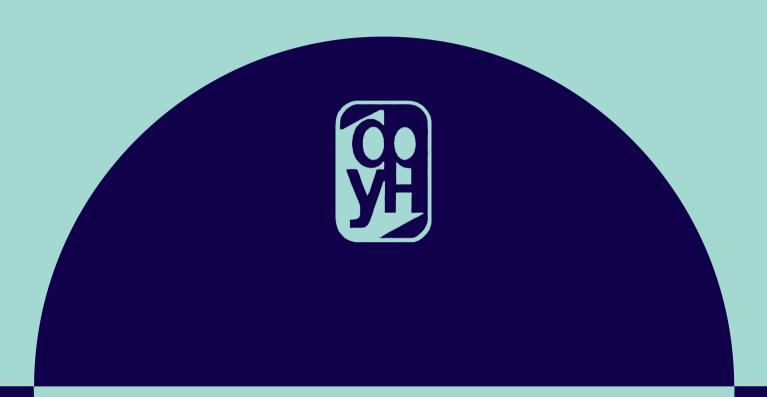
Physics-Uspekhi

Advances in Physical Sciences



October 2009 Volume 52, Number 10

Translation of the Russian journal

Успехи физических наук, Uspekhi Fizicheskikh Nauk

October 2009, Volume 179, No. 10



Tur**p**ion

IOP Publishing



ISSN 1063-7869

CODEN: PHUSEY

PHYSICS-USPEKHI

Uspekhi Fizicheskikh Nauk

Editor

V L Ginzburg PNLebedev 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 MV Lomonosov Moscow State University,

Managing Editor

MSAksent'eva Uspekhi Fizicheskikh Nauk, RAS, Moscow

Editorial Board

E B Aleksandrov All-Russian Research Center

'SI Vavilov State Optical Institute'

V S Beskin PNLebedev Physical Institute, RAS, Moscow V B Braginskiĭ MV Lomonosov Moscow State University,

Moscow

L P Grishchuk PK Shternberg State Astronomical Institute,

Moscow State University, Moscow

YuVGulyaev Institute of Radioengineering and Electronics,

RAS, Moscow

Russian State Research Center S P Denisov

'Institute for High Energy Physics' I M Dremin PNLebedev Physical Institute, RAS, Moscow

GR Ivanitskii Institute of Theoretical and Experimental Biology, RAS, Pushchino, Moscow Region

A A Kaplyanskii A F Ioffe Physico-Technical Institute,

RAS, St.-Petersburg

G N Kulipanov GIBudker Institute of Nuclear Physics,

RAS, Novosibirsk

PNLebedev Physical Institute, RAS, Moscow EG Maksimov M B Menskiĭ PNLebedev Physical Institute, RAS, Moscow PNLebedev Physical Institute, RAS, Moscow GA Mesyats

LBOkun' Russian State Research Center

Institute of Theoretical and Experimental

Physics', Moscow

V I Ritus PNLebedev Physical Institute, RAS, Moscow M V Sadovskii Institute of Electrophysics, Ural Branch of RAS,

Ekaterinburg

Institute for High Temperatures, RAS, Moscow B M Smirnov V E Fortov

Institute for High Energy Density,

RAS, Moscow

Scientific and Staff Editors

MS Aksent'eva, EA Frimer, TP Romanova

TS Vaĭsberg, 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.

© 2009 Uspekhi Fizicheskikh Nauk and PN 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 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 airspeeded 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 BS16BE, 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, withoutthe 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 PN Lebedev Physical Institute of the Russian Academy of Sciences

Contents

Study of layered superconductors in the theory of an electron-phonon coupling mechanism I N Askerzade	977
Research on phase transformations in 3d-metal oxides at high and ultrahigh pressure: state of the art I S Lyubutin, A G Gavriliuk	989
Fractional differential approach to dispersive transport	
in semiconductors R T Sibatov, V V Uchaikin	1019
Mass transport thermodynamics in nonisothermal molecular liquid mixtures	
S N Semenov, M E Schimpf	1045
The Solar System: current understanding and future prospects L M Zelenyi, A V Zakharov, L V Ksanfomality	1056
Nikolai Vasil'evich Karlov (on his 80th birthday)	1077
Isaak Markovich Khalatnikov (on his 90th birthday)	1079
Physics news on the Internet Yu N Eroshenko	1081
\Diamond \Diamond	

In the next special issue

P N Lebedev Physical Institute RAS — 75 years:

P N Lebedev Physical Institute RAS: past, present and future

G A Mesyats

Vavilov-Cherenkov radiation: discovery and applications

B M Bolotovsky

Toroidal ordering in crystals

Yu V Kopaev

RadioAstron: a radio telescope many times the size of the Earth.

Research program

N V Kardashev

Cosmic ray investigations

G T Zatsepin, T M Roganova

Spectroscopy: from atoms to space objects

A V Masalov

Laser frequency standards at the P N Lebedev Physical Institute

V L Velichanskii, M A Gubin

P N Lebedev Physical Institute Astro Space Center Pushchino Radio Astronomy Observatory: yesterday, today and tomorrow

R D Dagkesamanskii

Landau and modern physics

V L Pokrovsky

"The most remarkable of the scientists"

(on the occasion of the 130th birthday of L I Mandelstam)

V V Ragulsky

School of Modern Astrophysics — 2009

V S Beskin

Physics news on the Internet

New books on physics and related sciences



1063-7869(2009)52:10:1-7