

# CONTENTS

VOLUME 52

NUMBER 1

1997

## MOSCOW UNIVERSITY PHYSICS BULLETIN

Pages  
Russian/English

On bifurcation of the amplitude of forced Alfvén oscillations. S.A. Markovskii .....	3	1
Finslerian kinematic transformations between moving reference frames. G.S. Asanov ....	6	6
Theory of NMR correlation experiments with relayed coherence transfer. V.S. Tumanov	9	10
Neutrino oscillations in a magnetized neutron star with consideration for the realistic equation of state. A.M. Egorov, G.G. Likhachev, A.I. Studenikin .....	12	14
Calculation of fundamental frequencies and radiative losses of open dielectric resonators. A.A. Usankin .....	16	21
Radiative decay of $b$ -quark in a non-Abelian chromomagnetic field. A.E. Grigoruk and V.Ch. Zhukovskii .....	20	27
Ray diffusion in anisotropic media. V.D. Gusev and O.K. Vlasova .....	24	33
Intermittence of structural states of laser beams on near-the-ground paths. T.I. Arsenyan, L.S. Kornienko, P.V. Korolenko, E.A. Kulyagina, G.V. Petrova, and N.N. Fedotov	27	38
Excess noise in suspensions of torsion pendulums. A.Yu. Ageev and V.P. Mitrofanov ...	30	43
Phase stability in the Ginzburg–Devonshire model. G.V. Belokopytov .....	34	49
Manifestation of structural features in the cation sublattice of the 2212-type single crystals in Raman scattering. L.I. Leonyuk and G.-Yu. Babonas .....	39	56
Water basin heat losses under the conditions of free convection. Ya.L. Aleksandrov, E.P. Anisimova, S.N. Dikarev, A.A. Speranskaya, and O.A. Speranskaya .....	49	68
Correlation between the Earth’s global magnetic and gravity fields. N.A. Chuikova and N.V. Alakhverdova .....	52	72
Motion of poles of the Earth’s principal axes of inertia due to Earth’s rotational deformation. Yu.V. Barkin .....	57	80
Effect of gyroscope plane inclination on the accuracy of determination of the Earth’s rotation parameters. V.E. Zharov, S.N. Markova, and M.V. Sazhin .....	60	86
Hierarchical star clusters with maximum population. V.G. Surdin .....	63	90
<b><u>Brief Communications</u></b>		
Application of Lanczos-type methods to compute the waveguide modes. A.N. Bogolyubov and A.L. Delitsyn .....	69	96
Radiation-induced shift of the ground-state energy of an electron in a static magnetic field in (2+1)-dimensional quantum electrodynamics. I.M. Ternov, A.V. Borisov, and K.V. Zhukovskii .....	71	99
Structure of highly anisotropic laser speckle patterns. Yu.V. Vasiliev, E.F. Kuritsyna, and A.E. Lukyanov .....	73	102

# CONTENTS

VOLUME 52

NUMBER 2

1997

## MOSCOW UNIVERSITY PHYSICS BULLETIN

Pages  
Russian/English

### Theoretical and Mathematical Physics

- Electromagnetic radiation absorption and reaction rates in partially ionized plasma.  
M.A. Drofa, L.S. Kuzmenkov, and S.G. Maximov ..... 3 1

### Atomic and Nuclear Physics

- A model for describing cross sections of photoneutron reactions on heavy weakly deformed nuclei. S.S. Borodina, B.S. Ishkhanov, and V.I. Mokeev ..... 6 7

### Optics and Spectroscopy

- Slow induction of fluorescence of bean leaves on their treatment with  $\text{KH}_2\text{PO}_4$  solutions.  
S.A. Dovyd'kov and V.A. Karavaev ..... 14 13
- About possible origin of continual emission bands recorded in spectra of a plasma containing heavy inert gases doped with sulfur trioxide. I.S. Lakoba, S.P. Chernov, and P.B. Essel'bakh ..... 17 18

### Solid State Physics

- Temperature and concentration dependences of  $\text{Gd}_{1-x}\text{Zr}_x\text{Co}_2$  exchange and zone magnetostriiction. S.A. Nikitin, A.K. Kupriyanov, and Z.S. Umhaeva ..... 20 23
- The role of protons in charging the semiconductor surface. V.B. Zaitsev, V.F. Kiselev, D.I. Ol'shanskii, and G.S. Plotnikov ..... 24 29
- Photoinduced effects in  $\alpha\text{-Si:H}$  films at elevated temperatures. I.A. Kurova, N.N. Ormont, and D.V. Senashenko ..... 28 35
- Ascending diffusion in hydrogen-saturated palladium-samarium alloys. G.P. Revkevich, M.K. Mitkova, and A.A. Katsnel'son ..... 30 39

