

# **2015 16th International Conference of Young Specialists on Micro/Nanotechnologies and Electron Devices**

## **(EDM 2015)**

**Erlagol (Altai Republic), Russia  
29 June - 3 July 2015**



IEEE Catalog Number: CFP15500-POD  
ISBN: 978-1-4673-6720-2

# Table of Contents

## Section I. Semiconductor Physics and Technology. Photovoltaics Section Chair: **Viktor A. Gridchin**

1.	<b>Substrates and Coating for Graphene Based Devices</b> Ekaterina V. Bazyleva, Igor A. Kotin, Irina V. Antonova, Victor Ya. Prinz	3
2.	<b>Viscous Damping Influence on Dynamic Characteristics in MEMS Variable Capacitor</b> Kirill E. Blum, Dmitriy I. Ostertak	8
3.	<b>Mechanisms of Surface Morphology Formation During Ge Growth on Si(100) at High Temperatures</b> Anastasia E. Budazhapova, Alexander A. Shklyaev	12
4.	<b>Analysis of GaAs Surface Etching During Droplet Epitaxy Process (Monte Carlo Simulation)</b> Maxim A. Vasilenko, Nataliya L. Shwartz	16
5.	<b>2D silicon nanopillars arrays for photonics</b> Lyudmila S. Golobokova, Yuri V. Nastaushev, Fedor.N. Dultsev, Natalia.V. Kryzhanovskaya	20
6.	<b>Two-Dimensional Simulation of the Silicon Nanowires Thinning Effect During the Thermal Oxidation</b> Sergey V. Kalinin, Andrey V. Egorkin	24
7.	<b>Formation And Characterization Of Au-Al<sub>2</sub>O<sub>3</sub>-Native Oxide-HgCdTe Structures</b> Evgeniy R. Zakirov, Valeriy G. Kesler	27
8.	<b>Features of Hg<sub>x</sub>-Cd<sub>x</sub>Te Anodic Sulfidization</b> Dmitry E. Ipatov, Evgeniy R. Zakirov, Valeriy G. Kesler	32
9.	<b>Sentaurus TCAD for Modeling of the Elements of the Matrix Photodetectors on Organic Compounds</b> Oxana N. Kashirskaya	37
10.	<b>Self-Organized Low Density SiGe Quantum Dot Molecules</b> Polina A. Kuchinskaya, Vladimir A. Zinovьев, Sergey A. Rudin, Aleksey V. Katsyuba, Anatoly V. Dvurechenskii, Aleksandr V. Mudryi	42
11.	<b>A Solar Cell, Based on the Epitaxial Layers of AlIIBV Compounds, Transferred from the Substrate onto the Flexible Polymeric Carrier</b> Dmitry M. Legan, Mikhail O. Petrushkov, Eugene A. Emelianov, Mikhail A. Putyato, Valery V. Preobrazhenskii, Oleg P. Pchelyakov	45
12.	<b>Thermoactivated Particularities of PbSnTe:In Films Conductivity</b> Aleksey N. Akimov, Vladimir S. Epov, Alexander E. Klimov, Valentin A. Lunegov, Vladimir N. Shumsky	49
13.	<b>Criterion for Perturbation Theory Application in Calculation of Holes Spectrum in Thin Monocrystalline Germanium Film Subject to Strong Magnetic Field</b> Nurgali Z. Altynbekov, Yan Z. Ososkov, Aleksey G. Moiseev	53
14.	<b>Calculating Operating Characteristics and Element Dimensions for Electrostatic Micropump with Nonmechanical Valves</b> Maksim S. Palagin, Aleksandr B. Berkin, Aleksandr V. Gluhov, Gennady V. Perov	56
15.	<b>GaAs MBE on Vicinal Substrates Si (001): Impact of Nucleation and Growth Conditions on Crystallographic Properties of the Epitaxial Layers</b> Mikhail O. Petrushkov, Mikhail A. Putyato, Valerii V. Preobrazhenskii, Boris R. Semyagin, Eugene A. Emelyanov	61
16.	<b>Temperature Compensated Integrated Zener Diode with Wide Range of the Operating Currents and Low Temperature Coefficient</b> Mikhail A. Primak, Ivan S. Shestakov, Vladimir K. Makukha	65
17.	<b>Self-assembly of CdS Nanocrystals Obtained by Langmuir-Blodgett technique on the SiO<sub>2</sub> Surface</b> Kirill A. Svit, Konstantin S. Zhuravlev	69
18.	<b>Magnetotransport Features of Two-Dimensional Electron Gas on Cylindrical Surface Exposed to Microwave Radiation</b> - Denis B. Sultanov, Alexander B. Vorob'ev, Anatoly F. Buldygin and Alexander I. Toropov	72
19.	<b>Quantization Noise Influence on Mobility Spectrum Method</b> Alexandr V. Trifanov, Dmitry D. Protasov, Vladimir Ya. Kostuchenko	75

