

XVIII International Young Scientists' Conference on Applied Physics

Report of Contributions

Contribution ID: 129

Type: **Oral**

COMPUTER METHODS OF RECOGNITION OF THE ELECTRONIC STRUCTURE OF IRON BASE SUPERCONDUCTORS

The developed algorithm for processing ARPES spectra by the method of curvature, the presence of abnormal dependence on the temperature (red-blue offset) at the M point of the Brillouin zone is confirmed. That explains the blockage of the jump between the closest neighbors and is consistent with the Fermi Landau Land Model. The dependence obtained in the center of the Brillouin zone contradicts the predictions of a “red-blue shift”, which explains models of the Pomeranchuk instability due to electronic correlations. In the corner of the Brillouin zone, a more complex dependence is found which lies in the opposite shift of the upper and lower zones. It is believed that this is a consequence of a nematic transition, but the analysis of spectra with different polarizations does not confirm the known models of the evolution of the structure in the nematic state.

Primary authors: Mr KUKHELNYI, Kyrylo (Faculty of Radio Physics, Electronics and Computer Systems, Taras Shevchenko National University of Kyiv); Prof. KORDYUK, Alexander (G.V.Kurdyumov Institute for Metal Physics, NAS of Ukraine)

Presenter: Mr KUKHELNYI, Kyrylo (Faculty of Radio Physics, Electronics and Computer Systems, Taras Shevchenko National University of Kyiv)

Track Classification: Magnetism and Superconductivity

Contribution ID: 130

Type: Oral

Aluminium and Titanium Alloys Surface Behaviour under Argon and Helium Ion Exposure

Samples of aluminium alloy Al(2024) and titanium alloy Ti-6Al-4V are irradiated with 2 keV helium (He) and argon (Ar) ion fluxes using FALCON ion source. Cone-like structures are found to be formed on the surface of two Al(2024) samples due to both irradiation conditions: Ar and He exposure reaching total charge 150 Coulomb per sample. Ar exposure of Ti-6Al-4V causes cones formation. He exposure causes only physical sputtering morphology at the same total charge. Chemical composition of grown structures is obtained from energy dispersive spectroscopy (EDS). Surface roughness and roughness profile are investigated with co-focal microscope. Hardness of irradiated surfaces is obtained from results of whiskers hardness test. Residual stresses after irradiation and phase composition are measured by X-ray Diffraction spectroscopy (XRD). Free surface energy is measured with drop test.

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Presenter: Mr MYROSHNYK, Maksym (V. N. Karazin Kharkiv National University)

Track Classification: Plasma Physics

Contribution ID: 131

Type: Oral

POLARIZATION PROPERTIES OF QUARTZ-WEDGE DEPOLARIZER. SIMULATION AND EXPERIMENT

We describe the quartz-wedge depolarizer composed of two wedges of the anisotropic quartz. The wedges have the same geometry but the differently directed optical axes, which lay in plain, that are parallel to straight faces of wedges. The adjoined by inclined faces wedges form the depolarizer which depolarization power depends on the incident light beam radius: the larger depolarization power correspond to increasing light beam radius. Since the polarization of light at the output of the wedge depolarizer is changed periodically across the beam section, the integral polarization of a whole output beam is approximately neutral. The polarimetric model of the proposed depolarizer is described by the Stokes-Mueller matrix approach. In the model, the depolarizer is described as the sequence of two birefringent layers which thickness (and thereby phase shift) are the linear function of coordinates across the beam's section. The angle between optical axes of layers is 45 degrees. The total thickness of the depolarizer-adjoined wedges is a constant. We show that the depolarization power of the mentioned type of depolarizer depends on the polarization's azimuth of the input linearly polarized light and of the beam's radius. The simulation and experimental results are presented. The wedges depolariser is designed to use for the multispectral imager-polarimeter (MSIP) calibration during the Aerosol-UA space experiment to study the aerosol microphysics in the terrestrial atmosphere.

Primary authors: Mr OSIPENKO, R (Taras Shevchenko National University of Kyiv); Dr OBEREMOK, Ye. A. (Taras Shevchenko National University of Kyiv); Prof. SAVENKOV, S. N. (Taras Shevchenko National University of Kyiv); Mr SYNIAVSKY, I (Main Astronomical Observatory of National Academy of Sciences of Ukraine, Ukraine); Mr IVANOV, Yu (Main Astronomical Observatory of National Academy of Sciences of Ukraine, Ukraine); Dr MILINEVSKY, G (Main Astronomical Observatory of National Academy of Sciences of Ukraine, Ukraine); Dr KOLOMIETS, Ivan (Taras Shevchenko National University of Kyiv)

Presenter: Mr OSIPENKO, R (Taras Shevchenko National University of Kyiv)

Track Classification: Laser Physics and Optoelectronics

Contribution ID: 132

Type: **Poster**

SURFACE MODIFICATION OF PZT CERAMICS BY HYDROGEN ATOMS

Abstract: The process of surface modification of PZT ceramics by hydrogen atoms of thermal energies has been investigated. The change in surface electrical conductivity of the PZT ceramics by hydrogen atoms was studied. It was found that the change of the surface electrical conductivity was the result of reducing the surface layer of PZT ceramics. Mechanism of surface electrical conductivity for reduced PZT ceramics was discussed.

Primary author: Dr LUSHCHIN, Sergiy

Presenter: Dr LUSHCHIN, Sergiy

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: 133

Type: **Oral**

INVESTIGATION OF RELIABILITY OF ALUMINUM-GOLD CONTACT IN INTEGRATED CIRCUITS

The reliability of the integrated circuit and the performance of its functions strongly depend on the quality of the contacts.

Widespread misconception that formation of wire chip connection is a simple process. This process is complex and requires a thorough understanding of the metallurgy, thermodynamics, and surface chemistry involved.

To evaluate the impact of various factors on reliability, simplified models based on the theory of a multifactorial experiment are often used. Design of experiments and data analysis is an important part of reliability testing.

There are needs in effective formalized approach for risk assessment at HT application depends on factors which define bonding reliability risk assessment and degradation prediction of Al-Au intermetallic interface at HT application depending on different groups of factors: Time and Temperature of HTOL test (High temperature operating life); Kind of used Au wires (pure gold, and gold with palladium impurities); Outcome of bonding parameters settings; Kind of used Mold Compound (green or non-green mold compound) [1], [2]. Green mold compounds and substrates are materials that do not include bromine and antimony.

Bond Ball lift failure mode after high temperature stress is one of major and ambiguously interpreted failure mode. Reliability was analyzed using wire bonding pull test. The bond pull test is the most widely used technique for the evaluation and control of wire bond quality. This technique is also used for wire bonding process control and process optimization during assembly manufacturing. The bond pull test involves placing a hook under the wire and applying a normal upward force and the wire is pulled till it fails [3].

The purpose of the work is to construct polynomial models by means of method of multifactorial experiment, which make it possible to predict the behavior of the contact after the influence of the investigated factors.

Proposed approach for post HT stresses assessment of bonding reliability on the base of criticality of Bond Ball Lift Failure Mode category. Approach is based on statistically significant data gathered and analyzed during different products qualifications and research work.

[1] M.Blyzniuk, "Bond Ball Lift Failure Mode Category – Criteria for Post Stress Assessment of WBP Tests", 19th AEC Workshop Detroit, 2017.

[2] M.Blyzniuk, A.Devos, N.Furman, N.Simonne, Y.Vovk, "Post Stress Assessment of WBP Tests", 17th AEC Workshop Detroit, 2015.

[3] Caiyuan Wang, Ronglu Sun, "The Quality Test of Wire Bonding", Modern Applied Science, 2009.