### Geophysics

- Interaction of wind waves with the atmosphere and the field of surface heterogeneities in the coastal zone. E.P. Anisimova, V.L. Lebedev, K.V. Pokazeev, and A.A. Speranskaya ..... 33 44
- Estimation of the coefficient of turbulent diffusion for a solid impurity in a suspension flow. Yu.G. Pyrkin, I.B. Romanova, and M.A. Silayev ..... 38 50
- Internal gravitational and magnetic fields in the analysis of polar oscillations of the Earth's inner core. N.A. Chuikova, S.A. Kazaryan, and S.L. Pasyuk ..... 40 53
- Polarization effects and the baroelectric field. V.I. Grigor'ev and V.S. Rostovskii ..... 44 60

### Astronomy

- Ionization of hydrogen in optically dense atmospheric layers of cool stars. E.A. Bruevich and N.A. Katysheva ..... 48 66

## Brief Communications

### Theoretical and Mathematical Physics

Finslerian consequences of special relativistic approach versus Mansouri–Sexl test theory. G.S. Asanov .....	52	73
Calculation of processes in inhomogeneous plates under local thermal actions. G.N. Medvedev and B.I. Morgunov .....	54	76
Topological self-action in the space $M_2 \times V_2$ . Yu.V. Grats and A.B. Lavrent'ev .....	55	78
Higgs boson associative production by leptons in the field of an electromagnetic wave. K.V. Zhukovsky and P.A. Eminov .....	57	81
On electron polarization in a pulsed electromagnetic field. A.E. Lobanov .....	59	85

### Atomic and Nuclear Physics

Detection of neutrons and $\gamma$ -quanta under laboratory conditions and their separation by the scintillation pulse shape in CsI(Tl). A.V. Bogomolov and I.N. Myagkova .....	61	88
---	----	----

### Radiophysics

Three-dimensional radiometric model of a periodically perturbed water surface in the millimeter wave range and its experimental verification. V.V. Gladun, S.E. Petukhov, Yu.A. Pirogov, and D.A. Tishchenko .....	63	92
--	----	----

### Optics and Spectroscopy

Field distribution in the focal area of the Talbot cylindrical cavity. V.P. Kandidov and A.V. Kondrat'ev .....	66	96
--	----	----

### Geophysics

Directivity of dispersive tsunami radiation and specific features of sea floor motion in the focus area. M.A. Nosov, S.V. Mironyuk, and N.K. Shelkovnikov .....	68	99
---	----	----

# CONTENTS

VOLUME 52

NUMBER 3

1997

## MOSCOW UNIVERSITY PHYSICS BULLETIN

Pages  
Russian/English

### Theoretical and Mathematical Physics

- Foundations of possibility theory. Methods of optimal estimation and decision making.  
1. Measure of Possibility: Definition and Properties. Yu.P. Pyt'ev ..... 3 1
- Polarization in the  $p\bar{p} \rightarrow e\bar{e}$  process and quasi-nuclear bound state. V.A. Meshcheryakov,  
G.V. Meshcheryakov, and Chan Kuang Tuet ..... 7 7
- On interpretation of spin effects in Čerenkov radiation. I.M. Ternov and A.V. Borisov .. 9 10

### Radiophysics

- Electrothermal instability of oscillations in temperature-sensitive resonance systems.  
G.V. Belokopytov ..... 11 15
- Theory of pulse NMR dept processes. V.S. Tumanov ..... 15 21

### Optics and Spectroscopy

- Diagnostics of vibrational temperatures in CO<sub>2</sub> lasers by the gain of overlapping lines of  
different vibrational bands. V.A. Spazhakin ..... 18 26
- Investigation of optical properties of photographic emulsions by pulse optoacoustic method.  
L.A. Aslanov, V.N. Zakharov, A.A. Karabutov, and N.B. Podymova ..... 25 30

### Acoustics and Molecular Physics

- Density restoration in the vicinity of a plane shock wave front by the shape of the schlieren  
signal. V.I. Ivanov, G.I. Singaevskaya, E.N. Fomenko, and F.V. Shugaev ..... 30 38

