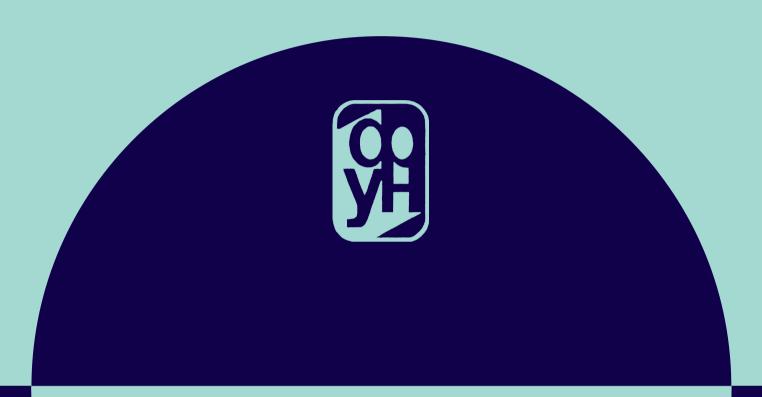
Physics-Uspekhi

Advances in Physical Sciences



January 2017 Volume 60, Number 1

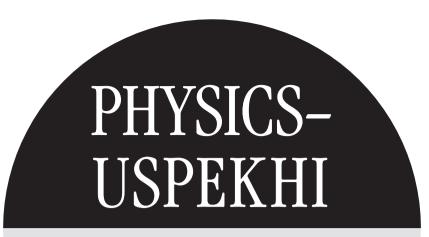
Translation of the Russian journal
Успехи физических наук, Uspekhi Fizicheskikh Nauk
January 2017, Volume 187, No. 1



Turpion

IOP Publishing





ISSN 1063-7869 (Print) ISSN 1468-4780 (Online)

CODEN: PHUSEY

Uspekhi Fizicheskikh Nauk

Editor Associate Editors

Valery A Rubakov

Lev P Pitaevskii, Oleg V Rudenko

Managing Editor Advisory Board

Maria S Aksent'eva Evgenii B Aleksandrov Fazly I Ataullakhanov Yurii V Gulyaev Sergei P Denisov Lev M Zelenyi

Aleksandr A Kaplyanskii Olga A Kocharovskaya Gennadii N Kulipanov Aleksandr G Litvak Gennadii A Mesyats Rashid A Sunyaev Vladimir E Fortov Aleksei R Khokhlov Anatolii M Cherepashchuk

Editorial Board

Petr I Arseev Vasily S Beskin Aleksandr E Bondar' Vadim V Brazhkin Sergei V Bulanov Mikhail A Vasil'ev Mikhail I Vysotskii Igor M Dremin Aleksei M Zheltikov Genrikh R Ivanitskii Dmitrii I Kazakov Vitalii V Kveder Nikolai N Kolachevskii Zakharii F Krasil'nik Evgenii A Kuznetsov Sergei A Nikitov Vladimir F Obraztsov Pavel N Pakhlov Konstantin A Postnov Vladimir I Ritus Grigorii I Rubtsov Mikhail V Sadovskii Aleksandr M Sergeev Boris M Smirnov Robert A Suris

Scientific and Staff Editors

MS Aksent'eva, EA Frimer, TB Larionova, TP Romanova, EV Zakharova

Uspekhi Fizicheskikh Nauk (Успехи Физических Наук, www.ufn.ru) publishes reviews of the current state of the most topical problems in physics and in associated fields under the general headings: reviews of topical problems, physics of our days, instruments and methods of investigation, methodological notes, from the history of physics, conferences and symposia, personalia, physics news on the Internet, and bibliography. The journal was founded in 1918 and is published monthly.

Dmitrii R Khokhlov

Evgenii M Churazov

Maria V Chekhova

Physics - Uspekhi

Scientific Editors

MS Aksent'eva, AM Semikhatov

English Language Editor

K Franchuk **Desk Editors**

AV Bobkov, NV Gribkova, OV Morgunova

Physics-Uspekhi (Advances in Physical Sciences) is the English edition of the Russian monthly journal Uspekhi Fizicheskikh Nauk. Translation into English started with Russian volume 66. From 1958 until 1992 the journal was published by American Institute of Physics under the title Soviet Physics - Uspekhi and in 1993 under its current title Physics - Uspekhi. Since 1994 Physics - Uspekhi has been published jointly by Uspekhi Fizicheskikh Nauk and Turpion Ltd. From the beginning of 1996 *Physics – Uspekhi* is being translated, typeset and edited in Moscow by Uspekhi Fizicheskikh Nauk (UFN), from 2009 published by Uspekhi Fizicheskikh Nauk, Moscow, printed by Page Bros, Norwich, UK.