Primary author: DUDASH, Viktor (Taras Shevchenko National University of Kyiv)

Presenter: DUDASH, Viktor (Taras Shevchenko National University of Kyiv)

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: 134

Type: **Poster**

ADSORPTION, ELASTIC CHARACTERISTICS OF POROUS POLYSTYRENE, RADIATION CROSSLINKED HYDROGELS AND AUTOMATED SYSTEM

Bandages from the radiation cross-linked hydrogels show by itself elastic films with thickness $h = 2 \div 4 \cdot 10^{-3} \text{ m}$ – transparent jelly sterile material, that with $C = 85 \div 90\%$ consists of distillate water. Such bandages for wounds for the grant of the urgent help at bleeding, burns must be biologically compatible and not stick to the wounds. They can contain antiseptic, anaesthetic, haemostatic. The software is developed for the automated system of anisotropy parameters analysis.

Primary author: Dr ONANKO, Yuriy (Taras Shevchenko Kyiv national university)

Presenter: Dr ONANKO, Yuriy (Taras Shevchenko Kyiv national university)

Track Classification: Medical Physics

Contribution ID: 135

Type: **Oral**

POSSIBLE COMBINATIONS OF GENETIC ALGORITHMS AND NEURAL NETWORKS

A review of some existing Combinations of Genetic Algorithms and Neural Networks (COGANN).
In its most general form, COGANN can be supportive or collaborative.

Primary author: Prof. MOROZOVA, Mariia

Presenter: Prof. MOROZOVA, Mariia

Track Classification: Computer Engineering

Contribution ID: 136

Type: **Poster**

ION IMPLANTATION STUDY OF Be IN InSb FOR PHOTODIODE FABRICATION

Ion implantation of Be in semiconductor material InSb to create semiconductor devices, like a photodiode. Process of forming doped by Be monocrystal InSb.

Primary author: Mr SHYMKO, Hlib (NTUU "Igor Sikorsky Kyiv Polytechnic Institute")

Presenter: Mr SHYMKO, Hlib (NTUU "Igor Sikorsky Kyiv Polytechnic Institute")

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: 137

Type: **Poster**

INVESTIGATION OF THE TEMPERATURE DEPENDENCE OF THE DIELECTRIC PERMITTIVITY OF PZT PIEZOCERAMICS

The temperature dependence of the dielectric permittivity of PZT piezoceramics based on solid solutions of lead zirconate-titanate oxides has been obtained. It is established that the temperature dependence of the permittivity of PZT piezoceramics is satisfactorily described by the exponential function. Different values of the activation energy for two temperature regions indicate the existence of different mechanisms of polarization of PZT piezoceramics in the investigated temperature range.

Primary author: Dr LUSHCHIN, Sergiy

Presenter: Dr LUSHCHIN, Sergiy

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: 138

Type: **Poster**

Effect of gold nanoparticles on photovoltaic properties of solar cells

This paper demonstrates the influence of gold nanoparticles incorporated into monocrystalline silicon solar cells using electrodeposition technique. It was determined that the presence of nanoparticles into the solar cell led to an unequivocal increase of short-circuit current. The largest increase in short-circuit current is observed for p+/n/n+ -structure of solar cell and nanoparticle size of 90 nm.

Primary author: DIDYCHENKO, Denys

Presenter: DIDYCHENKO, Denys

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: 139

Type: **Poster**

Molybdenum oxide thin films for transparent electronics

In this work it was investigated the structural, electrical and optical properties of molybdenum oxide thin films, which are synthesized by ion-beam sputtering, depending on technological parameters. It was found the possibility to increase transparency of the material by twice, and its electrical resistance to 3-4 orders of magnitude by changing the temperature and time of deposition.

Primary author: FILOV, Roman (Evgeniovic)

Presenter: FILOV, Roman (Evgeniovic)

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: 140

Type: **Poster**

Metal Assisted Chemical Etching for Silicon Nanowires Formation

In this work the silicon nanopillars were produced by means of metal assisted chemical etching in two stages. It was determined that using the amount of AgNO_3 of 68 mg in the first solution and the duration of the first stage of 20 sec made possible to reduce the sunlight reflection of silicon substrate from 20-30% to 10-12%.

Primary author: Mr KULISH, Dmytro

Presenter: Mr KULISH, Dmytro

Track Classification: Surface Physics and Nanoelectronics

Contribution ID: **141**Type: **Poster**

NANOCRYSTALLINE SILICON IN HETEROJUNCTION PHOTOVARACTORS

In this paper c-Si/nc-SiO_x heterostructure photovaractors were synthesized by means of RF magnetron sputtering method. Influence of illumination and deposition temperature of silicon on electrical and optical properties of photovaractors were studied. Under illumination conditions the output capacitance of photovaractors was increased by 7 times. Overlap ratio for these structures was in a range of 20 – 25.

Primary author: ZADOROZHNYI, Oleksandr

Presenter: ZADOROZHNYI, Oleksandr

Track Classification: Surface Physics and Nanoelectronics

Contribution ID: 142

Type: **Oral**

MAGNETOCONDUCTIVITY OF ITO FILMS AT LOW TEMPERATURES

The work is devoted to investigation of ITO films at temperatures close to the temperature of liquid helium. Using the theory of quantum corrections to the theory of conductivity, the theoretical values of the magnetoconductivity were calculated and compared with the experimental data obtained earlier in the laboratory.

Primary authors: Dr ISHCHUK, L.; Ms VINTONYAK, N.

Presenter: Ms VINTONYAK, N.

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: 143

Type: Oral

THE INTERNAL DYNAMICS FOR ONE-DIMENSIONAL SOLITONS IN ANTIFERROMAGNETS WITH REAL DZYALOSHINSKY-MORIYA INTERACTION.

The nonlinear internal dynamics of one-dimensional topological magnetic solitons in antiferromagnets were studied theoretically, taking into consideration their real magnetic symmetry [1]. The presence of the Dzyaloshinskii–Moriya interaction (DMI) in the general form, which is not reduced to a purely antisymmetrical form, leads to appearance a gyroscopic term in the Lagrangian system. It was shown that the nature of the soliton internal dynamics is related to the presence of such terms, the form of which is determined by the magnetic symmetry of the antiferromagnet (AFM).

The internal dynamics of solitons, the research on which started as a purely fundamental problem in the physics of low-dimensional magnets defines new prospects for applications in nanoelectronics of magnetic materials. Most of the results obtained in this field are related to the solitons of the magnetization field of ferromagnets. Antiferromagnetic structures possess unique characteristics, although the internal dynamics of solitons in such structures have been studied to a much lesser extent. Resonance frequencies of the AFM reach several THz due to the exchange enhancement effects, exceeding by an order of magnitude the resonance frequencies in ferromagnets. Exchange enhancement also has a place for the spin-pumping effects, antiferromagnets can conduct and even amplify the spin current. These properties of antiferromagnets determine the great possibilities for their practical application in spintronics [2]. Recently, it has been proposed to use antiferromagnets to create self-oscillators, which are excited by spin pumping and working in the range of terahertz [3].

The presence of the DMI, even sufficiently weak, leads to qualitatively new effects in soliton dynamics. In the presence of this interaction, the rotational dynamics of the antiferromagnetic vector \mathbf{l} for a number of antiferromagnets becomes connected with the translational dynamics of the soliton. For a sufficiently high precession frequency of the vector \mathbf{l} in a soliton, Cherenkov radiation of magnons should appear.