20.	<b>TCAD – Simulation of the Complementary Bipolar Pair of Transistors</b> Mikhail O. Hrapov, Victor A. Gridchin, Sergey V. Kalinin	79
21.	<b>A Study of 3D Boss Structure Formation in Anisotropic Etching of Si (100) in Aqueous KOH</b> Artyom S. Chernov, Mikhail A. Chebanov, Viktor A. Gridchin, Vladislav Yu. Vasilyev, Alexander D. Byalik	83
22.	<b>Silicon Solar Cells with Vertical p-n Junctions for Hybrid Solar Cells</b> Viktoria V. Malyutina-Bronskaya, Valeryi B. Zalesskii, Aleksey I. Konoiko, Victor S. Malyshev	87
23.	<b>Electromagnetic Properties of MWNT, Correlation of Structure Characteristics with Electrophysics Properties</b> Evgeny Yu. Korovin, Valentine I. Suslyakov, Alexandra A. Pavlova	90
24.	<b>Modeling of Elastic Energy Relaxation in Coaxial InAs-GaAs Nanowire Heterostructures</b> Alexander N. Karpov, Nataliya L. Shwartz	93
25.	<b>The Estimation of IC Wafers Structural Defects Density with Functional Parameters</b> Konstantin S. Gerasimov, Pavel I. Sergeev	97
26.	<b>In/Out Pad Electrostatic Discharge Protection for Sub-Micron Integrated Circuits Based on Lateral Bipolar Transistor</b> Maksim S. Karpovich, Igor V. Pichugin, Vladislav Yu. Vasilyev	100

## Section II. Radio- and Microwave Technology. Computer Science and Telecommunications Section Chair: **Svetlana V. Vorobyova**

1.	<b>The Geometric Model of Two-dimensional Reflective Objects</b> Vadim V. Artyushenko, Alexey V. Kiselev	107
2.	<b>Broadband Microwave Attenuator</b> Pavel G. Bogomolov	110
3.	<b>Analysis of Methods of Error-Correcting Coding in the Existing Telecommunication Systems of Broadband Access to the Information Resources of the Transmission System</b> Svetlana V. Vorobiova, Pavel S. Solodov	113
4.	<b>Event Monitoring System of Smart School Laboratory</b> Yuliya V. Novitskaya, Stepan A. Strekalovskiy, Andrey V. Gavrilov	116
5.	<b>New Printed Structures for Protection Against UWB Pulses</b> Alexander T. Gazizov, Alexander M. Zabolotsky, Olga A. Gazizova	120
6.	<b>Elliptic Filters for Television and Telecommunications</b> Valentina M. Goychuk, Vladimir P. Razinkin, Mikhail K. Adrianov, Aleksey G. Vikhorev, Ali D. Mekhtiev	123
7.	<b>Ultra Wideband Directional and Undirectional Power Detectors</b> Andrey S. Zagorodny, Alexey V. Drozdov, Nikolay N. Voronin, Igor V. Yunusov	126
8.	<b>The Efficiency of Downlink Control Channel Utilization in LTE</b> Vera G. Drozdova, Anatoly G. Nechaev, Andrey V. Andreev	130
9.	<b>FSM Based Approach for Locating Faulty Software Components</b> Anton D. Ermakov, Nina V. Yevtushenko, Svetlana A. Prokopenko	133
10.	<b>TCP Over Mobile Ad Hoc Networks: Performance Evaluation and Protocol Improvement</b> Denis I. Iovlev	137
11.	<b>Design of the pHEMT GaAs MIC L-band switch-LNA for Autonomous Spacecraft Radionavigation Equipment</b> Vadim N. Shkolniy, Sergey B. Suntsov, Aleksey V. Kondratenko, Kirill A. Alekseev, Dmitriy A. Shishkin, Vadim M. Karaban	144
12.	<b>Study of the Dielectric Polarization in Li-Zn Ferrite Ceramics</b> Elena N. Lysenko, Andrey V. Malyshev, Vitaly A. Vlasov	147
13.	<b>Performance Evaluation of Multiservice Network with Unreliable Elements</b> Vladimir I. Meikshan, Vjacheslav P. Korchagin	150

