suitable as a textbook for university faculty as well as undergraduate and graduate students and for specialists in optics and its applications. (MSU Publ.: 103009 Moscow, B. Nikitskaya ul. 5/7; tel. (7-095) 229-50-91; fax (7-095) 203-66-71; e-mail: kd\_mgu@df.ru; URL: <http://www.msu.ru/depts/MSUPubl/index.html>)

**Rubin A B** *Biophysics* in two volumes Vol. 1: *Theoretical Biophysics*; Vol. 2: *Biophysics of Cellular Processes* 3rd ed. (Moscow: Izd-vo MGU, 2004) Vol. 1, 448 pp.; Vol. 2, 469 pp. ISBN 5-211-06109-8.

A thorough text on the subject, this book presents the fundamentals of modern biophysical science. The revised edition of the first volume is concerned with the theoretical fundamentals of biophysics with much consideration given to the numerical simulation of biological processes at various levels of living organization. It covers the physical aspects as well as dynamic and electronic properties of the macromolecule constituting a structural unit of the living creature and discusses the physical and chemical mechanisms of energy conversion at work in biostructures. The second volume examines the physical and chemical mechanisms of the major processes occurring in organisms and provides a detailed discussion of such things as the structural and functional aspects of biological membranes; bioelectrogenesis; contraction of muscle receptor, and electron transport and energy conversion in biomembranes. The early stage mechanisms of photobiological processes, including photosynthesis, sight, and photochemical reactions in biopolymers, are also discussed. It is intended for a readership comprising undergraduate and postgraduate students and a wide-range of specialists with an interest in the physico-chemical fundamentals of vital processes. (MSU Publ.: 103009 Moscow, B. Nikitskaya ul. 5/7; tel. (7-095) 229-50-91; fax (7-095)

203-66-71; e-mail: kd\_mgu@df.ru; URL: <http://www.msu.ru/depts/MSUPubl/index.html>)

**Dirac P A M** *Collected Works* Vol. 3: *Quantum Theory* (Scientific papers, 1948–1984). ('Classics of Science' Series; compiled and general edited by A D Sukhanov) (Moscow: Fizmatlit, 2004) 720 pp. ISBN 5-9221-0503-5.

This is a further contribution to the first publication of the *Collected Works* of P A M Dirac, Nobel laureate and co-creator of quantum mechanics and quantum field theory (including its gauge formulation). The third volume contains quantum theory papers of 1948–1984, fundamental to the modern quantum theory of gauge fields and comprises papers on relativistic dynamics, generalized Hamiltonian mechanics, magnetic monopoles, and quantum electrodynamics. Uniquely, the works of this book have never been published together in one volume. The third volume offers, for the first time in Russian translation, the concluding sections from the 4th revised 1976 English edition of Dirac's famous *Principles of Quantum Mechanics*. The appendix includes the final section of B V Medvedev's paper "P A M Dirac and the logical foundations of quantum theory" and most of the content of the memorial essay by R Dalitz and R Peierls, which features the detailed biography of the great scientist, reviews most of his works included in the third volume, and contains his bibliography (with source language titles). The book is intended for undergraduate and postgraduate students, faculty and research workers in physics, mathematics, and science history. (Fiziko-Matematicheskaya Literatura & MAIK Nauka/Interperiodika Publishing: 117997 Moscow, Profsoyuznaya ul. 90; tel./fax (7-095) 334-74-21, 334-76-20; e-mail: fizmat@maik.ru; URL: <http://www.fizmatlit.ru/>)

**Sergei Ivanovich Vavilov: *New Glimpses of the Man*** (Studies on the history of FIAN. 'Portraits' Series, Installment 2, Part 1. Compiled and authored by V M Berezanskaya) (Moscow: Izd-vo FIAN, 2004) 164 pp. ISBN 5-902622-04-2.

The present edition, published to coincide with the 70th anniversary of the P N Lebedev Physics Institute, RAS (FIAN), is the second installment of the *Studies on the History of FIAN* collection in the 'Portraits' Series. The collection is dedicated to Sergei Ivanovich Vavilov, the FIAN founder (1934) and director (1934–1951), and the President (1945–1951) of the then USSR Academy of Sciences. The first chapter, a documentary account of Vavilov's life from 1908 to 1917, presents for the first time his letters, travel postcards, and photos discovered in the archive of the A A Bakhrushin State Central Theatre Museum and features similar materials from his published books and diaries. As illustrations, a large number of photos and documents from the private archives of the institute's staff members, former and current, are included. The second chapter is the remembrances of N L Timofeeva, who knew

Vavilov and worked under his immediate direction for many years. The third chapter is the author-transcribed talk on the history of discovery of the Vavilov–Cherenkov effect, which was delivered by B M Bolotovskii at the FIAN Academic Board session on the occasion of Vavilov's 110th birthday. A paper by V D Esakov, a well-known historian of Russian science, constitutes the content of chapter four. This enlarged version of the 10/1991 *Nauka i Zhizn'* (Science and Life) publication draws on declassified archive material to give a more accurate account of how S I Vavilov was elected the President of the Academy of Sciences and what his main areas of activity were at the time. Most of the collection's material is published for the first time. The second part of the collection, looking at Vavilov's later life and career, is currently under preparation. (P N Lebedev Physics Institute, RAS, Academic Secretary's Department, Berezanskaya V M: 119991 Moscow, Leninskiĭ prosp. 53; tel. (7-095) 132-63-14; e-mail: bereza@sci.lebedev.ru; bereza@mail.lebedev.ru)

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