The excitation and support of the above described dynamics is very interesting opportunity. Considering the general dissipative function, with “anti-damping” effect due to the spin pumping, shows the existence of a boundary cycle at which connected oscillations of the center of the domain wall with the oscillations of the vector \mathbf{l} is possible. This effect can be used to develop new types of antiferromagnet spintronic devices with the use of breaking the dynamics of soliton by spin current. It is worth noting that the antiferromagnetic soliton is topological and stable even when the pumping is switched off, in contrast to non-one-dimensional solitons in ferromagnetic nanogenerators. Furthermore, it is easy to create an AFM soliton at a specific location in the device using a sufficiently weak magnetic field.

The existence of Cherenkov radiation of magnons at higher frequencies allows synchronize a soliton antiferromagnetic generator with the use of several solitons. The possibility of generating a short-wavelength magnons that is excited by the effect of spin pump can consider separately.

- [1] E.G. Galkina, R.V. Ovcharov, and B.A. Ivanov, Precessional one-dimensional solitons in antiferromagnets with low dynamic symmetry. *Low temp Phys.* 43, 1609 (2017)
- [2] E.V.Gomonay, V.M.Loktev, Spintronics of antiferromagnetic systems. *Low temp Phys.* 40, 17 (2014).
- [3] R.Khymyn, I.Lisenkov, V.S.Tiberkevich, A.N.Slavin and B.A.Ivanov, *Phys.Rev. B* 93, 224421(2016).

Primary author: Mr OVCHAROV, Roman

Presenter: Mr OVCHAROV, Roman

Track Classification: Magnetism and Superconductivity

Contribution ID: 145

Type: **Oral**

Ethanol Reforming in Hybrid Plasma-Catalytic System

A study was conducted on the influence of the reaction chamber material on hybrid plasma-catalytic ethanol reforming. A comparison was made between the reforming in quartz and steel reaction chamber with the same geometry. Discharge behavior was investigated using current and voltage oscillograms, optical emission spectra and video capture. The composition of gaseous reforming products was determined via gas chromatography. The study showed the disappearance of NO bands from plasma torch emission spectra after the addition of ethanol into a reaction chamber. Rotational and vibrational temperatures of species inside plasma torch were shown to be independent of the flow of introduced ethanol. Research showed that reforming using steel reaction chamber had increased reforming efficiency and hydrogen energy yield in comparison with reforming using quartz reaction chamber.

Primary authors: Dr NEDYBALIUK, Oleg (Taras Shevchenko National University of Kyiv); Dr CHERNYAK, Valeriy (Taras Shevchenko National University of Kyiv); Mr FEDIRCHYK, Igor (Taras Shevchenko National University of Kyiv); Ms DEMCHINA, Valentyna (Gas Institute of National Academy of Sciences of Ukraine)

Presenter: Mr FEDIRCHYK, Igor (Taras Shevchenko National University of Kyiv)

Track Classification: Plasma Physics

Contribution ID: 146

Type: **Poster**

Electrical Breakdown in a Mixture of CO₂ and N₂ in Mars-Like Conditions

The model of electrical breakdown in a mixture of carbon dioxide and nitrogen in conditions similar to that on the surface of Mars is presented. The model includes reactions of impact ionization, associative attachment, dissociative recombination, excitation of oxygen atoms, charge exchange reactions, and electron and ion losses on dust particles. The magnitudes of the breakdown electric field and saturation electron density are estimated using numerical simulations.

Primary authors: IVKO, Sergii (V.N. Karazin Kharkiv National University); Prof. DENYSENKO, Igor (V.N. Karazin National University); Prof. AZARENKOV, Nikolay (V.N. Karazin Kharkiv National University)

Presenter: IVKO, Sergii (V.N. Karazin Kharkiv National University)

Track Classification: Plasma Physics

Contribution ID: 147

Type: **Poster**

FIBER-OPTIC LINKS WITH USE OF CWDM TECHNOLOGY

A model of the fiber-optic links with the use of wavelength-division multiplexing technology on the example of the URAN network in Poltava is proposed. It is suggested to carry out the modernization of the existing network using coarse wavelength division multiplexing technology. Based on the analysis of the network topology in Poltava, there is presented a variant of equipment placement for correct system operation, while connecting clients to the new network without interrupting the service.

Primary author: VEREMEIENKO, Oleksandr

Presenter: VEREMEIENKO, Oleksandr

Track Classification: Radio Engineering and Communications

Contribution ID: 148

Type: **Oral**

HIGHER RADIAL MODES OF AZIMUTHAL SURFACE WAVES IN MAGNETOACTIVE CYLINDRICAL WAVEGUIDES

Azimuthal surface waves (ASWs) are eigen modes of the cylindrical plasma-dielectric-metal structures both in presence and without axial d-c magnetic field. They are actively studied due to possible applications in plasma electronics, radiophysics, nanotechnologies, and biomedical diagnostics. Higher radial modes are known to propagate at higher frequencies and shorter wave lengths as compared to those of the zero-th mode which is of interest for practical applications. To get advantage of excitation of higher radial modes of ASWs one has first to know their dispersion properties. The paper generalizes the results of earlier papers via including axial d-c magnetic field and considering the higher radial modes. Account for the axial d-c magnetic field removes degeneration of the waves' spectrum in respect of the sign of azimuthal wave number.

Primary authors: Prof. GIRKA, Igor (V. N. Karazin Kharkiv National University); Mr KONDRATENKO, Viacheslav (V. N. Karazin Kharkiv National University)

Presenter: Mr KONDRATENKO, Viacheslav (V. N. Karazin Kharkiv National University)

Track Classification: Plasma Physics

Contribution ID: 149

Type: **Poster**

THE FORMATION OF ZERO-FIELD STEPS IN IV-CHARACTERISTICS OF LONG JOSEPHSON JUNCTIONS

We modeled IV-characteristics and dynamics of excitations produced in the long Josephson junction by the inhomogeneous distribution of critical currents. Zero-field steps were observed in IV-curves. We proved that the oscillation movement of fluxons took part in the formation of zero-field steps.

Primary authors: Dr GRYB, Alexander (senior scientific worker); SHATERNIK, Volodymyr (G.V.Kurdyumov Institute for Metal Physics of NAS of Ukraine); Mr VOVK, Ruslan; SHAPOVALOV, Andrii (V. Bakul Institute for Superhard Materials); KHANENKO, Pavlo (Kyiv Academic University, G. V. Kurdyumov Institute for Metal Physics)

Presenter: KHANENKO, Pavlo (Kyiv Academic University, G. V. Kurdyumov Institute for Metal Physics)

Track Classification: Magnetism and Superconductivity

Contribution ID: 150

Type: **Oral**

SIMULATION OF 3D SPIN CHAINS WITH GEOMETRY-DRIVEN ANISOTROPY

We develop a C-code based spin-lattice simulator SLaSi for magnetization dynamics in ferro- and antiferromagnets. It solves discrete dynamical Landau-Lifshitz-Gilbert equations taking into account exchange and coordinate-dependent anisotropy defined in terms of local discrete Frenet-Serret reference frame calculated on fly. Runge-Kutta-Fehlberg integration scheme of 4-5 order is used for description of time evolution. A user-friendly interface for sample and integrator parameters is developed.