14.	<b>Distributed Computing System for Solving Applied Tasks</b> Polina V. Mishchenko	154
15.	<b>Algorithm Of Two-Point Distributed Object Model Synthesis</b> Alexey V. Kiselev, Andrey V. Nikulin	158
16.	<b>Correlation Detection of Seismic Pulses For Hydraulic Fracturing Monitoring</b> Eugeniy V. Rabinovich, Pavel I. Vaynmaster, Grigory S. Shefel	162
17.	<b>Direct Patch Interference Cancellation in Passive Multi-Position Radar System</b> Eugeniy V. Rogozhnikov, Andrey A. Geltser	166
18.	<b>Error correction codes with approximation the border of Shannon</b> Pavel S. Solodov, Svetlana V. Vorobyova	170
19.	<b>Geometrical Method of Signal Parameters Definition for a Three-point Matrix Simulator</b> Maksim A. Stepanov	172
20.	<b>Simple Method of Protection against UWB Pulses Based on a Turn of Meander Microstrip Line</b> Roman S. Surovtsev, Alexander V. Nosov, Alexander M. Zabolotsky	175
21.	<b>Utilizing the 3d Earth Surface Maps in the Monostatic Emitter Location Task</b> Victor V. Tereshkov, Andrey A. Geltser, Eugeniy V. Rogozhnikov	178
22.	<b>A Simulation of Three-Team Printed Yagi-Uda Antenna</b> Anatoly P. Gorbachev, Anna V. Shvedova	181
23.	<b>Simulation of 50 to 75 Ω Impedance Transformer with Losses in the Frequency Band Up to 3.5 GHz for 50 W Input Power</b> Alexey A. Stolyarenko, Michael G. Rubanovich, Vladimir P. Razinkin, Vladimir A. Khrustalyov, Konstantin Y. Aubakirov	183
24.	<b>The Object Unknown Parameters Estimation for the “Inverted Pendulum - Cart” System in the Steady State</b> Galina V. Troshina, Alexander A. Voevoda, Vladislav M. Patrin, Marina V. Simakina	186
25.	<b>Formation of High Power Microwave Pulses with Adjustable Parameters in Active X-Band RF Compression Systems</b> Vladimir A. Avgustinovich, Sergey N. Artemenko, Vladislav S. Igumnov, Yury G. Yushkov	189

### Section III. Sonic and Ultrasonic Devices: Physics, Electronics, Application Section Chair: **Vladimir N. Khmelev**

1.	<b>Ultrasonic Technology of Production of Unit-dose Pack with Guide Way of Spreads</b> Vladimir N. Khmelev, Alexey N. Slivin, Alexey D. Abramov, Sergey S. Khmelev, Dmitry V. Genne, Vladimir A. Ankudinov	195
2.	<b>Experimental Studies of Integral Estimation of the Technological Media Parameters</b> Vladimir N. Khmelev, Roman V. Barsukov, Dmitry V. Genne, Evgeniy V. Ilchenko, Sergey S. Khmelev, Natalya S. Popova	201
3.	<b>Development of the Electronic Generators of the Ultrasonic Technological Apparatuses</b> Vladimir N. Khmelev, Dmitry V. Genne, Denis S. Abramenko, Roman V. Barsukov, Evgeniy V. Ilchenko, Sergey N. Tsyanok	204
4.	<b>Determination of Optimum Conditions of Ultrasonic Cavitation Treatment of High-viscous and Non-newtonian Liquid Media</b> Vladimir N. Khmelev, Roman N. Golykh, Andrey V. Shalunov, Vasiliy E. Bazhin, Viktor A. Nesterov	208
5.	<b>Efficiency Increase of the Dust-extraction Plant By High-intensity Ultrasonic Action</b> Vladimir N. Khmelev, Andrey V. Shalunov, Roman S. Dorovskikh, Roman N. Golykh, Viktor A. Nesterov	213
6.	<b>Using of Ultrasound In Grape Wine Making Process</b> Vladimir N. Khmelev, Valeriy P. Sevodin, Vladimir I. Shesternin, Yuriy M. Kuzovnikov, Sergey V. Levin	218
7.	<b>Study of Efficiency of Ultrasonic Treatment In Running Volumes</b> Vladimir N. Khmelev, Sergey V. Levin, Sergey S. Khmelev, Yuriy M. Kuzovnikov, Sergey N. Tsyanok	221
8.	<b>Ultrasonic Radiators for the Action on Gaseous Media at High Temperatures</b> Vladimir N. Khmelev, Andrey V. Shalunov, Viktor A. Nesterov, Roman S. Dorovskikh, Roman N. Golykh	224
9.	<b>The Development of Technology And Design of The Equipment of Geocell Ultrasonic Welding</b> Vladimir N. Khmelev, Alexey N. Slivin, Alexey D. Abramov, Sergey S. Khmelev	229
10.	<b>Cavitation Technologies of Wood Impregnation</b> Vladimir N. Khmelev, Sergey N. Tsyanok, Gennady A. Titov, Vladislav A. Shakura	234

