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Constructions of the Sensors for the Tunneling-Emission	
Accelerometers	

A possibility of fabrication of a high-sensitivity accelerometer is considered. The linear acceleration of the sensor causes displacement of the proof mass electrode. The displacement detector is based on a strong dependence of the tunneling or cold emission current on the gap between the electrodes. The geometry of the electrodes that provides the best sensitivity is determined. The accelerometer with tunneling-emission electrodes is fabricated. In the 5 kHz frequency range the sensitivity reaches  $10^{-4}$  g/Hz<sup>1/2</sup> in tunneling mode and  $10^{-3}$  g/Hz<sup>1/2</sup> in emission mode.

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The item considers control of material properties of microelectronic sensors (MES). Control concept is based on modification of material properties. The modification allows reinforcing or suppressing physical effects in materials for the purpose of MES selectivity improvement and stability increase.

#### Altukhov V. I., Strukov B. A., Katrysheva M. V. The Critical Phonon Scattering and Peculiarities of the Thermal Conductivity in Ferroelectrics.

The review of the theoretical study of the critical phonon scattering and anomalous heat transport near the phase transition temperature  $T_{\rm c}$  is presented. An interpretation and quantitative approach to the description of the anomalous temperature dependence of the thermal conductivity  $\lambda(T)$  near  $T_{\rm c}$  are discussed.

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Switching magnetic media models at termomagnetic recording, which uses two main types of switching: Curie point writing, temperature reduce coercivity force, are executed. Lacks of magnetization definition known ways in the field of record are revealed. The models are offered to enhance accuracy of the description.

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Using the nanoelectronic device simulator NANODEV, influence of constructive, material parameters, background charges and temperature on drain-to-gate characteristics of single-electron transistors was studied. There was stated these characteristics to be the most sensible to width of a tunnel junction, potential barrier height and temperature.

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The absolute values of the force exerted by the fiber probe of a scanning near-field optical microscope into the surface were measured using an atomic force microscope at ambient conditions. The near-field microscope is operated in shear force mode. In the experimental setup the tip is positioned over the flat portion of the cantilever. Upon approach, the deflection of cantilever, which is proportional to the interaction force, is optically measured. Usually neglected static attraction force is dominant at small dither amplitudes and may be as large as 300 nN. The tapping component of the force is of the order of 1 nN. The operation with resonantly excited fiber is compared with operation under non resonant excitation.

## Tchesov R. G., Nikolski K. N., Baturin A. S., Bormashov V. S., Knyazev A. I., Sheshin E. P. Lifetime of Field Emission Cathodes Based on Carbon Nanotubes

Field emission cathodes based on carbon nanotubes are widely used at the vacuum microelectronics devices. The main property of the cathodes is a lifetime. At this work the lifetime is investigated of cathodes made by different techniques from carbon nanotubes. The method of analyzing current or voltage versus time is presented. The criteria to compare the cathodes with different operating voltage are given.

### Fomin L. F. The Modelling of the Swimming of Microrobots. . . . . 30

The problem of the propulsion of MEMS — Microelectromechanical Systems (microrobots) in fluids by the excitation of undulatory longitudinal oscillations taking into account effects of inertia together with effects of viscous friction is investigated.

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The review of the several perspective world developments in the area of the microrobotics is reduced. The most developing directions are separated. They are: microrobots of the medical purposes, microrobots for the diagnostics of the technological cavities and micromanipulating systems. By each direction the examples of the experimental developments in the given area are cited.

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ЗАО МК-Периодика. E-mail: info@periodicals.ru;

Editor-in-Chief Ph. D. Petr P. Maltsev Index 79493.

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