Primary author: TOMILO, Artem (Taras Shevchenko National University of Kyiv)

Co-authors: Dr PYLYPOVSKYI, Oleksandr (Taras Shevchenko National University of Kyiv); Dr YERSHOV, Kostiantyn (Bogolyubov Institute for Theoretical Physics); Prof. SHEKA, Denis (Taras Shevchenko National University of Kyiv)

Presenter: TOMILO, Artem (Taras Shevchenko National University of Kyiv)

Track Classification: Computer Engineering

Contribution ID: **151**

Type: **not specified**

Magnetron sputtering of nanomaterials for various applications

Wednesday, 23 May 2018 12:20 (50 minutes)

Primary author: Dr PRYSIAZHNYI, Vadym (Institute of Physics and Biophysics, Faculty of Science, University of South Bohemia)

Presenter: Dr PRYSIAZHNYI, Vadym (Institute of Physics and Biophysics, Faculty of Science, University of South Bohemia)

Contribution ID: 152

Type: Oral

Investigation of the influence of cluster sizes on light scattering processes in the structured ferrofluid

Classic ferrofluid (FF) is a colloidal suspension of magnetic nanoparticles in a carrier-liquid, which stabilized by surfactant. FF is a unique substance that combines liquid properties (viscosity, fluidity, surface tension, etc.) and ability to interact with the magnetic field. Although there were made many different investigations of FF, full classification of aggregate formation and transformation processes were not created before. But such researches are very important due to the possibility of medical usage of FF.

The main idea of this work is a simulation of the light scattering on FF's aggregates. The main phase of our investigations was analyzing light scattering spectrum.

Primary authors: VOSHCHINSKIY, Victor; Mrs ZBOROVSKA, Ilona (Taras Shevchenko National University of Kyiv); Mr SHULYMA, Sergiy (Taras Shevchenko National university of Kyiv); Mr TANUGIN, Bogdan; Mr MATSKEVYCH, Dmytro

Presenter: VOSHCHINSKIY, Victor

Track Classification: Magnetism and Superconductivity

Contribution ID: 153

Type: **Oral**

CO2 METER USING NDIR INFRARED MH-Z14A SENSOR FOR AVR ATMEGA 328

In this paper we consider the possible way to create a system for automatically measuring of carbon dioxide concentrations in industrial premises as well as the light and sound staff alert when exceeding the maximum permissible concentration, which can lead to lethal effects. The system for the automatic CO2 concentration measurements is developed on the basis of the microcontroller AVR ATmega 328 and the sensor MH-Z14A. The proposed system not only allows you to automatically measure the CO2 concentration in the production premises and signal the personnel about the danger, but also claims to mass design and production as a separate device for household goods in the category of goods costing up to 100 USD.

Primary authors: Mr MOISEIENKO, Vladislav (Taras Shevchenko National University of Kyiv); BELIMENKO, Roman (Taras Shevchenko National University of Kyiv)

Presenter: BELIMENKO, Roman (Taras Shevchenko National University of Kyiv)

Track Classification: Computer Engineering

Contribution ID: 154

Type: **Poster**

Neutron reflectometry study of structure in thin films of polystyrene-fullerene nanocomposites

Thin polymer films have numerous technological applications in various industrial and biomedical sectors related to protective and functional coatings, non-fouling biosurfaces, biocompatibility of medical implants, separations, advanced membranes, microfluidics, sensors, devices, adhesion, lubrication and friction modification[1]. In many cases, the films can be of complex composition with different types of polymers with complex architecture and other components such as nanoparticles. Polymers in thin films and nanocomposite structures can exhibit unusual physical properties due to the geometric constraints imposed by the presence of surfaces and interfaces. Polystyrene-fullerene films present a suitable model system for investigation of these properties. Neutron reflectometry has proved to be an effective method for studying PS/C60, allowing evaluating the structural peculiarities of nanoparticles ordering in the polymer matrix [2].

In the present work, we performed neutron study of structure and glass transition in the thin films of polystyrene-fullerene C70 nanocomposite. PS/C70 and dPS/C70 solutions in toluene were spin-coated on Si (111) at 2000 rpm after filtering through 0.22 Milipore filter. Series of thin films samples with different concentration of C70 were prepared and investigated for the internal structure and glass transition.

Neutron measurements of polymer thin films in the temperature range up to 130°C were performed at the GRAINS instrument of the IBR-2, JINR. For this purpose, a special cell for samples was designed and created. Changing of the glass transition temperature has been observed and possible internal structure of films has been analyzed.

Primary author: Mr KARPETS, Maksym

Presenter: Mr KARPETS, Maksym

Track Classification: Surface Physics and Nanoelectronics

Contribution ID: 155

Type: **Oral**

COMPUTER SIMULATION OF CLUSTER FORMATION PROCESSES BY THE MOLECULAR DYNAMICS METHOD WITH USING THE BARNES-HUT ALGORITHM

It was investigated the cluster formation processes into ferrofluids for great magnetic nanoparticles ensembles. It was shown that such processes depend on magnetic field magnitude and magnetic field application time.

Primary authors: Mr MATSKEVYCH, Dmytro (Taras Shevchenko National University of Kyiv); Mr VOSHCHINSKIY, Viktor (Taras Shevchenko National University of Kyiv); Mrs ZBOROVSKA, Ilona (Taras Shevchenko National University of Kyiv); Mr SHULYMA, Serhii (Taras Shevchenko National University of Kyiv); Mr TANYGIN, Bogdan (Infopulse Ukraine)

Presenter: Mr MATSKEVYCH, Dmytro (Taras Shevchenko National University of Kyiv)

Track Classification: Magnetism and Superconductivity

Contribution ID: 157

Type: **not specified**

Numerical modeling of electromagnetic scattering by discrete random media

Wednesday, 23 May 2018 13:10 (50 minutes)

Primary author: Dr DLUGACH, Janna (Main Astronomical Observatory of NANU)

Presenter: Dr DLUGACH, Janna (Main Astronomical Observatory of NANU)

Contribution ID: 158

Type: **Oral**

INVESTIGATION OF KINETIC INSTABILITY OF SPIN WAVES IN NORMALLY MAGNETIZED THIN YTTRIUM-IRON GARNET FILMS

In this work, the behavior of secondary spin waves (SSW) arising under the action of parametric pumping in normally magnetized films of yttrium-iron garnet (YIG) was investigated. SSW frequencies differ from the frequency of parametric spin waves (PSW) with longitudinal pumping and correspond to the position of the bottom of the spin-wave spectrum. The dependences of the threshold of parametric instability and radiation frequency on the threshold of instability of SSW from the external magnetic field and the power of the microwave pumping have been obtained and analyzed. It is shown that for a normally magnetized film, the parametric excitation of the SSW leads to the appearance of electromagnetic radiation at the frequency γH_{eff} . The threshold of kinetic instability weakly depends on the power of the microwave pumping and is determined by an external constant magnetic field.

Primary authors: Mr MARTYNCHYK, Yuri (Student); Dr KOBLJANSKYI, Yuri (Ph. D. Assoc. Prof.); Mr KONDRATOVYCH, Yuri (Lead Engineer)

Presenter: Mr MARTYNCHYK, Yuri (Student)

Track Classification: Magnetism and Superconductivity

Contribution ID: 159

Type: **Oral**

LIGHT FOCUSING THROUGH A STRONGLY SCATTERING MEDIUM USING BINARY AMPLITUDE MODULATION

The results of an optical experiment on light focusing through a strongly scattering medium are described. The principal possibility of obtaining one and two focal spots by the use of binary amplitude modulation of incident light with the aid of a liquid crystal spatial light modulator is shown.

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Presenter: Mr DANKO, Oleksandr (National Taras Shevchenko Univ. of Kyiv)

Track Classification: Laser Physics and Optoelectronics

Contribution ID: 160

Type: **Oral**

THE VOLTAGE OSCILLATIONS IN THE SILICON STRUCTURE AT COURSE OF EXTREME CURRENTS

Voltage oscillations that arise when high-density currents flow through silicon with dielectric isolation (SDI) structure have been obtained and investigated. The investigations have been conducted in pulsed mode. Volt-ampere characteristics of SDI structure and distinctive parameters of oscillograms for both relaxation and quasi-harmonic oscillations have been studied. We have proposed a model to show how the voltage oscillations have been arising.

