

electrophysical measurements were applied. Our results show that the interaction between DNA or oligonucleotides and MWCNTs was ascribed to the strong  $\pi$  -  $\pi$  interactions between the backbones of DNA or oligonucleotides and the surface of carbon nanotubes.

The binding of nanotubes with fluorescent oligonucleotides allows the MWCNT to function as a "nanoquencher" of the fluorophore FAM. This functionality of MWCNT-oligonucleotide complex is demonstrated by agarose gel electrophoresis assay. It is proposed to use the thin LB-films of oligonucleotide/MWCNT complexes as a biosensing nanocoating based on nucleic acids.

### **Dielectric behavior of C6 rat glioma cell monolayer growing on CNT- and Ce-contained nanostructured LB-films**

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Capacity characteristics of C6 rat glioma cell monolayer growing on the surface of interdigital sensors has been investigated. Sensor electrodes have biosensitive dielectric nanostructured coating which contains cerium ions (Ce) and modified by carboxyl groups multiwall carbon nanotubes (CNT) and has been formed utilizing Langmuir-Blodgett technology. Dielectric analysis of the structure of electrically and functionally active near-electrodes medium with C6 rat glioma cells has been performed. Pulse oscillations of capacity of sensors with cellular monolayer according to non-zero capacity level Ce have been found using method of impedance dielectric spectroscopy. Observed capacity oscillations are due to changes of transmembrane potential following a functioning of ion channels. In the frequency range from 5 to 45 kHz a dependence of sensor capacity oscillation amplitude on the frequency of applied field is of a bell-shaped form with a maximum being closed to 20 kHz. But frequency of capacity oscillations does not depend on the frequency of applied field. It has been established that amplitude and frequency of oscillations and a value of the level Ce depend on a phase of cellular growth and composition of buffer medium.

### **Miniaturized conformal printed antennas for wireless communication based on chaotic transceiver: design and comparative analysis**

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Current trend for miniaturization of wireless communication devices imposes more and more stringent restrictions on dimensions of the antennas. In this paper the concept of using conformal printed antennas for wireless communication

based on chaotic transceiver. Printed monopole antenna with a transmitter in the form of a disk, and an F-inverted antenna were selected as samples for the research. The area of ground electrode of the antennas to be used for placing the transceiver circuit. It can significantly reduce the overall size of the device, but requires careful design, taking into account the electromagnetic compatibility. Both a numerical electromagnetic analysis of selected types of antennas and experimental verification of the optimal configuration were accomplished during research and presented in the paper.

### **Cluster finding in silicon detectors**

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The simple method of cluster finding and vertex reconstruction in silicon detectors are discussed.

### **Self-organization of polymetallic coordination LB-complexes of nanocyclic pyrrole-thiophene ligands**

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Metal-polymers with rare earth and transition elements are of great interest as a quantum spin-polarized conducting molecular layers formed in the process of self-assembly. Method of formation of a self-organizing monomolecular layer (monolayer) on the surface of a liquid subphase is the method of Langmuir - Blodgett (LB). Self-organized metal-polymeric LB-film from oligomer of pyrrole-thiophene series have been obtained. Incorporation of iron ions in the pyrrole-thiophene LB-monolayers in the presence of salts of rare earth elements has been studied by thermodynamic, electro-physical and optical methods with structural and fluorescence analysis to determine the states with intermediate valence of such organopolymetallic complexes. Distinctive characteristics of crystalline iron containing pyrrole-thiophene LB-monolayers fabricated on the surface of an aqueous solution of iron salts and hydrochloric acid are a magnetic ordering and an exciton excitation of metal atoms in nanocavities of organic environment. These properties are due to the paramagnetism of iron complexes of aromatic macrocyclic ligands from which in self-assembly process, provided the deformation of the electron density, the planar polynuclear metal-complexes of macrocyclic ligands -- Fe-containing monolayers of pyrrole-thiophene oligomer are formed. Nonlinear optical properties of such LB-films are due to the transfer of energy released at localization of  $\pi$ -electron states of organic ligand environment to electron-hole pair (exciton). Such a metal-polymer exists