

Physics–Uspekhi

Advances in Physical Sciences



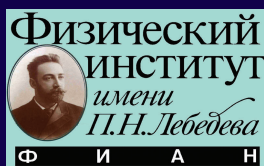
January 2022

Volume 65, Number 1

Translation of the Russian journal

Успехи физических наук, Uspekhi Fizicheskikh Nauk

January 2022, Volume 192, No. 1



Turpion

IOP Publishing



PHYSICS- USPEKHI

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

CODEN: PHUSEY

Uspekhi Fizicheskikh Nauk

Editor Valery A Rubakov
Associate Editors Lev P Pitaevskii, Oleg V Rudenko
Managing Editor Maria S Aksent'eva
Advisory Board 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
Aleksei R Khokhlov
Anatolii M Cherepashchuk

Editorial Board

Petr I Arseev
Vasily S Beskin
Aleksandr E Bondar'
Vadim V Brazhkin
Mikhail A Vasil'ev
Mikhail I Vysotskii
Igor M Dreminev
Aleksei M Zheltikov
Genrikh R Ivanitskii
Dmitrii I Kazakov
Vitalii V Kveder
Nikolai N Kolachevskii
Zakhar'ii 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
Dmitrii R Khokhlov
Maria V Chekhova
Evgenii M Churazov

Scientific and Staff Editors

MS Aksent'eva, EA Frimer, TB Larionova, TG Orekhova,
TP Romanova, EV 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.

Physics – Uspekhi

Scientific Editors
MS Aksent'eva, VL Derbov, A M Semikhatov
English Language Editor
K Franchuk
Desk Editors
AV Bobkov, AN Gribkov, MA 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 65, 2022, monthly) For all countries, except the United States, Canada, Central and South America, the subscription rates are: Print + Online (1958 – 2022) £ 2052; Online only (1958 – 2022) £ 1846. 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 – 2022) US \$3695; Online only (1958 – 2022) US \$ 3325. Delivery is by transatlantic airfreight and onward mailing.
United States Postal Identification Statement *Physics – Uspekhi*, volume 65, 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 customerservices@iopublishing.org

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) 190 34 52
Tel. / Fax (7-499) 190 42 44.
E-mail: ufn@ufn.ru

Contents

ii	2022 year — the International Year of Basic Sciences for Sustainable Development. To the readers of “Physics–Uspekhi”	1
3	Topological superconductivity and Majorana states in low-dimensional systems V V Val’kov, M S Shustin, S V Aksenov, A O Zlotnikov, A D Fedoseev, V A Mitskan, M Yu Kagan	2
45	Resonant scattering of electromagnetic waves by small metal particles: a new insight into the old problem M I Tribelsky, A E Miroshnichenko	40
69	Wavelets for the space-time structure analysis of physical fields P G Frick, D D Sokoloff, R A Stepanov	62
100	Discovery of the relativistic Schrödinger equation K Barley, J Vega-Guzmán, A Ruffing, S K Suslov	90
115	Gennadii Nikolaevich Kulipanov (on his 80th birthday)	104
117	Evgenii Mikhailovich Churazov (on his 60th birthday)	106
119	Physics news on the Internet Yu N Eroshenko	108

◇ ◇ ◇

In the next issue

Localized excitons and trions in semiconductor nanosystems
M A Semina, R A Suris

Laser solitons: topological and quantum phenomena
N A Veretenov, N N Rosanov, S V Fedorov

State of the art in dissociative electron attachment spectroscopy and its prospects
S A Pshenichnyuk, N L Asfandiarov, A S Vorob’ev, Š Matejčík

Compressible vortex structures and their role in the onset of hydrodynamic turbulence
D S Agafontsev, E A Kuznetsov, A A Mailybaev, E V Sereshchenko

In memory of Yurii Alekseevich Trutnev

In memory of Vadim L’vovich Gurevich

Physics news on the Internet
Yu N Eroshenko

