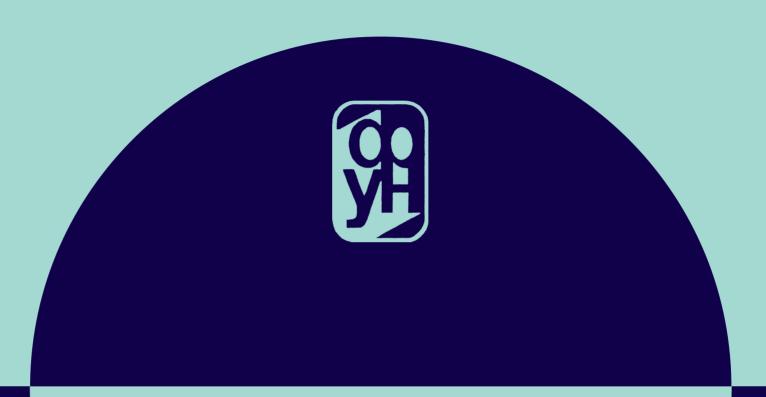
Physics-Uspekhi

Advances in Physical Sciences



October 2015 Volume 58, Number 10

Translation of the Russian journal

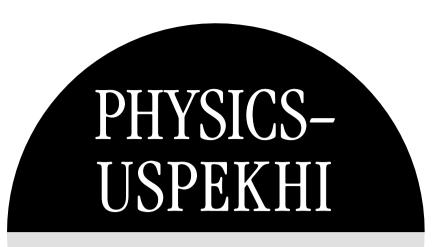
Успехи физических наук, Uspekhi Fizicheskikh Nauk

October 2015, Volume 185, No. 10



Turpion
IOP Publishing





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

CODEN: PHUSEY

Uspekhi Fizicheskikh Nauk

Editor

LV Keldysh PNLebedev Physical Institute,

Russian Academy of Sciences (RAS), Moscow

First Deputy Editor

VA Rubakov Institute for Nuclear Research, RAS, Moscow

Associate Editors

L P Pitaevskii PL Kapitza Institute for Physical Problems,

RAS, Moscow

OV Rudenko MV Lomonosov Moscow State University,

Moscow

Managing Editor M S Aksent'eva

Yeva Uspekhi Fizicheskikh Nauk, RAS, Moscow

Editorial Board

E B Aleksandrov All-Russian Research Center 'SI Vavilov State Optical Institute'

PI Arseev PNLebedev Physical Institute, RAS, Moscow VS Beskin PNLebedev Physical Institute, RAS, Moscow VB Braginsky MV Lomonosov Moscow State University,

Moscow

YuVGulyaev Institute of Radioengineering and Electronics,

RAS, Moscow

S P Denisov Russian State Research Center

'Institute for High Energy Physics'

I M Dremin
GR Ivanitskii

PNLebedev Physical Institute, RAS, Moscow
Institute of Theoretical and Experimental
Biology, RAS, Pushchino, Moscow Region

A A Kaplyanskii A F Ioffe Physico-Technical Institute,

RAS, St.-Petersburg

GN Kulipanov GI Budker Institute of Nuclear Physics,

RAS, Novosibirsk

M B Mensky
GA Mesyats

PNLebedev Physical Institute, RAS, Moscow
PNLebedev Physical Institute, RAS, Moscow

LBOkun Russian State Research Center

Institute of Theoretical and Experimental

Physics', Moscow

VIRitus PN Lebedev Physical Institute, RAS, Moscow MV Sadovskii Institute of Electrophysics, Ural Branch of RAS,

Ekaterinburg

BM Smirnov Institute for High Temperatures, RAS, Moscow

Institute for High Energy Density,

RAS, Moscow

Scientific and Staff Editors

V E Fortov

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.

© 2015 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 58, 2015, monthly) For all countries, except the United States, Canada, Central and South America, the subscription rates are: Print + Online (1958 – 2015) £ 1786; Online only (1958-2015) £ 1607; Single issue £ 179. 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 BS16HG, United Kingdom

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

Print + Online (1958 – 2015) US \$3215; Online only (1958 – 2015) US \$ 2894; Single issue US \$ 322. Delivery is by transatlantic airfreight and onward mailing. *United States Postal Identification Statement Physics – Uspekhi*, volume 58, 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, Leninskiĭ 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

© 2015 Uspekhi Fizicheskikh Nauk and PN Lebedev Physical Institute of the Russian Academy of Sciences

Russian original reference Usp. Fiz. Nauk Vol. 185 , pages	Contents	English translation eference Phys. Usp. Vol. 58 , pages
1009	Formation and properties of metallic atomic contacts A L Klavsyuk, A M Saletsky	933
1031	Photon far-infrared and submillimeter array detectors I G Neizvestnyi, A E Klimov, V N Shumsky	952
1043	Universality of hadron cross sections at ultrahigh energies V V Anisovich	963
1063	What's new in magnetism? (Scientific session of the Physical Sciences) Division of the Russian Academy of Sciences, 27 May 2015)	nces 968
1064	Ultrafast optomagnetism A M Kalashnikova, A V Kimel, R V Pisarev	969
1077	Micromagnetism and topological defects in magnetoelectric media A P Pyatakov, A S Sergeev, E P Nikolaeva, T B Kosykh, A V Nikolaev, K A Zvezdin, A K Zvezdin	981
1089	Dynamic magnetoelectric phenomena with electromagnons in rare-earth borate multiferroics A A Mukhin, A M Kuzmenko, V Yu Ivanov, A G Pimenov, A M Shuvaev, V E Dziom	993
1099	Magnonics: a new research area in spintronics and spin wave electronics S A Nikitov, D V Kalyabin, I V Lisenkov, A N Slavin, Yu N Barabanenkov, S A Osokin, A V Sadovnikov, E N Beginin, M A Morozova, Yu P Sharaevsky, Yu A Filimon Yu V Khivintsev, S L Vysotsky, V K Sakharov, E S Pavlov	1002 nov,
1048	Physics news on the Internet Yu N Eroshenko	1029
	\Diamond \Diamond	

In the next issue

Transient dynamics of perturbations in astrophysical disks

D N Razdoburdin, V V Zhuravlev

Amazing growth of helium crystal facets

V L Tsymbalenko

Fundamental interactions involving neutrons and neutrinos: reactor-based studies led by the Petersburg Nuclear Physics Institute (National Research Center 'Kurchatov Institute') [PNPI (NRC KI)]

A P Serebrov

Aperiodic multilayer structures in soft X-ray optics

A S Pirozhkov, E N Ragozin

Elastic properties of solids at high pressure

Yu Kh Vekilov, O M Krasilnikov, A V Lugovskoy

Gravitational mass of the photons

R I Khrapko

Lagrange equations of motion of particles and photons in the Schwarzschild field V I Ritus

Problems of information support in scientific research

V G Shamaev, A B Gorshkov

Physics news on the Internet



1063-7869(2015)58:10;1-R