New books on physics and related sciences

Fedorov B V *Radioelectretic Effect in Phosphate Glasses* (Tyumen': TyumGNGU Press, 1998) 196 pp. Bibliography: 174 refs.

This volume looks at how radioelectrets are manufactured from phosphate glasses obtained in the field of the electron beam emerging from a linear accelerator. Exploring the external electric field associated with the irradiated glass, the book describes the way it is distributed over the thickness of the plate as well as above its surface; how it is affected by irradiation conditions and by the environment, and how it relaxes during isothermal quenching and linear heating. The text considers the effects of induced optical absorption, thermal-stimulated current, and thermoluminescence and presents a comparative analysis of generation processes leading to such things as radiation defects, stored charge, light summing of thermoluminescence and color centers. Highlighted in the text are the radiation damage to the glass; an electron trapping mechanism involved in the radical transformation process, and the way the electric and physical properties of an electret are related to the energetics of the glass structure.

Reznik B L (Ed.) *Quarks in Nuclei and Relativistic Nuclear Dynamics.* In commemoration of the 25th anniversary of cooperation between the Joint Institute for Nuclear Research and Far East State University. Collection of studies. (Vladivostok: Far East University Press, 1997) 128 pp.

This collection sums up the 25 years of cooperation in the theory of the atomic nucleus and nuclear reactions, between the theoretical physicists of the N N Bogolyubov Laboratory for Theoretical Physics at the Joint Institute for Nuclear Research in Dubna and the Physics Department of Far East State University in Vladivostok. The collection concludes with a bibliography of theoretical nuclear physics publications produced by FESU faculty members from 1967 to 1997.

Grigor'ev V P, Protasevich E T *Ecological Problem Solutions Using Electromagnetic Radiation and Plasma* (Tomsk: Tomsk Polytechnical University Press, 1998) 204 pp. Bibliography: 214 refs.

This volume provides an in-depth examination of radioactive fallout detection methods, including active and passive remote control techniques as well as approaches involving the detection of microwave emission from atomic hydrogen and hydroxyl OH. The authors make a number of suggestions on how to precipitate or scatter radioactive clouds and describe devices and instruments capable of achieving this

Uspekhi Fizicheskikh Nauk **169** (6) 703–704 (1999) Translated by E G Strel'chenko goal. The book will serve the needs of undergraduate and post-graduate students, teachers, and researchers concerned with atmospheric electricity and ecology.

Lokshin A A, Saakyan A S Schrödinger Equation in Quantum Chemistry (Moscow: Dialog-MGU, 1998) 63 pp. Bibliography: 48 refs. RFBR project 95-01-01171a.

Aimed at undergraduate students and researchers in mathematical physics and quantum chemistry, the book employs the methods of operator analysis to study the geometry of adiabatic potentials of diatomic and polyatomic molecules.

Zhivopistsev F A, Ivanov V A Regression Analysis in Experimental Physics (Moscow: Moscow State University Press, 1995) 208 pp. Bibliography: 21 refs.

Intended for the researchers and senior students in experimental physics, this book addresses the most important aspects of data processing: evaluating unknown random distribution parameters, establishing criteria for the validity of the hypotheses used, and regression analysis techniques (multiple regression). Special attention is given to the systematic presentation of the χ^2 method. Regression analysis is described in a concise style that is easily accessible to a wide circle of experimentalists. Since a practical application of regression analysis is impossible without the aid of computers, user-friendly computer codes are also presented.

Kul'bachinskii V A Structures and Superlattices in Two, One, and Zero Dimensions (Moscow: Moscow State University Press, 1998) 164 pp. Bibliography: 34 refs.

Here is a systematic presentation of theoretical results and experimental data on semiconducting superlattices and twodimensional structures as well as more recent types of physical objects, such as one-dimensional (quantum wires) and zero-dimensional (quantum dots) structures, graphite intercalation compounds, layered semiconductors, and organic salts. This book reviews the manufacture and application of low-dimensional structures and superlattices, discusses their conductivity and optical properties, and considers quantum effects is such systems. The latest developments and discoveries in this area are also outlined.

Second Scientific Seminar in Memory of V P Sarantsev (23–24 September 1997, Dubna) (JINR issue D9-98-153) (Dubna: OIYaI Publ., 1998) 160 pp.

This collection is based on proceedings at the Second Scientific Seminar in memory of Vladislav Pavlovich Sarantsev, organized by the Joint Institute for Nuclear Research and the Russian Academy of Sciences' Accelerator Council. Two major topics at the seminar were novel acceleration methods and the physics of charged-particle beams. A special session dealt with the application of high-power accelerating systems in power generation (inertial thermonuclear fusion, electronuclear reactor) and nuclear waste transmutation.

Zaĭtsev V F, Polyanin A D Handbook of Linear Ordinary Differential Equations (Moscow: Faktorial, 1997) 304 pp. Bibliography: 25 refs.

A ready reference on the exact solutions of linear ordinary differential equations, this handbook covers about 2,000 differential equations of the second, third, and higher orders, with emphasis on general equations with coefficients depending on arbitrary functions. Other equations covered in the handbook contain one or more free parameters whose values are set at the reader's choice. For a number of equations occurring in various areas of theoretical physics and mechanics, exact solutions are given, and in some sections asymptotic solutions also are presented. An important source for scientific researchers, university teachers and for engineers and students in mathematics, mechanics, and physics.

Zaĭtsev V F, Polyanin A D Handbook of Nonlinear Ordinary Differential Equations (Moscow: Faktorial, 1997) 512 pp. Bibliography: 26 refs.

The book describes over 3,200 nonlinear ordinary differential equations and their solutions, with special attention paid to general equations dependent on arbitrary functions. The volume includes new integrable equations and covers seven times as many nonlinear equations of the second, third, and higher orders as does E Kamke's *Differentialgleichunge*. *Lösungsmethoden und Lösungen*. Bd. I. *Gewöhnliche Differentialgleichungen*. 6 Aufl. (Leipzig, 1959). Of special interest are exact solutions to equations of nonlinear mechanics and theoretical physics (appearing in heat conduction, mass transfer, theory of elasticity, hydrodynamics, vibration theory, combustion, chemical reactors, etc.). A much needed guide for a wide circle of scientific researchers, university teachers as well as for engineers and students in mathematics, mechanics, and physics.

Compiled by E V Zakharova