### Solid State Physics

- PrFe<sub>5</sub> structure in Pr-Fe system. E.A. Rykova, N.A. Khatanova, and A.S. Ilyushin ..... 33 43
- Short-range order in Fe-5 at.% Re alloy. V.M. Silonov and L. Enkhtor ..... 37 49
- To the theory of superconductivity in high-temperature superconductors. A.V. Vedyayev,  
A.M. Savchenko, and A.V. Stefanovich ..... 39 52
- Low-frequency dielectric dispersion and pyroelectric effect in ferroelectric vinylidene  
fluoride-trifluoroethylene copolymer in phase transitions. K.A. Verkhovskaya,  
N.D. Gavrilova, V.K. Novik, I.A. Malyshkina, and T.B. Frolova ..... 41 55
- Effect of crystallite size on optical spectra of diamond powders and polycrystalline films.  
A.N. Obraztsov, T. Izumi, H. Okushi, H. Watanabe, and I.Yu. Pavlovsky ..... 45 61

### Geophysics

Effect of water mass aeration on vertical temperature distribution in the near-the-water layer of the atmosphere. E.P. Anisimova, S.N. Dikarev, A.A. Speranskaya, and O.A. Speranskaya .....	49	67
Effect of water surface pollution by petroleum products on the formation of Langmuir circulations and the energy exchange between a basin and the atmosphere. N.S. Blokhina and A.E. Ordanovich .....	52	71
Experimental investigations of spatial structure of traveling ionospheric disturbances. V.D. Gusev, A.G. Vologdin, and D.V. Kiryanov .....	56	77

### Discussion

#### Atomic and Nuclear Physics

On the kink in the energy spectrum of cosmic rays. N.F. Gorshkov .....	59	82
--	----	----

#### Brief Communications

#### Theoretical and Mathematical Physics

Radiative shift of neutrino energy in a magnetized electron-positron gas. P.A. Eminov, V.Yu. Grishina .....	62	86
Approximate calculation of Green's function for the Poisson equation on space $E_{D-2} \times V_2$ . Yu.V. Grats and A.B. Lavrent'ev .....	63	89

#### Radiophysics

Still parametric solitons in periodically nonuniform media with quadratic nonlinearity. S.V. Polyakov and A.P. Sukhorukov .....	65	92
---	----	----

#### Solid State Physics

Hydrogen-induced nonequilibrium oscillating phase transitions in solid-state open Pd-Sm-H systems and Belousov-Zhabotinskii waves. A.A. Katsnel'son, G.P. Revkevich, and V.M. Avdyukhina .....	68	96
--	----	----

# CONTENTS

VOLUME 52

NUMBER 4

1997

## MOSCOW UNIVERSITY PHYSICS BULLETIN

Pages  
Russian/English

### Theoretical and Mathematical Physics

- Foundations of possibility theory. Methods of optimal estimation and decision making.  
2. Measure of necessity: definition, properties, integration over possibility and  
necessity. Yu.P. Pyt'ev ..... 3 1
- On a mathematical model of immunology. O.S. Vasiliev, V.B. Glasko, Yu.V. Glasko,  
V.M. Zemskov, and S.V. Rodionov ..... 7 7
- Propagation of weakly nonlinear plasma waves in periodically inhomogeneous structures.  
I.M. Aleshin ..... 11 14

### Atomic and Nuclear Physics

- On mechanism of formation of energy spectrum of cosmic ray protons. Yu.A. Popov,  
S.N. Sidorenko, A.P. Chernyaev, and Lissuk Daniel ..... 14 18

### Radiophysics

- On theory of cascade energy exchange between an electron and an open resonator field.  
Yu.K. Alekseev, I.Yu. Krasovskaya, and A.P. Sukhorukov ..... 16 22

### Optics and Spectroscopy

- Optimization of film thickness and thermal diffusivity measurement by thermal wave  
method. A.A. Karabutov, V.V. Klevitsky, A.P. Kubyshkin, and V.Ya. Panchenko ..... 20 28
- A spectrophotometric study of thin films inhomogeneity. Yu.A. Bobrovnikov, A.V. Kozar',  
K.V. Popov, A.N. Tikhonov, A.V. Tikhonravov, and M.K. Trubetskov ..... 24 35

### Solid-State Physics

- Mobility of samarium atoms in hydrogen-saturated palladium-samarium alloy.  
G.P. Revkevich, M.K. Mitkova, and A.A. Katsnelson ..... 27 40
- Low-temperature electron mobilities in subbands of dimensional quantization in  
combined-doped GaAs/Al<sub>x</sub>Ga<sub>1-x</sub>As heterostructures. R.A. Lunin, V.G. Kytin,  
V.A. Kulbachinsky, and G.A. Mironova ..... 31 45
- Extraordinary Nernst-Ettingshausen effect in magnetic granular alloys. A.V. Kalitsov,  
M.G. Chshiev, and N.I. Tsidaeva ..... 35 51