Primary authors: Mr PAVLYUK, S (Taras Shevchenko National University of Kyiv); Prof. GRYGORUK, Valerii; TELEGA, Volodymyr; Mr PETRYCHUK (Taras Shevchenko National University of Kyiv); Mr IVANCHUK (Taras Shevchenko National University of Kyiv); GANDZYUK (Taras Shevchenko National University of Kyiv)

Presenter: GANDZYUK (Taras Shevchenko National University of Kyiv)

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: 161

Type: **Poster**

INTERACTION OF MEMBRANNE TRPV1 AND TRPA1 CHANNELS IN DRG NEURONS OF RATS

TRPA1 and TRPV1 channels are nonselective Ca^{2+} channels and regulate intracellular calcium levels. Deviation from the normal level of calcium in the cell can lead to a number of pathologies in the nervous system, including neuropathy and pain syndromes. The purpose of this work was the experimental studies of interaction of TRPA1 and TRPV1 channels, their sensitivity to selective agonists - allyl isothiocyanate (AITC) and capsaicin (Caps), and the interaction of channels with each other, by microfluorescent measurement. Our experiments have shown that the interaction between TRPA1 and TRPV1 channels was proved, indicating that the activation of the TRPA1 channel results in the resensitization of the TRPV1 channel sensitivity to the agonists.

Primary author: Mr GRYNDII, Roman (Taras Shevchenko National University of Kyiv)

Co-authors: Prof. LUKYANETZ, Elena (Bogomoletz Institute of Physiology NAS Ukraine); DRAGAN, Andrii (Bogomoletz Institute of Physiology NAS Ukraine); PETRUSHENKO, Olena (Bogomoletz Institute of Physiology NAS Ukraine); IVANYUTA, Oleksandr (Faculty of Radiophysics, Electronics and Computer Systems of Taras Shevchenko National University of Kyiv, Ukraine)

Presenter: Mr GRYNDII, Roman (Taras Shevchenko National University of Kyiv)

Track Classification: Medical Physics

Contribution ID: 162

Type: **Oral**

EMULATOR OF A MODULAR MEASURING SYSTEM FOR AUTOMATION TOOLS LEARNING

The emulator of the modular measuring system is implemented in order to use for study of the measuring system program control. The emulator has advanced graphical system which represents the complete configuration of the measuring system. In the process of performing a laboratory task, the student writes the text of the program (on C++ or C#) in the console application projects implemented as a part of this software package.

Primary authors: KONONOV, Viktor (Kyiv Electronic Devices College); Dr KONONOV, Mykhailo (Taras Shevchenko National University of Kyiv)

Presenter: KONONOV, Viktor (Kyiv Electronic Devices College)

Track Classification: Radio Engineering and Communications

Contribution ID: 163

Type: Oral

Analytical solutions of Schrödinger's equation for an open spherical semiconductor quantum dot with a shell

Solutions are obtained for the Schrödinger equation for an open semiconductor spherical quantum dot with a shell that is embedded in a medium of another semiconductor. The analytical solutions are exact for the zero orbital quantum number and approximate for $l=1÷3$. These results can subsequently be applied to the calculation of the permittivity of a similar system.

Primary author: Mr KOROVIN, George (Taras Shevchenko National University of Kyiv)

Presenter: Mr KOROVIN, George (Taras Shevchenko National University of Kyiv)

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: 164

Type: **Oral**

CHANGES IN THE LEVEL OF DECREMENT OF LOW-FREQUENCY OSCILLATIONS AFTER EXPOSURE TO PULSES OF A WEAK MAGNETIC FIELD

It was detected, compared and generalized the patterns of changes in the level of decrement of oscillations (DO) of dislocation low-frequency external and internal friction generated after exposing samples of materials with differing original structural conditions to pulses of a weak magnetic field (PWMF), each time in a new mode, which was changed 52 times.

Abstract Content

Type of Book of Abstracts

Contact Phone

Primary authors: Prof. DATSKO, Oleg (Interregional Academy of Personnel Management); Dr HOTSULIAK, Stanislav (Interregional Academy of Personnel Management); NEDYBALIUK, Anatolii (Vinnytsia National Technical University); Prof. KASIYANENKO, Vasyl (Vinnytsia National Technical University); Mr DEMCHUK, Mykola (Vinnytsia National Technical University)

Presenter: NEDYBALIUK, Anatolii (Vinnytsia National Technical University)

Track Classification: Magnetism and Superconductivity

Contribution ID: 165

Type: **Poster**

RESISTIVE SWITCHING PHENOMENA IN NANOSCALE COMPLEX-OXIDE HETEROSTRUCTURES: RESPONSE TO THE AC SIGNAL

In order to identify a physical mechanism responsible for the resistive switching effect in memristive oxide-based structures, we propose to study an ac response to a periodic current or voltage perturbation. A minimalist model which accounts for the frequency impact on hysteresis phenomenon in current-voltage characteristics of the yttrium-barium-cuprate $\text{YBa}_2\text{Cu}_3\text{O}_{7-c}$ (YBCO) based contacts is proposed and analyzed numerically.

Primary authors: Dr ZHITLUKHINA, Elena (O.O. Galkin Donetsk Institute for Physics and Engineering, NASU); Dr PLECENIK, Tomas (Comenius University in Bratislava); BELOGOLOVSKII, Mikhail (G.V. Kurdyumov Institute for Metal Physics, National Academy of Sciences of Ukraine); Prof. KUS, Peter (Comenius University in Bratislava); Prof. PLECENIK, Andrej (Comenius University in Bratislava)

Presenter: Dr ZHITLUKHINA, Elena (O.O. Galkin Donetsk Institute for Physics and Engineering, NASU)

Track Classification: Surface Physics and Nanoelectronics

Contribution ID: 166

Type: **Oral**

Theoretical Consideration Of The Interaction In The System Of Three Nanoparticles

Interaction in the system 'virus-two nanoparticles' has been studied. The local field distribution in the system was calculated using the Green function method and the concept of the effective susceptibility. Obtained results show that interaction between nanoparticles can be neglected if the distance between them is at least around the nanoparticle size. The approach can be used for description interactions in the system of many nanoparticles, including the antiviral effect of nanoparticles.

Primary author: DEMCHENKO, Hanna

Co-author: RUSINCHUK, Natalia

Presenter: DEMCHENKO, Hanna

Track Classification: Medical Physics

Contribution ID: 167

Type: **Oral**

INVESTIGATION OF THE FERROMAGNETIC RESONANCE OF HIGH-THIN METAL FERROMAGNETIC FILMS

The non-planar angular dependence of the ferromagnetic resonance (FMR) was measured for CoFeB, films of different thicknesses made by magnetron sputtering. Angle outside the plane the dependence of the FMR resonance field and the line width were analyzed using the Landau-Lifshitz-Hilbert equation with allowance for broadening of the line width due to magnetic inhomogeneities in the film. Magnetic irregularities were considered fluctuations the magnitude and direction of the effective demagnetization field, which contains both demagnetization and perpendicular field of anisotropy for the film. Calculations of the angular variations of the line width are consistent with the experimental quantitatively. With the help of the experiment, it was found that it is sufficient to use only uniform broadening, since the samples are performed fairly qualitatively. The value of $\alpha = 0.0065$. After the calculations, it was revealed that the experimental values are as close as possible to the theoretical values.

