

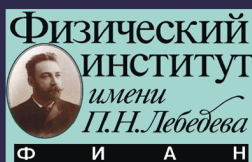
Physics–Uspekhi

Advances in Physical Sciences



November 2013
Volume 56, Number 11

Translation of the Russian journal
Успехи физических наук, Uspekhi Fizicheskikh Nauk
November 2013, Volume 183, No. 11



Turpion

IOP Publishing



PHYSICS- USPEKHI

ISSN 1063-7869 (Print)

ISSN 1468-4780 (Online)

CODEN: PHUSEY

Uspekhi Fizicheskikh Nauk

Editor

LV Keldysh *PN Lebedev Physical Institute,
Russian Academy of Sciences (RAS), Moscow*

First Deputy Editor

VA Rubakov *Institute for Nuclear Research, RAS, Moscow*

Associate Editors

LP Pitaevskii *PL Kapitza Institute for Physical Problems,
RAS, Moscow*

OV Rudenko *MV Lomonosov Moscow State University,
Moscow*

Managing Editor

MS Aksent'eva *Uspekhi Fizicheskikh Nauk, RAS, Moscow*

Editorial Board

EB Aleksandrov *All-Russian Research Center
'SI Vavilov State Optical Institute'*

PI Arseev *PN Lebedev Physical Institute, RAS, Moscow*

VS Beskin *PN Lebedev Physical Institute, RAS, Moscow*

VB Braginsky *MV Lomonosov Moscow State University,
Moscow*

YuV Gulyaev *Institute of Radioengineering and Electronics,
RAS, Moscow*

SP Denisov *Russian State Research Center*

'Institute for High Energy Physics'

IM Dremin *PN Lebedev Physical Institute, RAS, Moscow*

GR Ivanitskii *Institute of Theoretical and Experimental*

Biology, RAS, Pushchino, Moscow Region

AA Kaplyanskii *AF Ioffe Physico-Technical Institute,*

RAS, St.-Petersburg

GN Kulipanov *GI Budker Institute of Nuclear Physics,*

RAS, Novosibirsk

MB Mensky *PN Lebedev Physical Institute, RAS, Moscow*

GA Mesyats *PN Lebedev Physical Institute, RAS, Moscow*

LB Okun *Russian State Research Center*

'Institute of Theoretical and Experimental

Physics', Moscow

VI Ritus *PN Lebedev Physical Institute, RAS, Moscow*

MV Sadovskii *Institute of Electrophysics, Ural Branch of RAS,*

Ekaterinburg

BM Smirnov *Institute for High Temperatures, RAS, Moscow*

VE Fortov *Institute for High Energy Density,
RAS, Moscow*

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.

© 2013 Uspekhi Fizicheskikh Nauk and P N Lebedev Physical Institute of the Russian Academy of Sciences

Physics – Uspekhi

Scientific Editors

MS Aksent'eva, A Radzig, A M Semikhatov

English Language Editor

K Franchuk, *M.A., Carleton University, Ottawa, Canada*

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 56, 2013, monthly)

For all countries, except the United States, Canada, Central and South America, the subscription rates are: Print + Online (1958 – 2013) £ 1717; Online only (1958 – 2013) £ 1545; Single issue £ 172. Delivery is by air-speeded mail from the UK.

Orders, back issues, change of address to: Physics–Uspekhi, Journals Subscription Fulfilment, IOP Publishing, Temple Circus, Temple Way, Bristol BS1 6HG, United Kingdom

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

Print + Online (1958 – 2013) US \$3091; Online only (1958 – 2013)

US \$ 2782; Single issue US \$ 309. Delivery is by transatlantic

airfreight and onward mailing. **United States Postal Identification**

Statement Physics – Uspekhi, volume 56, 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

© 2013 Uspekhi Fizicheskikh Nauk and P N Lebedev Physical Institute of the Russian Academy of Sciences

Contents

1145	Electronic properties of pristine and modified single-walled carbon nanotubes M V Kharlamova	1047
1175	Fractional phenomenology of cosmic ray anomalous diffusion V V Uchaikin	1074
1225	T2K observation of muon-to-electron neutrino oscillations Yu G Kudenko	1120
1231	Bernstein's paradox of entangled quantum states A V Belinsky, A S Chirkin	1126
1237	The role of B B Kadomtsev's ideas in shaping the current understanding of turbulent transport O G Bakunin	1132
1255	In memory of Evgenii Pavlovich Mazets	1150
1224	Physics news on the Internet Yu N Eroshenko	1153

◇ ◇ ◇

In the next issue

Black holes in the presence of dark energy
E O Babichev, V I Dokuchaev, Yu N Eroshenko

Computer simulation of liquid metals
D K Belashchenko

Synchronization of delay-coupled oscillator networks
V V Klinshov, V I Nekorkin

On the problem of the interpretation of quantum physics
A A Grib

*Dynamics of frequency-modulated wave packets in optical guides
with complex-valued material parameters*
I O Zolotovskii, R N Minvaliev, D I Sementsov

Physics news on the Internet

Authors index to Vol. 56, 2013

Subject index to Vol. 56, 2013

*Concordance table of page numbers of papers
in the English and Russian editions*

