

## SUMMARY

**Roshchupkin S.N. PP - waves and strings dynamics** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. - C. 3-6

Exact solutions describing dynamics of an open string in a gravitational field of PP-waves are found. It is shown, that action of PP-waves on a string is equivalent to action of the anisotropic environment.

**Keywords:** the PP-wave, cosmic string, exact solution.

**Lelyakov A.P. Dynamics of a tensil string in the planar symmetry spaces.** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. - C. 7-12.

In this article, we have received the exact solution of the equations of motion of a cosmic string in a gravitational field "thick" planar symmetry objects which arise in massless, real scalar field, in a case when the string at each moment of time  $t$  completely lays in a plane  $x,y$ .

**Keywords:** cosmic string, the equations of motion, pseudo-riemannian spaces.

**Zhovtan A.V., Roshchupkin S.N. The exact solutions describing dynamics of a cosmic string in Rindlere space-time.** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. - C. 13-16.

Solutions of the equations of movement and connections for a string in Rindlere space-time are found.

**Keywords:** Rindlere space-time, a cosmic string, exact solutions.

**Zhovtan A.V., Lelyakov A.P., Roshchupkin S.N. Null-string in the field of plane weakly singularity gravitational wave.** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. - C. 17-19.

General exact solution that describes a dynamics of null-string in the field of plane gravitational wave with weak singularity is found. Farther, are shown that dynamics of the null-strings are described by regular functions near singularity of the gravitational wave.

**Keywords:** gravitational wave, weak singularity, null-string.

**Fridman Yu.A., Kosmachev O.A., Kozhenyako O.V. Phase states of a biaxial non-Heisenberg ferromagnet with equal constants of heisenberg and biquadratic coupling** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. - C. 20-26.

We investigate the phase states and spectra of coupled magnetoelastic waves of a biaxial ferromagnet with a biquadratic exchange, assuming that the constants of Heisenberg and biquadratic interactions are approximately equal. We show that in this case the fields of transitions from different phase states coincide, and the implementation of a quadrupolar-ferromagnetic phase is energetically unfavorable. At such relation between material constants there realize only ferromagnetic and quadrupolar phases in the system. The phase transition between these phases is of the first order.

**Keyword:** Magnetoelastic coupling; Reorientation phase transition; Quadrupolar phase; Quasiphonon; Quasimagnon

**Fridman Yu.A., Klevets Ph.N., Matunin D.A. Formation of spatially inhomogeneous states in 2D non-Heisenberg magnetics** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. - C. 27-36.

Influence of the magnetodipolar interaction on the phase states of a 2D non-Heisenberg ferromagnetic is investigated. It is shown that in the system considered both the homogeneous states (ferromagnetic or quadrupolar) and the spatially inhomogeneous ones can be realized. Thus, spatial inhomogeneity is related with the distribution of the quadrupolar order parameter.

**Keywords:** non-Heisenberg magnets, quadrupolar phase, spatial inhomogeneity

**Alekseev K.N., Yavorsky M.A. Non-adiabatic phase correction to the topological Berry's phase in spiral optical fibres** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. - C. 37-43.

The perturbation theory for spiral optical fibres is developed. It is demonstrated that the non-adiabatic phase correction to the topological Berry's phase includes a term describing hybridization of a spin-orbit interaction and geometrical effects.

**Keywords:** spiral fibres, topological phase.

**Gorskaya I.U., Fursenko A.V. Calculation of vector magnetic potential infinite cylindrical layer of current at the presence of the short ferromagnetic cylinder** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. - C. 44-51.

The design procedure of a magnetic field infinite cylindrical layer of current is offered at the presence of the short ferromagnetic cylinder. Numerically integrated equation concerning distribution of microcurrents to surfaces of the ferromagnetic cylinder is solved. At essentially increased length of the cylinder comparison of the received numerical decision of a three-dimensional problem with the analytical decision of a similar two-dimensional problem is carried out. Diagrams of distribution of vector potential in volume of the ferromagnetic cylinder are given.

**Keywords:** vector magnetic potential, ferromagnetic, the integrated equation, a method of division of variables.

**Ponomarenko V.I., Popov V.V., Vinogorodsky D.F. Usage of an inductive post and strip as an element of waveguide quasisresonator.** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. – C. 56-61.