Institutional subscription information (volume 60, 2017, monthly) For all countries, except the United States, Canada, Central and South America, the subscription rates are: Print + Online (1958 2017) £ 1877; Online only (1958 – 2017) £ 1689. Delivery is by airspeeded mail from the UK.

Orders, back issues, change of address to: Physics-Uspekhi, Journals Subscription Fulfilment, IOP Publishing, Temple Circus, Temple Way, Bristol BS16HG, United Kingdom

For the United States, Canada, Central and South America, the subscription rates are:

Print + Online (1958 – 2017) US \$3377; Online only (1958 – 2017) US \$ 3039. Delivery is by transatlantic airfreight and onward mailing. United States Postal Identification Statement Physics – Uspekhi, volume 60, published monthly. Periodicals Postage Paid at Continental Station, PA and additional mailing offices. POSTMASTER: Send orders, address changes to *Physics – Uspekhi*,

IOP Publishing, PO Box 320, Congers, NY 10920-0320, USA Online services: Since 2008 electronic access to the journal content

is hosted by IOP Publishing. All subscriptions to the journal include electronic access dating from the first English translation volume. The electronic version of the journal is available at http:/ iopscience.org/phu. All questions regarding online access should be sent to customer services at custserv@iop.org or custserv@turpion.ru

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form, or by any means, electronic, mechanical, photographic, recording, or otherwise, without the prior permission of Uspekhi Fizicheskikh Nauk.

Editorial Office: P N Lebedev Physical Institute, RAS, Leninskii prospekt 53, 119991 Moscow, Russian Federation Tel. (7-499) 132 62 65, (7-499) 132 63 48, (7-499) 190 34 52 Tel./Fax (7-499) 190 42 44. E-mail: ufn@ufn.ru

© 2017 Uspekhi Fizicheskikh Nauk and PN Lebedev Physical Institute of the Russian Academy of Sciences

© 2017 Uspekhi Fizicheskikh Nauk and PN Lebedev Physical Institute of the Russian Academy of Sciences

Russian original reference Usp. Fiz. Nauk Vol. 187 , pages	Contents	English translation reference Phys. Usp. Vol. 60 , pages
2	On the contest "Best reviews and articles published in Uspekhi Fizicheskikh Nauk [Physics – Uspekhi] (UFN) journal	in 2015"
3	Dark matter in galaxies A V Zasov, A S Saburova, A V Khoperskov, S A Khoperskov	3
45	Search for antimatter and dark matter and precision studies of cosmic ray fluxes on the International Space Station. AMS experiment. Results of four-year exposure Yu V Galaktionov	40
65	Neutron spectroscopy and strongly correlated electrons: a view from the inside P A Alekseev	58
99	Application of dynamic mass spectrometers for investigations in the field of thermonuclear synthesis N N Aruev	91
119	A drop jumps to weightlessness: a lecture demo V V Mayer, E I Varaksina, V A Saranin	108
125	Review of a book on the anniversary of the theory of the Berezinskii-Kosterlitz-Thouless transition—a book which proved to be a precursor of the 2016 Nobel Prize in physic V N Ryzhov	114 es
118	Physics news on the Internet Yu N Eroshenko	119

 \Diamond \Diamond

 \Diamond

In the next issue

Superconductivity in uranium ferromagnets V P Mineev

Material surface ablation produced by ultrashort laser pulses A A Ionin, S I Kudryashov, A A Samokhin

Third generation Cu-In-Ga-(S, Se) based solar inverters G F Novikov, M V Gapanovich

Possibilities of gas phase synthesis of diamond structures from mixtures of hydrogen and hydrocarbons

A K Rebrov

X-ray microscopy

V V Lider

2D printing technologies using graphene based materials I V Antonova

Life originated as a genetic code Yu N Korystov

Physics news on the Internet



1063-7869(2017)60:1;1-9