

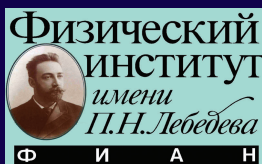
Physics–Uspekhi

Advances in Physical Sciences



September 2009
Volume 52, Number 9

Translation of the Russian journal
Успехи физических наук, Uspekhi Fizicheskikh Nauk
September 2009, Volume 179, No. 9



Turpion

IOP Publishing



PHYSICS- USPEKHI

Uspekhi Fizicheskikh Nauk

Editor

V L Ginzburg *PN Lebedev Physical Institute,
Russian Academy of Sciences (RAS), Moscow*

Associate Editors

L P Pitaevskii *PL Kapitza Institute for Physical Problems,
RAS, Moscow*
VA Rubakov *Institute for Nuclear Research, RAS, Moscow*
OV Rudenko *M V Lomonosov Moscow State University,
Moscow*

Managing Editor

M S Aksent'eva *Uspekhi Fizicheskikh Nauk, RAS, Moscow*

Editorial Board

E B Aleksandrov *All-Russian Research Center
'SI Vavilov State Optical Institute'
PN Lebedev Physical Institute, RAS, Moscow*
V S Beskin *M V Lomonosov Moscow State University,
Moscow*
V B Braginskii *PK Shternberg State Astronomical Institute,
Moscow State University, Moscow*
L P Grishchuk *Institute of Radioengineering and Electronics,
RAS, Moscow*
Yu V Gulyaev *Russian State Research Center
'Institute for High Energy Physics'
PN Lebedev Physical Institute, RAS, Moscow*
S P Denisov *Institute of Theoretical and Experimental
Biology, RAS, Pushchino, Moscow Region*
I M Dremin *A F Ioffe Physico-Technical Institute,
RAS, St.-Petersburg*
G R Ivanitskii *GI Budker Institute of Nuclear Physics,
RAS, Novosibirsk*
A A Kaplyanskii *PN Lebedev Physical Institute, RAS, Moscow*
G N Kulipanov *PN Lebedev Physical Institute, RAS, Moscow*
E G Maksimov *PN Lebedev Physical Institute, RAS, Moscow*
M B Menskii *PN Lebedev Physical Institute, RAS, Moscow*
G A Mesyats *Russian State Research Center
'Institute of Theoretical and Experimental
Physics', Moscow*
L B Okun' *PN Lebedev Physical Institute, RAS, Moscow*
VI Ritus *Institute of Electrophysics, Ural Branch of RAS,
Ekaterinburg*
M V Sadvovskii *Institute for High Temperatures, RAS, Moscow*
B M Smirnov *Institute for High Energy Density,
RAS, Moscow*
V E Fortov

Scientific and Staff Editors

M S Aksent'eva, EA Frimer, T P Romanova
T S Vaisberg, E V Zakharova

Uspekhi Fizicheskikh Nauk (Успехи Физических Наук, [www.ulf.n.ru](http://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.

© 2009 Uspekhi Fizicheskikh Nauk and P N Lebedev Physical Institute of the Russian Academy of Sciences

Physics – Uspekhi

Scientific Editors

M S Aksent'eva, A Radzig, A M Semikhatov

English Language Editor

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

Desk Editors

AV Bobkov, N V 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 52, 2009, monthly)

For all countries, except the United States, Canada, Central and South America, the subscription rates are: Print + Online (1999 – 2009) £ 1433; Print + Online with historic archive (1958 – 2009) £ 1543; Online only (1999 – 2009) £ 1290; Online only with historic archive (1958 – 2009) £ 1400; Single issue £ 143. Delivery is by air-speeded mail from the UK.

Orders, back issues, change of address to: Physics–Uspekhi, Journals Subscription Fulfilment, Institute of Physics Publishing Dirac House, Temple Back, Bristol BS1 6BE, United Kingdom

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

Print + Online (1999 – 2009) US \$2580; Print + Online with historic archive (1958 – 2009) US \$ 2778; Online only (1999 – 2009) US \$ 2322; Online only with historic archive (1958 – 2009) US \$ 2520; Single issue US \$ 258. Delivery is by transatlantic airfreight and onward mailing. **United States Postal Identification Statement** *Physics – Uspekhi*, volume 52, published monthly. Periodicals Postage Pending at Huntington Station, NY and at additional mailing offices. **POSTMASTER:** Send orders, address changes to *Physics – Uspekhi*, American Institute of Physics, Suite 1NO1, 2 Huntington Quadrangle, Melville, NY 11747-4502, USA.

Online services: Since 2009 electronic access to the journal content is hosted by IOP Publishing. The electronic version of the journal is available at <http://www.iop.org/journals/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

Leninskii prospekt 15, 119071 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

© 2009 Uspekhi Fizicheskikh Nauk and P N Lebedev Physical Institute of the Russian Academy of Sciences

Contents

Structure of silicon/oxide and nitride/oxide interfaces V A Gritsenko	869
Electron–proton separation in calorimetry experiments directly measuring the composition and energy spectrum of cosmic rays S A Voronov, S V Borisov, A V Karelin	879
Solid-solid thermal contact problems: current understanding S Yu Mesnyankin, A G Vikulov, D G Vikulov	891
Hydrodynamic and hydromagnetic stability of the Couette flow D A Shalybkov	915
Force acting on a substance in an electromagnetic field V P Makarov, A A Rukhadze	937
Nanoplasmonics and metamaterials (Scientific session of the Division of Physical Sciences, Russian Academy of Sciences, 27 April 2009): contribution by S G Tikhodeev, N A Gippius; T V Shubina, S V Ivanov, A A Toropov, P S Kop'ev; V V Kurin; A N Lagarkov, A K Sarychev, V N Kissel, G Tartakovsky	945
New books on physics and related sciences E V Zakharova	973
Physics news on the Internet Yu N Eroshenko	975

◇ ◇ ◇

In the next issue

Study of layered superconductors in the framework of electron–phonon coupling theory
I N Askerzade

High and ultra-high pressure research on phase transformations in 3d-metal oxides: current progress
I S Lyubutin, A G Gavriiliuk

Fractional differential approach to dispersive transport in semiconductors
R T Sibatov, V V Uchaikin

On mass transfer thermodynamics in nonisothermal molecular liquid mixtures
S N Semenov, M E Schimpf.

The Solar system, current understanding and future prospects
L M Zelenyi, A V Zakharov, L V Ksanfomaliti.

Nikolai Vasil'evich Karlov (on his 80th birthday)

Isaak Markovich Khalatnikov (on his 90th birthday)

Physics news on the Internet