Primary authors: KOVALYK, Roman (Taras Shevchenko National University of Kyiv); Dr KOBLJANSKYJ, Yuri (Taras Shevchenko National University of Kyiv); Mr KONDRATOVYCH, Yu. (Taras Shevchenko National University of Kyiv)

Presenter: KOVALYK, Roman (Taras Shevchenko National University of Kyiv)

Track Classification: Magnetism and Superconductivity

Contribution ID: **168**Type: **Oral**

STUDYING OF PHOTSENSITIVITY AND GAS SENSITIVITY OF Si-CdTe-ZnO HETEROSTRUCTURES

The studying of the photocurrent relaxation kinetics in Si-CdTe-ZnO semiconductor heterostructure at illumination of light of 632 and 458 nm wave lengths and influence of light on sensitivity to ethyl alcohol vapor was carried. It was shown, that photocurrent relaxation kinetics is qualitatively dependent on the wave length of illuminating light, and the light causes growth of adsorptive response.

Primary authors: GAPONENKO, Volodymyr (Taras Shevchenko National University of Kyiv); LUSHKIN, Oleksandr (Taras Shevchenko National University of Kyiv); KOSTIUKEVYCH, Oleksandr (Taras Shevchenko National University of Kyiv)

Presenter: GAPONENKO, Volodymyr (Taras Shevchenko National University of Kyiv)

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: 169

Type: **Oral**

SENSORY POSSIBILITIES OF COMPOSITE STRUCTURES WITH MAGNETIC STRUCTURAL PROPERTIES

Measurements of the magnetization curves for mechanical deformations of composite layered structures with ferromagnetic and piezoelectric properties and simulation of these curves on the basis of Stoner-Wolfart's model made it possible to explain both the physical processes occurring with magnetic subsystem under deformation and features of the curve shapes for the purpose of adaptation the properties of the mentioned structures for different operating conditions.

Primary author: Mr ZUBENKO, Igor (KNU)

Presenter: Mr ZUBENKO, Igor (KNU)

Track Classification: Magnetism and Superconductivity

Contribution ID: 172

Type: **Poster**

CYLINDRICAL RESONATOR WITH METASURFACE AT END-FACE: THEORY AND EXPERIMENT

Theoretical model for resonator eigenmodes $HE_{\pm 11\delta}$ in the cylindrical cavity with ferrite layer on metal end-face in T-wave approximation was developed and compared with experiment. Experimentally obtained effective tuning of $HE_{+11\delta}$ resonance frequency was 0.2 MHz/Oe at ferromagnetic antiresonance frequency, that one order less than typical frequency tuning in ferrite resonators by ferromagnetic resonance.

Primary authors: Dr ZAVISLYAK, Igor (Taras Shevchenko National University of Kyiv); Mr CHUMAK, Hryhorii (Taras Shevchenko National University of Kyiv)

Presenter: Mr CHUMAK, Hryhorii (Taras Shevchenko National University of Kyiv)

Track Classification: Magnetism and Superconductivity

Contribution ID: 173

Type: **Oral**

REFERENCELESS WAVEFRONT RECONSTRUCTION USING THE TALBOT SENSOR

The most common used approach of wavefront measurement is based on the sampling light amplitude distribution. By analyzing intensity patterns derived from reference and object wave, the local front slopes can be measured. The new approach for referenceless wavefront reconstruction is proposed by using the Talbot sensor. It is shown, that by comparing the images of an object wave produced in two sequential Talbot planes, the local front slopes can be measured too. Experimental results have been compared with Talbot and Shack-Hartmann sensors while using classic methodology

Primary authors: BRAZHNIKOV, Denis; Mr SHARASHIDZE, David (Taras Shevchenko National University of Kyiv); Mr KOTOV, Myhailo (Taras Shevchenko National University of Kyiv); Dr KOVALENKO, Andrey (National Taras Shevchenko Univ. of Kyiv)

Presenter: BRAZHNIKOV, Denis

Track Classification: Laser Physics and Optoelectronics

Contribution ID: 174

Type: **Oral**

Variants of increasing autonomy time for IoT measurement devices

The using of devices in such areas as meteorology, agrarian sphere, protection and etc requires special conditions for energy supply. Most IoT devices used in these industries are located in areas with unstable power supply and complicated access to equipment. In this regard, there is a question of the uninterruptible power supply for these devices. Considered the possibility of using additional components to autonomous devices.

Primary author: Mr ZAGARIA, Olexandr (Taras Shevchenko National University of Kyiv)

Co-author: Mr BOYKO, Yuriy (Taras Shevchenko National University of Kyiv)

Presenter: Mr ZAGARIA, Olexandr (Taras Shevchenko National University of Kyiv)

Track Classification: Computer Engineering

Contribution ID: 175

Type: **Oral**

ONE-DIMENSIONAL SIMULATION OF NANOPARTICLE DEPOSITION FROM PLASMAS ON SOLID SURFACE

In this paper, we report about computer simulation of nanoparticles deposition from the rarefied plasma onto the solid substrate. In our model, we used equations of cold hydrodynamics for ions, the equilibrium Boltzmann distribution for electrons, and PIC method for modelling of nanoparticles. It is shown that charged nanoparticles can change the sheath, so that deposition of nanoparticles on the substrate occurs non-uniformly in time.

Primary authors: Mr BONDAR, Maksym (Taras Shevchenko National University of Kyiv); KRAVCHENKO, Oleksandr (Taras Shevchenko National University of Kyiv)

Presenter: Mr BONDAR, Maksym (Taras Shevchenko National University of Kyiv)

Track Classification: Plasma Physics

Contribution ID: 176

Type: **Oral**

DETERMINATION OF THE REDUCED ELECTRIC FIELD IN THE MICRODISCHARGE AIR PLASMA

The paper presents the results of finding of microdischarge reduced electric field. Current-voltage characteristics were measured for distances between electrodes 0.5-4.5 mm. Microdischarge based on rotating discharges in vortex flow. Air was used as a plasma forming gas.

Primary authors: KOLOMIETS, Oksana (Taras Shevchenko National University of Kyiv); Prof. CHERNYAK, V.Ya. (Faculty of Radio Physics, Electronics and Computer Systems, Taras Shevchenko National University of Kyiv); Dr IUKHYMENKO, V.V. (Faculty of Radio Physics, Electronics and Computer Systems, Taras Shevchenko National University of Kyiv); Mr IUKHYMENKO, K.V. (Faculty of Radio Physics, Electronics and Computer Systems, Taras Shevchenko National University of Kyiv); Mr FEDIRCHYK, I.I. (Faculty of Radio Physics, Electronics and Computer Systems, Taras Shevchenko National University of Kyiv); Mr LENDIEL, V.V. (Faculty of Radio Physics, Electronics and Computer Systems, Taras Shevchenko National University of Kyiv); Dr SAMCHENKO, Y. (F.D. Ovcharenko Institute of Biocolloidal Chemistry NAN Ukraine); PASMURCEVA, N. (F.D. Ovcharenko Institute of Biocolloidal Chemistry NAN Ukraine); POLTORACKA, T. (F.D. Ovcharenko Institute of Biocolloidal Chemistry NAN Ukraine); KERNOSENKO, L. (F.D. Ovcharenko Institute of Biocolloidal Chemistry NAN Ukraine)

Presenter: KOLOMIETS, Oksana (Taras Shevchenko National University of Kyiv)

Track Classification: Plasma Physics

Contribution ID: 177

Type: **Poster**

THE INFLUENCE OF A MAGNETIC FIELD ON THE MAGNETIC SUSCEPTIBILITY OF THE TITANIUM ALLOY VT3-1

An increase of the magnetic susceptibility on 8% of a paramagnetic titanium alloy VT3-1 upon its multiple processing in a permanent magnetic field with induction $B=[0,25\div1,0]$ T was found. If we make an analogy with ferromagnets, the obtained results of the dependence of the magnetic susceptibility of the titanium alloy VT3-1 on the preceding magnetic state make it possible to speak of the existence of a paramagnetic hysteresis.

