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## New books on physics and related sciences

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Isaev A P, Rubakov V A Theory of Groups and Symmetries: Finite Groups. Lie Groups and Algebras (Moscow: URSS, 2018) 504 pp. ISBN 978-5-396-00841-0.

The propositions and results of the theory of groups and symmetries that can be widely applied in theoretical and mathematical physics are presented extensively. Both the algebraic group theory and the theory of Lie group and algebra representations are discussed. Particular attention is paid to Lie compact groups and algebras, as well as conformal groups and algebras in spaces of different dimensions. The classification of semisimple finite-dimensional Lie algebras is briefly discussed. Yangians related to simple Lie algebras of classical series are defined. The basic principles of differential geometry of homogeneous spaces are presented. The book is intended for research workers, postgraduates, and senior students engaged in theoretical and mathematical physics. (URSS Publishers Group: tel./fax: +7(499)724-25-45, e-mail: urss@URSS.ru, URL: http://urss.ru/)

Thorne K S Black Holes and Time Warps: Einstein's Outrageous Legacy (Translated from English by M L Gorodetskii, Ed. V B Braginskii) (Moscow: Izd. Fiziko-matematicheskoi literatury, 2017) 616 pp. ISBN 978-5-94052-261-4.

Translation of the book by Thorne K S, Black Holes and Time Warps: Einstein's Outrageous Legacy. (New York: W W Norton & Co., 1994). The author is the 2017 Nobel Prize winner for physics (for the experimental discovery of gravitational waves), American theoretical physicist, member of the American Academy of Arts and Sciences, the USA National Academy of Sciences, and the NASA Academic Council, foreign member of the Russian Academy of Sciences, Professor at the California Institute of Technology, and honorary doctor of MSU. This edition is a popular presentation of the latest achievements in astrophysics and gravitation closely related to fundamental predictions by Albert Einstein. The reader will find many interesting things concerning the contribution of scientists from different countries to this area of science and related branches. The book is translated from English into French, German, Japanese, Chinese, Polish, and Greek. Several chapters were earlier translated into Russian and published in the journal Priroda. The book is meant for a wide circle of readers, including senior schoolchildren. The book can be bought at the publishing house (tel. +7(499)390-51-38, +7(499)720-41-53; e-mail: fizmatlit@fizmatlit.com) and also through the Internet at https://fizmatlit.com/novyeknigi/ (shop site http://fizmft-kniga.ru/catalog/section-210/ product-950/) and on the site Ozon.ru (URL: https://

www.ozon.ru/context/detail/id/143319389/), where one can find wonderful reviews by readers about the first edition of this brilliant book in the Russian language.

**Thorne K S** *Interstellar. The Science of Interstellar* (Translated from English by S Lomakin; Preface by C Nolan) (Moscow: Mann, Ivanov and Ferber, 2015) 335 pp. ISBN 978-5-00057-536-9; Translation of the book by Thorne K S, *The Science of Interstellar* (New York: W W Norton & Co., 2014).

In his book written during the shooting of the film Interstellar, Kip Thorne, who is the creator, a consultant, and an executive producer of the well-known film by Christopher Nolan, explains in detail all the facts concerning gravitation, black holes, the fifth dimension, and other phenomena embodied visually in the film. During the shooting, Thorne worked together with the supervisor of visual effects P J Franklin and his team from Double Negative. Thorne placed the theoretical material at the disposal of the team, who then constructed new computer programs exactly modeling these phenomena. The result provided Professor Thorne with new insight into the effect of gravitational lensing and accretion disks of a black hole. This encouraged him to write two scientific books, one in astrophysics and the other in the field of computer graphics. The book is intended for a wide range of readers. (Mann, Ivanov and Ferber Publishing House: tel. +7 (800) 775-67-41, e-mail: support@m-i-f.ru, URL: https://www.mann-ivanov-ferber.ru/)

**Popov S** Universe. Brief Guidebook to Space and Time: From the Solar System to the Furthest Galaxies and from the Big Bang to the Future of the Universe (Series Politekh) (Moscow: Alpina non-fiction, 2018) 400 pp. ISBN 978-5-91671-726-6.

Contemporary astrophysics is a rapidly developing science that makes use of modern (and very expensive) devices and supercomputers. This yields a huge stream of results: exoplanets, dark energy, gravitational waves, and the first close-range photos of Pluto. As a consequence, the astronomical picture of the world is constantly changing. However, many fundamental features of this picture have already been formed. We know that we live in an expanding Universe whose age is a little less than 14 billion years. We know how the nuclei of elements formed and are forming now. We can even observe different stages of star and planet system formation. We even manage to discern how planets are formed in discs around stars. Nevertheless, many questions and enigmas remain. What are dark matter and dark energy? How do different types of supernovae explode? What is the structure of black holes? And, finally, is there life somewhere else in the Universe and what can it look like? In this book, the well-known Russian astrophysicist and popularizer of science Sergei Popov systematizes conventional scientific notions of the Universe and simultaneously appeals to the latest discoveries and unsolved problems. (Alpina Publisher: tel. + 7 (495 120-07-04,

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+7 (800) 550-53-52, e-mail: shop@alpina.ru, URL https://www.alpinabook.ru/)

Surdin V G Astronomy: Popular Lectures (Moscow: Liteo, 2017) 288 pp. ISBN 978-5-00071-853-7.

This book presents full-length and edited versions of some lectures delivered in recent years to students of different specialties. They were based on the interdivisional course at M V Lomonosov Moscow State University, "Basic principles of astronomy". These lectures can be used as an introductory course for students of natural-science faculties (physicists, chemists, biologists, geographers, and geologists) and for mathematicians and engineers who have never learnt astronomy systematically but may need it in their work. The lectures will also be of some use to philologists, especially translators and editors, because they acquaint them with current astronomical terminology and very important notions from the field of cosmic sciences. The book will also be useful to physics teachers who teach astronomy in secondary school. It will also be interesting to those who love astronomy. The book is rich in illustrations (URL: http://Infm1.sai.msu.ru/ ~surdin/)

Konov V I, Ral'chenko V G, Bol'shakov A P, Vlasov I I, Ashkinazi E E, Kononenko V V, Kononenko T V, Obraztsova E D, Chernov A I, Tausenev A V, Arutyunyan N R, Fedotov P V, Rybin M G, Obraztsov P A *Carbon Photonics* (Ed. VIKonov) (Moscow: Nauka, 2017) 327 pp. ISBN 978-5-02-039997-6.

This book presents the results of studies in a new scientific area — carbon photonics. The subjects of the study are synthetic (so-called new carbon) materials: CVD-diamond, single-walled carbon nanotubes, and graphene. The technologies of their plasma-chemical synthesis are analyzed, as are the thermal and optical properties, the methods of control and modification, and the technique of processing predominantly with lasers. Different applications of the new carbon materials in photonics are demonstrated. The book is meant for research workers and engineers investigating carbon photonics, as well as students and postgraduates interested in achievements in this field. (Nauka Publishing House: tel. +7(495) 276-77-35, fax +7(499 724-89-24, e-mail: info@naukaran.com, URL: https://www.naukaran.com/)

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