New books on physics and related sciences

Glezer A M, Shurygina N A *Amorphous-Nanocrystalline Alloys* (Moscow: Fizmatlit Publ., 2013) 452 pp. ISBN 978-5-9221-1547-6.

Methods of fabricating amorphous-nanocrystalline materials (hardening from melt, controlled crystallization, stress-strain action, pulsed — photon, laser, and ultrasonic — treatment, thin film evaporation, ion implantation) are considered. Detailed information is presented concerning the structure specificities of transition from the amorphous to nanocrystalline state under thermal and stress-strain actions. Theoretical and experimental studies are analyzed, in which the mechanisms of plastic deformations and the peculiarities of physicomechanical properties being formed are described. The ranges of practical applications of nanocrystalline alloys are considered. The book is intended for researchers, engineers, postgraduate students, and holders of a master's degree at educational institutions interested in issues related to nanotechnologies and nanomaterials science for obtaining new materials with unique properties. (Izd-vo Fizmatlit: 117342 Moscow, ul. Butlerova 17B; tel. + 7 (499) 968-92-28; e-mail: fizmat@maik.ru; URL: http://www.fml.ru/)

Mikhail Dmitrievich Millionshchikov*: *On the 100th Anniversary of His Birth ('Outstanding Scientists of the Kurchatov Institute' Series, Exec. Ed. S E Voinova, Compiler Ed. N E Kukharkin, author preface by E P Velikhov) (Moscow: NRC 'Kurchatov Institute', 2014) 200 pp. ISBN 978-5-904437-87-9.

Collection of Theses of the International Conference 'Turbulence and Wave Processes' Devoted to the Centenary of Academician M D Millionshchikov (Moscow, 26–28 November 2013) (Compilers: D V Georgievskii, M G Golitsyna, M A Lebedev, D V Millionshchikov, A S Petrosyan, T S Rat'yu, E V Troitskii) (M V Lomonosov MSU and RAS) (Moscow: Intuit.ru, 2013) 192 pp. ISBN 978-5-9556-0157-1; http://dubrovinlab.msu.ru/files/AbstrMilli100.pdf

Mikhail Dmitrievich Millionshchikov*: *1913–1973 (RAS Series 'Materialy k Biobibliografii Uchenykh' ('Materials for Biobibliography of Scientists'), Compiler M A Lebedev; author of introductory article N N Ponomarev-Stepnoi, I A Kerimov, M A Lebedev) 2nd edition revised and updated (Moscow: Nauka, 2014) ISBN 978-5-02-039028-7.

The publications are devoted to the 100th anniversary of the birth of Mikhail Dmitrievich Millionshchikov (1913–1973). Academician Millionshchikov made a considerable contribution to the turbulence theory and the theory of oil and gas filtration in a porous medium; he is one of the founders of the

Russian gas ejector theory. From 1949 to 1973, M D Millionshchikov worked at the Kurchatov Institute of Atomic Energy (famous Lab. No. 2 of the Academy of Sciences): after 1949 as assistant to I K Kikoin, scientific supervisor of work on uranium isotope separation for Soviet Atomic Project, after 1960 as Deputy Director of the Institute (Director — A P Aleksandrov). In 1951–1962, he headed the Selection Committee for the acceptance and control of diffusion and centrifugal machines at the USSR Ministry of Medium Machine Building. He is the author of theoretical studies of centrifugal hydrodynamics. In 1960–1973, under the guidance of M D Millionshchikov, great success was achieved in the construction of high-temperature nuclear reactors, in the development of magnetohydrodynamic and thermoelectric methods of energy conversion, and in the study of low-temperature plasma properties. He participated from the very beginning in work on the application of the MHD method for the design of a transportable pulsed energy source. M D Millionshchikov was scientific supervisor for work on the creation of Romashka, the first thermoelectric nuclear reactor-converter in the world (1964) that laid the basis for the elaboration of reactor nuclear energy installations in space. In 1953, M D Millionshchikov was elected a Corresponding Member, and in 1962 a Full Member and Vice President of the USSR Academy of Sciences. He was a professor at the Moscow Aviation Institute, Moscow State University, and the Moscow Engineering Physics Institute, where in 1949 he founded the Chair of Isotope Separation. He was Editor-in-Chief of the journals *Vestnik akademii nauk SSSR* (*Herald of the USSR Academy of Sciences*), *Atomnaya energiya* (*Atomic Energy*) and the international annual publication *Nauka i chelovechestvo* (*Science and Mankind*). He was a member of the editorial staff of *The Great Soviet Encyclopedia* and sat on the Editorial Board of the journal *Kvant* (*Quantum*). When Chair of the Soviet Pugwash Committee under the Presidium of the USSR Academy of Sciences (1964–1973), M D Millionshchikov largely promoted the establishment of trustworthy relations between scientists of the West and East, especially in the period when the Non-Proliferation Treaty and the Anti-Ballistic Missile Treaty were being worked out — a process in which he took an active part. M D Millionshchikov was elected an Honorary Member of the American Academy of Arts and Sciences, a Corresponding Member of The Deutsche Akademie der Naturforscher Leopoldina, and a Foreign Member of the Czechoslovak Academy of Sciences.

Rudoy Yu G *Mathematical Structure of Equilibrium Thermodynamics and Statistical Mechanics* (Moscow–Izhevsk: Izhevsk Institute for Computer Studies, 2013) 368 pp. ISBN 978-5-4344-0159-3

This book gives a systematic, concise, and accessible presentation of mathematical aspects of thermodynamics and statistical mechanics, and covers the basic mathematical structures of these fields of physics, namely geometrical,

probabilistic, algebraic, and functional ones. The main focus is on the geometrical structure with application of contact-geometry and differential-form methods. The evolution of the ideas is presented in a wide historical and physical context. Information geometry, or geometro-statistics and, in particular, its noncommutative (quantum) generalization, is presented consistently for the first time in literature in the application to the evaluation of parameters of the probabilistic distribution function or the density matrix. A number of physical objects are considered, including classical and quantum ideal gases, the quantum harmonic oscillator, and the spin paramagnet; particular attention is paid to the uncertainty relations — both thermodynamic and quantum. The presentation is practically completely self-contained and does not require that the reader have knowledge beyond the standard courses delivered to (3–5)-year students in physics and mathematics at classical and pedagogical universities. The book can be used as a tutorial for students and postgraduates of the above-mentioned specialities and may also be of interest for research workers in other natural-science fields, e.g., astronomy, chemistry, biology, and geology. The issue was supported by the Russian Foundation for Basic Research, Project No. 12-01-07119. (Izhevsk Institute for Computer Studies: 426034 Izhevsk, ul. Universitetskaya 1; tel./fax: $+7$ (3412) 500-29-5; URL: http://shop.red.ru, http://ics.org.ru)

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