Primary authors: Mr SEIDAMETOV, Stanislav (Zaporizhzhya National Technical University); Dr LOSKUTOV, Stepan (Zaporizhzhya National Technical University); Dr SNEZHNOJ, Valentin (Zaporizhzhya National University)

Presenter: Mr SEIDAMETOV, Stanislav (Zaporizhzhya National Technical University)

Track Classification: Magnetism and Superconductivity

Contribution ID: 178

Type: **Oral**

METHOD OF GAUSSIAN FILTRATION OF PHOTODETECTOR NOISE IN THE AMPLIFICATION SPECTRA OF FIBER RAMAN AMPLIFIER

The maximum power of the amplified spontaneous noise in silica single-mode fiber (SMF) is studied experimentally as function of the pump power variation in the idle mode of counter-pumped fiber Raman amplifier (FRA). Method of Gaussian filtration of detector noise in the amplification spectra of fiber Raman amplifier is presented.

Primary authors: Ms SERDEHA, Irina (Taras Shevchenko National University of Kyiv); Mr BRATANICH, Dmytro (Taras Shevchenko National University of Kyiv, Faculty of Radiophysics, Electronics and Computer Systems); Dr FELINSKYI, Georgii (Taras Shevchenko National University of Kyiv, Faculty of Radiophysics, Electronics and Computer Systems); Dr REZNIKOV, Michailo (Taras Shevchenko National University of Kyiv, Faculty of Radiophysics, Electronics and Computer Systems)

Presenter: Mr BRATANICH, Dmytro (Taras Shevchenko National University of Kyiv, Faculty of Radiophysics, Electronics and Computer Systems)

Track Classification: Laser Physics and Optoelectronics

Contribution ID: **180**

Type: **Oral**

0

Track Classification: Computer Engineering

Contribution ID: **181**Type: **Oral**

ETHANOL VAPOR INFLUENCE ON ELECTRICAL PROPERTIES OF POROUS SiC

Freestanding porous silicon carbide (PSiC) was synthesized via electrochemical etching of silicon carbide (3C-SiC). The surface morphology of PSiC has been studied using scanning electron microscopy (SEM). The electrical properties of porous SiC structures were investigated using impedance measurements in dry air and in saturated vapor of ethanol.

Primary authors: Dr GAVRYLCHENKO, Iryna (Institute of High Technologies, Taras Shevchenko National University of Kyiv,); Dr MILOVANOVA, Yurii (* Institute of High Technologies, Taras Shevchenko National University of Kyiv); Mrs FILIMONOVA, Olha; Mrs TYSCHENKO, Valentyna; Mrs VLASENKO, Iryna; Prof. SKRYSHEVSKY, Valeriy; Dr ALEKSEEV, Sergey

Presenter: Dr GAVRYLCHENKO, Iryna (Institute of High Technologies, Taras Shevchenko National University of Kyiv,)

Track Classification: Physics of Semiconductors and Dielectrics, Semiconductor's Devices

Contribution ID: **182**

Type: **Oral**

DEVELOPMENT AND ANALYSIS OF TOOL FOR VERIFICATION GRAPHIC ISOMORPHISM

Created application checks whether the first graph is isomorphic to the second one. Conclusions about the practical use of this program and its benefits were made.

Primary author: BILETSKIY, Pavlo (Taras Shevchenko National University of Kyiv)

Co-author: Prof. POGORILYY, Sergiy (Taras Shevchenko National University of Kyiv)

Presenter: BILETSKIY, Pavlo (Taras Shevchenko National University of Kyiv)

Track Classification: Computer Engineering

Contribution ID: 183

Type: **Oral**

ABOUT THE ROLE OF ANTI-REFLECTIVE COATING IN GAS SENSITIVITY OF THE Si-BASED PHOTOVOLTAIC CELLS

The current-voltage characteristics and current kinetics under influence of ethanol at constant applied bias voltage were measured and compared for the Si-based photovoltaic cell with Si₃N₄ anti-reflective layer and for the uncovered one. It was shown that porous anti-reflective film acts as a barrier for molecules of analyte and its presence leads to decreasing of adsorptive response of the samples as well as prolongation of the response time.

Primary authors: PAVLIVSKYI, Olexandr; LUSHKIN, Oleksandr (Taras Shevchenko National University of Kyiv); KOSTIUKEVYCH, Oleksandr (Taras Shevchenko National University of Kyiv); TEL-EGA, Volodymyr

Presenter: PAVLIVSKYI, Olexandr

Contribution ID: **184**Type: **Oral**

CONTINUOUS EMISSION SPECTRUM OF PLASMA OF ELECTRIC ARC DISCHARGE BETWEEN TUNGSTEN AND MOLYBDENUM ELECTRODES

The results of spectroscopic studies of plasma arc discharge between tungsten and molybdenum electrodes are presented. Atomic emission lines and continuous spectrum were observed during experiment. Continuous spectrum was assumed as result of heated macroscopic particles emission, so it can be modeled by Planck's law. The temperature of such particles was estimated in this way

Primary authors: Ms BELIMENKO , Julia (Taras Shevchenko National University of Kyiv); Mrs KHUDENKO, Zhanna (Taras Shevchenko National University of Kyiv)

Co-authors: Mr LEBID, Anton (Taras Shevchenko National University of Kyiv); Prof. VEKLICH, Anatoly (Taras Shevchenko National University of Kyiv)

Presenters: Ms BELIMENKO , Julia (Taras Shevchenko National University of Kyiv); Mrs KHUDENKO, Zhanna (Taras Shevchenko National University of Kyiv)

Track Classification: Plasma Physics

Contribution ID: **186**Type: **Oral**

SCATTERING MECHANISMS FROM ELECTRONIC SURFACE STATES IN TOPOLOGICAL INSULATORS

The uniqueness of topological insulators lies in the presence of the topologically protected electronic surface states. The study of the electronic structure of these states allows us to find new applications for topological insulators in electronics, especially as a material for spintronic devices. The electronic structure of bismuth selenide and compounds with tellurium, which are topological insulators, are investigated. Using approximation methods, the quasi-particle scattering curves were derived, which gave information about contributions of different types of scattering. The study of scattering near the Dirac point revealed the existence of additional contributions that could be caused by magnetic interaction and additional spin ordering.

Primary authors: TOPOROV, Yurii (Taras Shevchenko National University of Kyiv); Prof. KORDYUK, Alexander (G.V.Kurdyumov Institute for Metal Physics, NAS of Ukraine)

Presenter: TOPOROV, Yurii (Taras Shevchenko National University of Kyiv)

Track Classification: Magnetism and Superconductivity

Contribution ID: **187**Type: **Oral**

PHASE-LOCKING EFFECT IN ONE-DIMENSIONAL AND TWO-DIMENSIONAL ARRAYS OF SPIN-TORQUE NANO-OSCILLATORS

In this paper we numerically study the phase-locking effect in one-dimensional (1-D) and two-dimensional (2-D) arrays of spin-torque nano-oscillators (STNOs) consisting various number of oscillators (2 and 4). Our calculation results show that the efficiency of STNO synchronization depends on the geometry of oscillator array and the spread of oscillator eigenfrequencies. In particular linear STNO array could be rather easily phase-locked for the case of almost identical STNOs, while STNOs having a large spread of eigenfrequencies are better synchronized if they organized in 2-D arrays.