The solutions of the waveguide diffraction problems for the symmetrical inductive strip and post have been obtained. The resonance characteristics of a quasisresonator on the base of rectangular waveguide excited through an inductive element were simulated by computer. An ability of using the inductive strip or post as an element with the known scattering matrix for measuring the complex reflection coefficient by the multiresonance method has been clearly shown.

**Keywords:** microwave transmission lines, scattering matrix.

**Ponomarenko V.I., Popov V.V. A resonance method for measuring the scattering matrix of a directional coupler** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. – C. 62-70

We have suggested a method for measuring the complex reflection and transmission coefficients of the coupling area of a rectangular waveguide with a directional coupler. The method is based on measuring the resonance characteristics of shorted quasisresonator excited through an inductive diaphragm. We have experimentally measured the scattering matrix of the directional couplers from the SNA R2-54/3 assembly.

**Keywords:** multiresonance method, directional coupler, scattering matrix.

***Lyashko D.A. Making and examination echelle spectrum of the artificial star*** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. – C. 71-78

The algorithm of superposition of a synthetic spectrum of a star on echelle spectrum of a flat field lamp. Processing of the obtained spectrum is providing by program StarXP. The ration signal / noise, a spectral solution, quality of carrying out of a continuum for the obtained spectrum is explored.

**Keywords:** echelle spectrum, extraction

***Popov V.V., Rudenko V.V., Ponomarenko V.I., Vinogorodsky D.F. A Scalar Network Analyzer for waveguide measurements.*** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. – C. 79-87.

A cost-effective solution for scalar network measurements is proposed. An analyzer proposed in the paper is intended for gaining and detecting the signal from a waveguide power detector. The analyzer is connected to a personal computer via the LPT-interface and has a 12-bit resolution per channel. A method for calibrating the analyzer is also proposed. The method is based on measurements of the magnitude of the field in a quasi-resonator for several values of the magnitude of the exciting wave. A rotary vane attenuator is used to set-up the magnitude of the exciting wave. This calibration significantly extends the dynamic range of the analyzer.

**Keywords:** microwave transmission lines, power detectors, calibration of detectors, scalar network analyzer.

***Berzhansky V. N., Polulyakh S. N., Tupitsin Yu. V. Formation of two pulses nuclear spin-echo signals in yttrium-garnet films.*** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. – C. 88-95

The behaviour of nuclear spin echo at large angle of spins rotation on an example of ions Fe<sup>3+</sup> in YIG film is investigated. It is revealed that the echo amplitude falls down with growth of a angle of rotation. It is shown, that the reason of such behaviour is nonuniformity of an intrinsic radio-frequency field.

**Keywords:** nuclear magnetic resonance, magneto-ordered materials, coherent spectrometer, signal an echo, yttrium iron garnet.

***Redin M.I. General relations for geometrical parameters of an equal-stepped conical spiral antenna.*** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. – C. 96-102

The main equation illustrating equal-stepped conical spiral structure geometry is submitted in this paper. The written relations make us able to perform conical spiral antenna in the comfortable and easy way to numerical integrating.

**Keywords:** antenna, conical spiral antenna, helical antenna, antenna geometry.

***Dzedolik I.V. Flow of polaritons in linear and nonlinear medium*** // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. – C. 103-114

The photons propagated in a transparent dielectric medium are considered as polaritons. The Vigner distribution function for the polariton flow is found. Kinetic equation, characteristic and hydrodynamic equations are obtained. It is shown that regarding the quantum effects, the flow density and its local speed depend from time and coordinates in a linear and nonlinear medium.

**Keywords:** polariton, The Vigner distribution function, the flow density, local speed

*Berzhansky V.N., Polulyakh S.N., Preobrazhensky V.L., Rudenko V.V. The automized pulse ultrasonic spectrometer with induction excitation for examination of magnetic materials // Uchenye zapiski Tavricheskogo Natsionalnogo Universiteta im. V.I. Vernadskogo. – 2005. – Series «Fizika». – V. 17-18 (56-57). - № 1. – С. 115-120*

The automized pulse spectrometer with induction excitation for examination of magnetoelastic oscillations in magnetics was designed and manufactured. The induction method of excitation and registration of oscillations does not demand application of piezoelectric transducers that excludes presence of additional mechanical tensions. The method allows to investigate both frequency and dissipative performances of substances. As an example there was a sample of the nickel ferrite doped by cobalt, copper and samarium. The dependences of resonance frequencies and damping time on an exterior magnetic field for the sample were measured.

**Keywords:** pulse spectrometer, induction excitation, magnetoelastic oscillations, nickel ferrite