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New books on physics and related sciences

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Gorbunov D S, Rubakov V A ***Introduction to the Early Universe Theory: The Theory of Hot Big Bang*** 2nd ed. (Moscow: Izd-vo URSS, 2012) 552 pp. ISBN 978-5-382-01336-7.

This book was written largely from the standpoint of ties between cosmology and the physics of the microscopic world. It presents conclusions pertaining to the uniform isotropic Universe at the hot stage of its evolution and during subsequent cosmological stages. The main parts of the book discuss the established picture of the early and the current Universe; these parts can serve as a modern introduction to the rapidly expanding field of science. To facilitate reading of the main chapters, required information from the general theory of relativity and the theory of elementary particles is given in the Appendices. The book also scrutinizes some hypotheses (often mutually exclusive) that stem from cosmology's unsolved problems, such as dark matter, dark energy, and matter–antimatter asymmetry. The book is intended for researchers and for postgraduate and undergraduate students specializing in elementary particle physics and in cosmology. (URSS Publishing group: 117312 Moscow, prosp. 60-letiya Oktyabrya 9, office No. 203 at the RAS Institute for System Analysis; tel./fax +7 (499) 135-44-23; e-mail: urss@URSS.ru; URL: http://urss.ru/)

Surzhikov S T ***Hypersonic Flow of Rarefied Gas Around the Surface Glow Discharge in an External Magnetic Field*** (Moscow: Izd-vo IPMekh. RAN, 2011) 273 pp. ISBN 978-5-91741-035-7.

This book gives a computational model of gas-dynamic and electric-discharge processes in the hypersonic flows of rarefied gas at pressures of several torrs, based on the two-dimensional Navier–Stokes equation and on the drift–diffusion model of electrical discharge in the quasineutral plasma approximation, taking into account the external magnetic field with induction $B \sim 0.1$ T. The results of numerical modeling of a number of problems are discussed; these are of practical interest for solving problems of controling hypersonic gas flows. The specific problem of viscous interaction of a gas flow with a flat surface on which steady-state dc surface discharge glows between two electrodes placed across the gas flow is considered. Cases of the heating of electrode sections and of the impact of a transverse magnetic field are analyzed. The results of studying the structure of hypersonic flow in a plane channel on whose opposite surfaces gas discharge is created between segmented electrodes are presented. The structure of rarefied hypersonic flow was studied in a plane channel between whose two surfaces the volume glow discharge is maintained transversely to the gas flow and to the external magnetic field. Specifics were calculated of the structure of rarefied hypersonic flow in a curvilinear channel with the cathode section of the electric discharge gap installed on one of the surfaces, while the other surface is the anode. The book is intended for researchers and practising engineers in aerospace engineering disciplines. It was recommended as a textbook for students of the MFTI basic Faculty of Physical and Chemical Mechanics at the Faculty meeting on 10.10.2011. (A Yu Ishlinskii Institute for Problems in Mechanics, RAS: 119526 Moscow, prosp. Vernadskogo 101, korp. 1; tel. +7 (495) 434-32-38, +7 (499) 739-95-31; e-mail: ipm@ipmnet.ru; URL: http://www.ipmnet.ru/)

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Georgii Ivanovich Petrov: 100th Anniversary of the Birth of the First Director of the Space Research Institute (Compiled by N M Astafieva, K V Krasnobaev) (Moscow: IKI RAN, 2012) 126 pp.

This volume of collected publications was specially prepared for the 100th anniversary of the birth of Academician Georgii Ivanovich Petrov (born on May 31, 1912), the first director of the Academy's Space Research Institute (IKI), outstanding expert in mechanics, and Hero of Socialist Labor. The second half of the twentieth century saw the beginning of intense investigation and practical exploration of cosmic space. Documents in this collection reflect the main stages in strengthening space research, in which G I Petrov took the most direct and active part. He became the organizer and first director of the Space Research Institute on the recommendation of the Academy's President, Academician M V Keldysh, in 1965; he guided the Institute until 1973. In the years when the IKI was taking shape, he gave priority to IKI research in a wide range of promising avenues of the space sciences and was one of the co-founders of a new field — cosmic gas dynamics. The present collection, presenting the biography of G I Petrov the scientist, is mostly based on documentary material — excerpts from Georgii Ivanovich's publications and from articles and books published by many members of his scientific school and by scientists with whom he worked in close contact. The collection includes documents from the RAS Archive (very few of them, unfortunately, as most of his papers were classified), texts published in the Soviet mass media, quotes from G I Petrov's popular science papers and from his publicistic articles, as well as extracts from his press conferences and numerous interviews. (RAS Space Research Institute: 117997 Moscow, ul. Profsoyuznaya 84/32; tel. +7 (495) 333-52-12; fax +7 (495) 913-30-40; e-mail: iki@cosmos.ru; URL: http://www.iki.rssi.ru/)

A.M. Fridman — More Than Just a Scholar (Executive editors A B Mikhailovsky and A A Boyarchuk) (Moscow: Dobrosvet, Izd-vo KDU, 2012) 704 pp. ISBN 978-5-98227-843-2, 978-5-7913-0083-6.

This book is a collection of reminiscences, archival materials, and miscellaneous publications devoted to the memory of the

prominent Soviet (Russian) astrophysicist and winner of three State awards, Academician Aleksei Maksimovich Fridman. A M Fridman started his career as a plasma physicist; in the last years of his life, he also worked, alongside with his astrophysics research, on the problem of tsunami containment. The book is addressed to students, postgraduate and undergraduate, university teachers, researchers, and anyone interested in the history of Russian science. (Institute of Astronomy, RAS: 119017 Moscow, ul. Pyatnitskaya 48; tel. + 7 (495) 951-54-61; fax +7 (495) 951-55-57; e-mail: admin@inasan.ru; URL: http://www.inasan.ru/)

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