

- Astahov M. V., Filonov M. R., Yagodkin Yu. D., Sarkisov P. D., Yurtov E. V.** *About Realization of Personnel Training Projects in the Field of Functional and Structural Materials* 2
 The problems of engineering skills training and retraining for nanoindustry within the scope of Federal state educational standards of 3rd generation are discussed.
Keywords: education in science and technology, nanoindustry, nanomaterials, educational standards
- Belkin L. M., Belkin M. E.** *Application of Optoelectronic Principle for Microwave-Band Frequency Conversion and Multiplication*. 4
 Based on vertical channel surface-emitting laser (VCSEL) a cost-effective arrangement of an optoelectronic frequency converter is investigated in theory and experimentally. Results of the model design representing its work in frequency converter (OEFC) and multiplier (OEFM) modes and the simulation of a key frequency converter's parameter that is conversion loss are highlighted. In accordance with the simulating results and closed to them measured data on S-band prototypes the conversion loss of the OEFC is near 36 dB and the same of the OEFM is near 45 dB. An example of OEFM cost-effective employment for the RoF's base station uplink is reviewed.
Keywords: microwave photonics, vertical channel surface-emitting laser (VCSEL), optoelectronic frequency converter, Radio-over-Fiber telecom system (RoF)
- Vasil'ev V. A., Chernov P. S.** *Diffusion Model of Growth and Surface Morphology of Thin Films of Materials*. 11
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Keywords: surface, thin film, a stochastic cellular automaton, the surface morphology
- Abramov I. I., Kolomejtseva N. V.** *Simulation of Resonant Tunneling Diode Based on Si/SiGe*. 16
 The combined two-band model for the simulation of I–V characteristics RTD based on Si/SiGe is developed. Satisfactory agreement with experimental data with proposed model is obtained.
Keywords: the resonant tunneling diode, numerical simulation, combined two-band model
- Sokolov L. V., Parfenov N. M.** *Technological Singularities of Forming of Three Dimensional Microelectromechanical Systems*. 19
 Recent achievements in the area of researches and the development of different physics-chemical processes of etching of monocrystal silicon for formation solid micromechanical structures are generalized and analyzed. The main trends of the development of sensors and microelectromechanical devices are shown.
Keywords: recent technologies, micromechanical structures, microelectromechanical devices
- Averin I. A., Pecherskaya R. M., Pronin I. A.** *Features of Low Self-Organized Sols Based on Binary Systems Based on SiO_2 – SnO_2* 27
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Keywords: sol-gel technology, self-organization, the spinodal, binodal, fractals
- Rathke L. S.** *Prospective of Development and Producing of Nanomaterials* 30
 Under the patronage of Russian academy of science (RAS), Ministry of education and science of Russian Federation, Department of chemistry and sciences of materials of RAS, Scientific Council for nanomaterials at Presidium of RAS, Institute of metallurgy and materials named after A. A. Baykov of RAS and Lomonosov state university at the spring of 2011 organized the IV Russian conference for nanomaterials.
Keywords: Russian academy of sciences, RAS, nanomaterials, fullerenes, multimodal nanosystems, modification of surface, nanocrystalline structure, catalyses, adsorption, hydroxyl-apatite, halogenides

Sopilnyak A. A., Fetisov Yu. K., Lebedev S. V., Segalla A. G. *Piezoelectric Resonance Sensor of Magnetic Fields Based on Planar Bimorph Structure with Electromagnetic Excitation Coil*. 33
Piezoelectric resonance sensor of permanent magnetic fields based on planar bimorph lead zirconate titanate structure with excitation electromagnetic coil is described. The sensor uses combination of the Ampere force, the piezoelectric effect and the bending oscillation resonance of the structure in order to increase the output voltage. The sensor has a sensitivity of ~ 250 V/(A-T) and linear output voltage vs. field dependence in the $\sim 10^{-5}$ –0,3 T magnetic field range. The theory describing characteristics of the sensor is developed.

Keywords: magnetic field sensor, Ampere force, piezoelectric effect, lead zirconate titanate

Timoshenkov S. P., Plehanov V. E., Anchutin S. A., Zaryankin N. M., Rubchits V. G., Dernov I. S., Shilov V. F., Kochurina E. S. *Micromechanical Ring Gyroscope Resonator Balancing* 37
The article gives results of the ring resonator microgyroscope analysis with accounting of systematic factors (material anisotropy and presence of elastic suspension), requirements for resonator material stated, way of frequency convergence by method of mass removing with balancing results modeling shown.

Keywords: ring resonator, anisotropy, finite element method, balancing adjustment

Maltsev P. P., Matveenko O. V., Gnatyuk D. L., Lisitskiy A. P., Fedorov Yu. V. *Lines of Development of 5 GHz Integrated Planar Antennas with Minimal Size* 45
5 GHz multilayer antennas, based on metamaterials and tunable antennas are examined relying on the criterion of size reduction. Size reduction is resulted from multilayer antenna realization.

Keywords: antenna, multilayer antenna, small antenna, metamaterials, tunable antenna, circular polarization, circularly polarized antenna

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 *Е. В. Комиссарова*

Сдано в набор 13.09.2011. Подписано в печать 26.10.2011. Формат 60×88 1/8. Бумага офсетная. Печать офсетная.
Усл. печ. л. 6,86. Уч.-изд. л. 8,21. Заказ 777. Цена договорная

Отпечатано в ООО "Подольская Периодика", 142110, Московская обл., г. Подольск, ул. Кирова, 15