11.	<b>Carousel-Type Device For Ultrasonic Welding Of The Articles Made Of Thermoplastic Materials</b> Vladimir N. Khmelev, Sergey S. Khmelev, Alexey D. Abramov, Dmitry V. Genne, Galina A. Bobrova, Maxim V. Khmelev	237
12.	<b>Modeling of the Piezoelectric Elements Using «Piezo» Solver</b> Vladimir N. Khmelev, Sergey N. Tsyanok, Alexander A. Voronkov, Daria E. Shumkova, Maxim V. Demyanenko	242
13.	<b>Determination of the Concentrations of Water Solutions During Their Cavitation Processing</b> Vladimir N. Khmelev, Roman V. Barsukov, Evgeniy V. Ilchenko, Dmitry V. Genne, Natalya S. Popova	245
14.	<b>Study of Interaction of Cavitation Zone With Interphase Boundary For the Determination of Efficient Modes of Ultrasonic Intensification of Physical-chemical Processes</b> Vladimir N. Khmelev, Roman N. Golykh, Anna V. Shalunova, Viktor A. Nesterov, Evgeniy V. Ilchenko	249
15.	<b>Development of the Waveguide-tool for the Action on Wounds and Wound Infection</b> Valery V. Pedder, Vladimir N. Khmelev, Andrey V. Shalunov, Viktor A. Nesterov, Roman S. Dorovskikh, Roman N. Golykh	253
16.	<b>Control Device of Ultrasonic Vibration Amplitude</b> Vladimir N. Khmelev, Sergey V. Levin, Sergey S. Khmelev, Sergey N. Tsyanok	262
17.	<b>The Use of Converse Ultrasonic Capillary Effect for the Extraction of Wound Contents from Capillary-Porous Human Tissue</b> Valery V. Pedder, Vladimir N. Khmelev, Roman N. Golykh, Andrey V. Shalunov, Alexander V. Pedder, Maxim V. Naboka	265
18.	<b>Ultrasonic Welding With The Application Of Rotating Welding Tool And Roller Support</b> Vladimir N. Khmelev, Alexey N. Slivin, Alexey D. Abramov	272