### Geophysics

- Structure of intense convective humid-type air vortices. E.P. Anisimova, A.M. Nikolaev,  
A.A. Speranskaya, and O.N. Chernyshev ..... 38 56
- Resonance three-wave interactions of seismic waves in viscoelastic geomeia. S.A. Arseniev  
and N.K. Shelkovnikov ..... 41 60

### Astronomy

- Higher order disturbances in three-body stellar problem. N.A. Solovaya ..... 47 64

**Brief Communications**

**Theoretical and Mathematical Physics**

Calculation of matched transducer between two coaxial oval waveguides. A.G. Sveshnikov, A.N. Bogolyubov, and D.V. Minaev .....	51	71
--	----	----

**Radiophysics**

Competition of self-localization and delocalization processes of two-dimensional waves in a nonlinear grating. A.P. Sukhorukov and A.V. Churilova .....	54	77
---	----	----

**Optics and Spectroscopy**

The nature of low-temperature peak in delayed fluorescence thermograms of leaves. A.V. Gushchin and A.K. Kukushkin .....	56	81
Spatial quantization of edge laser speckles. Yu.V. Vasil'ev, E.F. Kuritsyna, and A.E. Luk'yanov .....	59	85
Diffraction phenomena in wave packet propagation and focusing. Yu.E. Dyakov .....	61	88
Dynamics of channel shape and depth in punching holes by laser beam. A.V. Nesterov, V.G. Niz'ev, and O.A. Novodvorskii .....	64	93

**Acoustics and Molecular Physics**

Absorption of longitudinal acoustic waves in polycrystalline titanium in the temperature range from 120 to 220 K. A.I. Korobov and A.N. Ekonomov .....	66	97
--	----	----

# CONTENTS

VOLUME 52

NUMBER 5

1997

## MOSCOW UNIVERSITY PHYSICS BULLETIN

Pages  
Russian/English

### Theoretical and Mathematical Physics

Discontinuous distributions of transport coefficients in mean-field electrodynamics. D.D. Sokolov .....	3	1
Computer simulation of spontaneous decay of a three-particle cluster. O.A. Chichigina ...	6	6
Classification of solutions of a special kind of nonlinear Schrödinger-type equations. A.G. Kornienko, A.R. Frenkin, and G.A. Chizhov .....	10	12
Some new relations for the electromagnetic field tensor in pseudo-Riemannian space-time. V.I. Grigor'ev and I.P. Denisova .....	15	17
Reconstruction of electron concentration profile for plasma layers of different size from radiosonde observation data. V.E. Kunitsyn and I.A. Nesterov .....	17	21
Regularized scaling factor method for calculating molecule force fields. I.V. Kochikov, G.M. Kuramshina, A.V. Stepanova, and A.G. Yagola .....	21	28

### Atomic and Nuclear Physics

Magnetic hyperfine fields at $^{181}\text{Ta}$ nuclei in the laves phases $\text{RFe}_2$ ( $\text{R} = \text{Tb}, \text{Ho}, \text{Yb}$ ). A.A. Sorokin, B.A. Komissarova, G.K. Ryasnyi, S.I. Reiman, L.G. Shpin'kova, A.V. Tsvyashchenko, E.N. Shirani, L.N. Fomicheva, and A.S. Denisova .....	26	34
--	----	----

### Radiophysics

Dispersion properties of planar shielded waveguides with Kerr's dielectric. A.F. Aleksandrov and V.A. Kubarev .....	34	39
Incoherent signal accumulation in gravity-wave experiment. M.P. Vinogradov, A.V. Gusev, and V.K. Milyukov .....	37	44

### Optics and Spectroscopy

Effect of anti-Stokes component on the gain of stimulated Raman scattering in plasma. O.M. Bilak and S.Yu. Nikitin .....	40	49
Nonreciprocal effects in ring Raman lasers. N.V. Kravtsov and N.I. Naumkin .....	44	55

### Acoustics and Molecular Physics

Propagation of wide-band acoustic pulses in unidirectional fibrous composites. A.A. Karabutov, I.M. Kershtein, I.M. Pelivanov, and N.V. Podymova .....	47	60
---	----	----