Primary authors: YURCHAK, Nataliia; Dr PROKOPENKO, Oleksandr (Taras Shevchenko National Unaversity of Kyiv)

Presenter: YURCHAK, Nataliia

Track Classification: Magnetism and Superconductivity

Contribution ID: 188

Type: Oral

DETERMINATION OF MICROWAVE SIGNAL FREQUENCY IN A SYSTEM OF THREE UNCOUPLED SPIN-TORQUE MICROWAVE DETECTORS

Typical frequency dependence of the output dc voltage generated by a spin-torque microwave detector (STMD) based on the magnetic tunnel junction is almost symmetric which makes difficult to determine microwave signal frequency using only one nanostructure. Previously it was shown that two STMDs can be used as a spectrum analyzer in the short range of frequencies between the resonance frequencies of the detectors. In this work we have developed the procedure that allows one to determine frequency of an external microwave signal in a wider range of frequencies. Both the calibration and the frequency determination procedures can be performed completely automatically and do not require any human analysis. The described method can be applied to an arbitrary number of STMDs (not less than 3) with minimal changes.

Primary authors: SHANIDZE, Roman; Dr PROKOPENKO, Oleksandr (Taras Shevchenko National University of Kyiv)

Presenter: SHANIDZE, Roman

Track Classification: Magnetism and Superconductivity

Contribution ID: 189

Type: **Oral**

Dual-frequency fiber Raman laser for terahertz and radio-over-fiber applications

Photonic methods for generating and detecting THz signals are a subject of a great research activity in recent years because such systems combine the potential of a high THz wireless communication capacity with a long-range fiber-optic communication potential. We propose the new design scheme of dual-frequency fiber Raman laser in our work and its advantages in comparison with semiconductor photonics circuits for terahertz and radio-over-fiber applications are discussed.

Primary author: Mr TARASHCHUK, Ihor (Taras Shevchenko National University of Kyiv)

Co-authors: Dr FELINSKYI, G. (Taras Shevchenko National University of Kyiv); Dr REZNIKOV, M.I. (Taras Shevchenko National University of Kyiv, Faculty of Radiophysics, Electronics and Computer Systems)

Presenter: Mr TARASHCHUK, Ihor (Taras Shevchenko National University of Kyiv)

Track Classification: Radio Engineering and Communications

Contribution ID: **190**Type: **Oral**

COUPLING OF SURFACE WAVE RESONATORS

The waveguide segment limited in the direction of wave propagation is a resonator the resonance frequency of which is determined by the length of this segment l . This also applies to surface plasmons. Thus, a separate metal plate (or film) on the dielectric substrate can be a resonator. Such resonator is called a surface wave resonator (SWR). The system of two such resonators has rather interesting properties. These properties were investigated in this paper.

Primary authors: Mr PROKOPENKO, Yaroslav (Faculty of Radiophysics, Electronics and Computer Systems of Taras Shevchenko National University of Kyiv); Mr MALYSHEV, Vladimir

Presenter: Mr PROKOPENKO, Yaroslav (Faculty of Radiophysics, Electronics and Computer Systems of Taras Shevchenko National University of Kyiv)

Track Classification: Magnetism and Superconductivity

Contribution ID: 192

Type: **Oral**

DETERMINATION OF SURFACE RESONANCE BY A SURFACE WAVE RESONATOR

The surface electromagnetic wave resonator has a fairly simple design. It can be used as a non-destructive analyzer of the properties of the material of its surface. The method of determining the surface resistance of a surface electromagnetic wave resonator is proposed. The proposed method specifies the specific surface resistance of an unknown material, based on various materials of the surface of the resonator.

Primary authors: DMYTRENKO, Oksana (Taras Shevchenko National University of Kyiv); Dr MALYSHEV, Vladimir (Taras Shevchenko National University of Kyiv)

Presenter: DMYTRENKO, Oksana (Taras Shevchenko National University of Kyiv)

Track Classification: Magnetism and Superconductivity

Contribution ID: 193

Type: **Oral**

THE ROLE OF COULOMB SCATTERING IN THE PLASMA HEATING BY THE BEAM-PLASMA INSTABILITY

Efficient method for ion-electron Coulomb scattering for particle-in-cell simulation was proposed, the simulation results of the initial stage of beam-plasma instability with and without allowance for Coulomb scattering are presented, the effect of scattering on the plasma heating is discussed.

Primary authors: Mr DADYKA, Dmytro (Taras Shevchenko National University of Kyiv); Prof. ANISIMOV, Igor (Taras Shevchenko National University of Kyiv)

Presenter: Mr DADYKA, Dmytro (Taras Shevchenko National University of Kyiv)

Track Classification: Plasma Physics

Contribution ID: 194

Type: **Poster**

IMPROVED ROUTINE OF COMPLEX PERMITTIVITY AND PERMEABILITY EVALUATION FROM THE MEASURED MICROWAVE SCATTERING PARAMETERS

The purpose of the work is to propose an improved procedure of both material parameters (complex permittivity ϵ and permeability μ) determination from the measured microwave scattering parameters. A qualitative analysis revealed that analytical methods give inaccurate and unphysical results in the resonance regions. Nowadays there exist a couple of improved only permittivity determination algorithms. It is shown the possible routine of both permittivity and permeability evaluation from the measured data using VNA.

Primary author: Mr SHIRINIAN, Artur (Taras Shevchenko National University of Kyiv)

Presenter: Mr SHIRINIAN, Artur (Taras Shevchenko National University of Kyiv)

Track Classification: Radio Engineering and Communications

Contribution ID: 195

Type: **Oral**

SIMULATION OF THE DYNAMICS IN THE SYSTEM 'CELLS-VIRUSES- NANOPARTICLES'

Interaction in the system 'cells-viruses- nanoparticles' has been simulated. The case of the viruses 'pretreatment' with nanoparticles and their further introduction to the cell culture has been considered. The model takes into account the growth restriction and the probability of adsorption and desorption. The model can be useful in medical physics while studying the virucidal action of nanoparticles and other medicines for explaining the experimental results and for evaluation of the viruses amount.

Primary authors: Mrs BOGACHUK, A. (Taras Shevchenko National University of Kyiv); Dr RUS-INCHUK, Natalia (Taras Shevchenko National University of Kyiv)

Presenter: Mrs BOGACHUK, A. (Taras Shevchenko National University of Kyiv)

Track Classification: Medical Physics

Contribution ID: 196

Type: **Oral**

Куда стремятся сетевые технологии, и роль Cisco в этих процессах

Thursday, 24 May 2018 10:35 (40 minutes)

Primary author: Mr ДОВГАНЬ, Юрий (Cisco Systems, Inc.)

Presenter: Mr ДОВГАНЬ, Юрий (Cisco Systems, Inc.)

Contribution ID: 197

Type: **Oral**

POSSIBILITIES OF MRI ANALYSIS UNDER CONDITION OF INSTABILITY OF SIGNALS MEASUREMENT

The influence of the instability parameters and the irregularities of the magnetic fields of the gradient system on the quality of tomograms was studied by methods of processing real tomographic images. It is shown that the possibility of obtaining reliable diagnostic information depends on the type of image. Three types of the reconstructed images for different values of signal deviation from the usual positions were received. The histogram analysis was conducted for estimation of the contributions of the unstable magnetic field gradients.

Primary authors: Dr NETREBA, Andrii (Taras Shevchenko National University of Kyiv); Mr KOMAROV, A. O. (Taras Shevchenko National University of Kyiv); Mr KYIASHKO, Y. O. (Taras Shevchenko National University of Kyiv); Mr PERSHUKOV, I. O. (Taras Shevchenko National University of Kyiv)

Presenter: Mr KOMAROV, A. O. (Taras Shevchenko National University of Kyiv)

Track Classification: Medical Physics

Contribution ID: **198**

Type: **Oral**

IT

Thursday, 24 May 2018 11:20 (40 minutes)