

Rathkeen L. S. *Problems and Prospective of Russian Nanotechnological Development* 2

The forth International nanotechnological forum was organized in Moscow 26—28, October 2011. On meetings were discussed the questions of nanotechnological development and producing of nanomaterials in Russia, investment in innovation nanotechnological projects and investigations for small and medium nanoindustrial enterprises.

Keywords: Russian academy of sciences, RAS, nanotechnologies, nanomaterials, innovations, investment, electronics, building, health care, pharmaceuticals, medicine, nanophotonics, energetic, machine building

Glukhova O. E., Zhnichkov R. Y., Slepchenkov M. M. *Program Complex for Nanoelectronics* 5

The program-calculated complex is developed. The quantum-chemical method of tight-binding is the theoretical basis of this complex. The electronic spectrum of the compressed graphene nanoribbons are calculated by this complex. It is established that the compressed nanoribbons have improved emissive properties. One can investigate the atomic structure and properties of the polyatomic structures by the developed complex.

Keywords: nanoribbons, tight-binding method, electronic spectrum, parallel calculations, electronic density

Ephimov V. V., Kalinin V. A., Likhoshester V. V., Matveev V. V., Raspopov V. Ya. *Information and Analytical Support of Micromechanical Gyroscopes and Accelerometers Initial Design Stage* 11

Examined information and analytical support of micromechanical gyroscopes and accelerometers design including classifications, basic structures and basic mathematical models.

Keywords: micromechanics, gyroscope, accelerometer, design, classification, basic construction diagrams, basic mathematical models

Belahurau Y. A., Shukevich Ya. I., Barkaline V. V., Khatko V. V., Taratyn I. A. *Finite Element Modelling Thermomechanical Properties of Nanoporosity Materials* 18

Technique has been developed for definition of tensors of modules elasticity and heat conduction of nanoporosity materials on the basis simulation modeling standards experimental techniques by finite elements method. Dependences on the porosity have been calculated for indicated tensors for α -Al₂O₃ and silicon. Influence of porosity on distribution of temperature into the structure of chemical sensor on basic α -Al₂O₃ has been calculated.

Keywords: finite elements method, tensor of module elasticity, tensor of heat transfer, nanoporosity materials

Pecherskaya Ye. A., Metalnikov A. M., Varenik Yu. A., Boboshko A. V. *Method for Measuring the Current Switching and Dielectric Parameters of Ferroelectrics* 24

The method of measurement of the dielectric parameters of ferroelectric materials, based on measuring the time dependence of the switching current through the scheme Sawyer — Tower is presented. The formulas for calculating the switching time, the resistance which characterizes the loss effect of energy loss in the spontaneous polarization, capacitance, polarization are considered.

Keywords: ferroelectric, spontaneous polarization, switching current, measurement method, the circuit Sawyer—Tower

Bakhvalova T. N., Belkin M. E. *Modeling of Photonic Cristal Demultiplexer* 27

A model of spectral demultiplexer based on photonic crystal in integrated design is investigated. We used two-dimensional photonic crystal with square lattice formed by dielectric rods in air. Design of the demultiplexer based on the change in transverse dimensions of the waveguide channels and the introduction of additional defective rods of various radii inside the channels. Selection of geometric parameters of the model is based on the analysis of full photonic bandgap maps. The computations were carried out using the OptiFDTD 8 program of Optiwave Software.

Keywords: two-dimensional photonic crystal optical waveguide, demultiplexer, photonic bandgap

Samoylovich M. I., Talis A. L. *Crystalline Multiferroics and Symmetry Characteristics of the Magnetic Subsystems* 31

Shown that the classical crystallography is not able to adequately display the symmetry of the multiferroics, whose structure is determined by the laws of the local approach. The examples of the manifestations of these laws and their physical implications are considered.

Keywords: MULTIFERROICS, a local approach, the electronic subsystem

Akopyan V. A., Zakharov Yu. N., Matveev S. Yu., Panich A. A., Rozhkov E. V. *Analysis of the Electro-Physical Characteristics Piezoceramics Different Composition Used for High Power Piezoelectric Generators* 37

The results of experimental investigations of influence compression stress amplitudes on quantity of the piezoelectric constants and generated piezoelement charge have been presented. Most stability of the voltage output there is with piezoelement from piezoceramic processed compression technology, particularly with piezoceramic PKR-78. Amongst main parameters which characterized a stability of the output power piezo-generator have been reliable a piezoelectric constant d_{33} of the ferroelectric material.

Keyword: piezoceramic, piezoelectric constants, axial compression, output voltage, piezoelectric generators

Belozubov E. M., Belozubova N. E., Vasil'ev V. A. *The Vibration Proof Lead-to-Pad Bonds of Thin-Film Nano- and Microelectromechanical Systems (NaMEMS) and Pressure Sensors on the Base* 42

The vibration proof lead-to-pad bonds of thin-film nano- and microelectromechanical systems (NaMEMS) and pressure sensors on the base is considered.

Keywords: thin-film nano- and microelectromechanical systems (NaMEMS), pressure sensor, vibration, temperature

Ichkitidze L. P., Mironuk A. N. *Topological Nanostructured Filmy Superconducting Transformer of Flux* 47

The object of study is a superconducting film flux transformer in the form of a square shaped loop with the tapering operative strip. The magnetosensitive film element based on the giant magnetoresistance effect is overlapped with the tapering operative strip of the flux transformer and is separated from the latter by an insulator film.

It is shown that the topological nanostructuring of the operative strip of the flux transformer increases its gain factor by one or more orders of magnitude, i.e. increases its efficiency, which leads to a significant growth of important parameters of a magnetic field sensor.

Keywords: superconducting thin film, sensor, magnetic field, magnetic flux transformer, topological nanostructuring

For foreign subscribers:

Journal of "NANO and MICROSYSTEM TECHNIQUE" (Nano- i mikrosistemnaya tekhnika, ISSN 1813-8586)

The journal bought since november 1999.

Editor-in-Chief Ph. D. Petr P. Maltsev

ISSN 1813-8586.

Address is: 4, Stromynsky Lane, Moscow, 107076, Russia. Tel./Fax: +7(499) 269-5510.

E-mail: nmst@novtex.ru; http://novtex.ru/nmst/

Адрес редакции журнала: 107076, Москва, Стромьинский пер., 4. Телефон редакции журнала (499) 269-5510. E-mail: nmst@novtex.ru
Журнал зарегистрирован в Федеральной службе по надзору за соблюдением законодательства
в сфере массовых коммуникаций и охране культурного наследия.
Свидетельство о регистрации ПИ № 77-18289 от 06.09.04.

Дизайнер Т. Н. Погорелова. Технический редактор Е. М. Патрушева. Корректор М. Г. Джавадян

Сдано в набор 20.11.2011. Подписано в печать 22.12.2011. Формат 60×88 1/8.

Усл. печ. л. 6,86. Заказ МС112. Цена договорная

Оригинал-макет ООО «Авансед солюшнз».

Отпечатано в ООО «Авансед солюшнз». 105120, г. Москва, ул. Нижняя Сыромятническая, д. 5/7, стр. 2, офис 2.