

Physics–Uspekhi

Advances in Physical Sciences



**February 2023
Volume 66, Number 2**

Translation of the Russian journal
Успехи физических наук, Uspekhi Fizicheskikh Nauk

February 2023, Volume 193, No. 2



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

CODEN: PHUSEY

PHYSICS-USPEKHI

Uspekhi Fizicheskikh Nauk

Uspekhi Fizicheskikh Nauk (UFN) (*Успехи физических наук (УФН)*, 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.

Editor-in-Chief Oleg V Rudenko

Managing Editor Maria S Aksent'eva

Advisory Board Evgenii B Aleksandrov
Fazly I Ataullakhhanov
Yuri V Gulyaev
Sergei P Denisov
Lev M Zelenyi
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 Dremin
Aleksei M Zheltikov
Genrikh R Ivanitskii
Dmitrii I Kazakov
Vitalii V Kveder
Nikolai N Kolachevskii
Zakharii 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

Physics – Uspekhi

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.

Scientific Editors
M S Aksent'eva, V L Derbov, A M Semikhatov

English Language Editor
K Franchuk

Scientific and Staff Editors
M S Aksent'eva, E A Frimer, T B Larionova,
T P Romanova, E V Zakharova

Desk Editors
AV Bobkov, N V Gribkova, M A Morgunova

Online services
The electronic version of the journal is available at <http://ufn.ru/en/> and <http://iopscience.org/phu>. All questions regarding online access should be sent to customer services at ufn@ufn.ru and customerservices@ioppublishing.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

113	General relativity effects in precision spin experimental tests of fundamental symmetries S N Vergeles, N N Nikolaev, Yu N Obukhov, A Ya Silenko, O V Teryaev	109
155	Rogue waves in the sea: observations, physics, and mathematics A V Slunyaev, D E Pelinovsky, E N Pelinovsky	148
182	Spectroscopy of the interaction of a low-energy electron beam with organic luminescent molecules A V Kukhta, S M Kazakov	173
192	Diffusive methods of isotope separation in plasma D A Dolgolenko, E P Potanin	182
206	NICA Booster: a new-generation superconducting synchrotron A V Butenko, O I Brovko, A R Galimov, E V Gorbachev, S A Kostromin, V N Karpinsky, I N Meshkov, V A Monchinskiy, A O Sidorin, E M Syresin, G V Trubnikov, A V Tuzikov, A V Philippov, H G Khodzhibagyan	195
227	In memory of Lev Petrovich Pitaevskii	213
229	In memory of Yurii Mikhailovich Romanovsky	215
231	In memory of Valery Anatol'evich Rubakov	217
226	Physics news on the Internet Yu N Eroshenko	219

◊ ◊ ◊

In the next issue

Nonlocal (fractional-differential) model of cosmic ray transport in the interstellar medium
V V Uchaikin, A D Erlykin, R T Sibatov

Optical nanoresonators
V V Klimov

Universal structural properties of three-dimensional and two-dimensional melts
B A Klumov

Galvanomagnetic and thermomagnetic phenomena in thin metal CoPt films
Yu M Kuznetsov, M V Dorokhin, A V Zdoroveyshchev,
A V Kudrin, P B Demina, D A Zdoroveyshchev

Yuriii Nikolaevich Kul'chin (on his 70th birthday)

Rashid Alievich Sunyaev (on his 80th birthday)

Physics news on the Internet