### Solid-State Physics

Spin-torsional interactions in magnetic substances. S.A. Istomin and R.N. Kuz'min .....	51	66
Influence of ferroelectric phase transition on Langmuir-Blodgett film adsorption properties. N.L. Levshin, S.G. Yudin, and A.P. Diankina .....	54	71

## Brief Communications

### Theoretical and Mathematical Physics

Oscillatory disintegration of small-amplitude magnetohydrodynamic shock waves. S.A. Markovskii .....	57	75
Influence of polarization potential on probabilities of free-free electron transitions. N.Yu. Dobrolyubov, V.D. Kukin, and V.S. Rostovskii .....	59	78
Relation for nonlocality parameters of gluon and four-quark condensates of QCD from finite-energy sum rules. D.V. Meshcheryakov and V.B. Tverskoi .....	61	81
Neutrino pair production by virtual photon in external magnetic field. V.Ch. Zhukovskii, A.E. Grigoruk, K.G. Levchenko, and P.A. Eminov .....	62	83

### Solid-State Physics

On magnetic moment of Cr <sup>3+</sup> ion in ferrites-chromites with spinel structure. A.N. Goryaga, L.G. Antoshina, and E.N. Kukudzhanova .....	64	86
--	----	----

# CONTENTS

VOLUME 52

NUMBER 6

1997

## MOSCOW UNIVERSITY PHYSICS BULLETIN

Pages  
Russian/English

### Theoretical and Mathematical Physics

Foundations of possibility theory. methods of optimal estimation and decision making. 3. Independence, conditional possibility and necessity. Integral conditional with respect to $\sigma$ -algebra. Yu.P. Pyt'ev .....	3	1
Analysis of local microwave hyperthermia based on fictitious sources method. Yu.A. Eremin, V.I. Ivakhnenko, and V.E. Kunitsyn .....	6	6
Equations of mean-field electrodynamics and functional integrals. D.D. Sokolov .....	9	11
Equation of state for argon at high densities and temperatures. P.N. Nikolaev, E.V. Shchurova, and G.V. Moiseeva .....	14	15
The $l$ -curve method always introduces a nonremovable systematic error. A.S. Leonov and A.G. Yagola .....	17	20
Antisymmetric tensor field in space with torsion. A.Yu. Baurov and P.I. Pronin .....	19	24
A boundary value problem describing the Hall effect in a semiconductor with a periodic set of electrodes. P.A. Krutitskii and K.A. Logginova .....	23	30

### Atomic and Nuclear Physics

Electroinduced decay of a proton inside a nucleus. B.S. Ishkhanov, I.M. Kapitonov, and V.N. Rodionov .....	31	37
--	----	----

### Radiophysics

Experimental testing of adaptive pulse accumulation algorithm in gravitational wave experiment. M.P. Vinogradov, A.V. Gusev, and V.K. Milyukov .....	33	41
The surfatron physical model and spatial distribution of surface wave energy. G.S. Solntsev, P.S. Bulkin, M.V. Mokeev, and L.I. Tsvetkova .....	36	46

### Optics and Spectroscopy

Dynamics of stochastization of amplitude and velocity of optical solitons by the noise of spontaneous Raman scattering. V.A. Aleshkevich, V.A. Vysloukh, and K.G. Skirtach .	40	52
--	----	----

### Acoustics and Molecular Physics

Effect of shock waves on flow density fluctuations. O.A. Azarova, E.A. Bratinkova, L.S. Shtemenko, F.V. Shugaev, and B.E. Yanitsky .....	43	58
--	----	----

### Solid-State Physics

Stage character of $\beta \rightarrow \alpha$ transformation and evolution of defective structure in the Pd-H system. A.A. Katsnelson, M.A. Knyazeva, A.I. Olemskoi, and G.P. Revkevich ....	46	63
Multiplication of dislocations in an ultrasonic field. O.V. Bubnovskaya, D.L. Legotin, and N.A. Tyapunina .....	49	68

**Geophysics**

Earth crust deformation and separation of areas of seismic hazard illustrated by the Caucasian region. E.V. Voronina and A.V. Lyusina .....	53	74
--	----	----

**Astronomy**

On the possibility of collisions of comets and asteroids with the Moon. E.L. Vinnikov, I.A. Gerasimov, and N.P. Gorbatko .....	60	80
---	----	----

**Brief Communication**

**Astronomy**

Effect of the atmosphere rotation on Earth's nutation. V.E. Zharov .....	65	85
--	----	----