## Section IV. Optoelectronic Devices and Systems: Physics, Electronics, Application Section Chair: Evgeniy V. Sytin

1.	<b>Multielement IR FPA for new-generation IR LIDARs</b> Nikolai V. Grishanov, Irlam I. Lee	279
2.	<b>The Lasing Thresholds Comparison in Active Medium Microlayers with Metal and Dielectric Nanoparticles</b> Mihail M. Zinoviev, Alexey A. Zemlyanov, Alina V. Trifonova, Vladimir A. Kharenkov	282
3.	<b>Automated Installation for Conducting Explosions of Gas-Dust-Air Mixtures</b> Ivan S. Zorin, Dmitriy A. Gerasimov, Evgeniy S. Povernov, Eugene V. Sytin	285
4.	<b>Coordinate Correction of Distortions in the Television-Computer Systems for Pattern Recognition</b> Viacheslav V. Kapustin, Anatoly G. Kostevich, Mikhail I. Kuryachiy	289
5.	<b>About CuBr Laser Pulse Duration in an Unstable Discharge</b> Fedor A. Gubarev, Miron S. Klenovskii	292
6.	<b>High-speed Flame Detector with the Reduction of Optical Noise by the Compensation Method</b> Sergey A. Lisakov, Andrey N. Pavlov, Eugene V. Sytin	297
7.	<b>High Speed Low Power 384x288 Readout Integrated Circuit for MWIR and LWIR MCT Based FPA</b> Sergey A. Dvoretskiy, Alexey V. Zverev, Yuriy S. Makarov, Eugene A. Mikhantiev	302
8.	<b>On the Choice of Fire Detection Principles by Combined Fire Detector</b> Julia L. Mikhanoshina, Eugene V. Sytin	306
9.	<b>Experimental Investigation of the Noise Stability to Optical Noise of the Electro-Optical System of the Center of Explosion Detection</b> Anton I. Sidorenko, Eugene V. Sytin, Gennady V. Leonov	310
10.	<b>Detection Time of the Explosion Initial Stage by the Electro-Optical System with Cylindrical Lenses</b> Sergey A. Terentiev, Artem V. Kuraev, Ivan S. Zorin, Eugene S. Povernov, Eugene V. Sytin	314
11.	<b>Low Input Energy Copper Vapor Laser</b> Anton E. Kulagin, Genadii S. Evtushenko, Stanislav N. Torgaev, Tatiana G. Evtushenko	317
12.	<b>Investigation of Active Optical Systems for Remote Object Visualization</b> Maxim V. Trigub, Kirill V. Fedorov, Gennadii S. Evtushenko	321

13.	<b>Development of Testing Technique of Main Parameters for Two Spectral Ratios Optical-Electronic Device</b> Nadezhda Y. Tupikina, Eugene V. Sypin, Sergey A. Lisakov, Andrey N. Pavlov, Gennady V. Leonov	325
14.	<b>Localized High Field Enhancements from Hemispherical 3D Mesoscale Dielectric Particles in the Reflection Mode</b> Igor V. Minin, Oleg V. Minin, Nikita A. Kharitonoshin	331
15.	<b>Application of a Multichannel Radiation Thermometer for Increase in Adequacy of Non-contact Temperature Measurement Results</b> Nadezda S. Chernysheva, Anton B. Ionov	334
16.	<b>Automated System for Registration of Spectral Images Set</b> Eugene V. Maksimenko, Lyudmila V. Chernyshova	337
17.	<b>Sharpness Assessment of Images Obtained with a Laser Monitor</b> Daria S. Chertikhina, Maxim V. Trigub, Tatiana G. Evtushenko	340
18.	<b>Experimental Assessment of Parameters of Electro-Optical System with Optical Shutters</b> Anton I. Sidorenko, Eugene V. Sypin, Gennady V. Leonov	343
19.	<b>Application of Numerical Simulation for Solving the Problem of Determining the Spatial Coordinates of the Fire Seat by Multipoint Electro-optical System</b> Marina N. Zyryanova, Sergey A. Lisakov, Andrey N. Pavlov, Eugene V. Sypin	347
20.	<b>Determination of Optical Radiation Attenuation in Dispersed System «Coal Dust-Air»</b> Sergey A. Lisakov, Julia L. Mikhanoshina, Andrey N. Pavlov, Eugene V. Sypin, Gennady V. Leonov	353
21.	<b>Experimental Determination of the Parameters of Two Spectral Ratios Optical-Electronic Device</b> Nadezhda Y. Tupikina, Eugene V. Sypin, Sergey A. Lisakov, Andrey N. Pavlov, Gennady V. Leonov	359
22.	<b>Adapting the Method of Spectral Pyrometry to Building a High-speed Fire Detection Device</b> Marina.N. Zyryanova, Eugene.V. Sypin	365

## Section V. Power Electronics, Mechatronics and Automation

### Section Chair: Gennady S. Zinoviev

1.	<b>Designing and Verification of Integrated Circuit Driver for Power Transistor Operation in AC/DC Power Supply Units in Zero Voltage Switching Mode</b> Andrey A. Antonov, Maksim S. Karpovich, Igor V. Pichugin, Vladislav Yu. Vasilyev, Viktor A. Gridchin	371
2.	<b>Primary Power Generation System with Low Output Voltage</b> Maxim V. Balagurov, Sergey A. Kharitonov, Dmitry V. Korobkov, Sergey F. Konyahin, Alexander G. Volkov	375
3.	<b>The Universal Control System for Semiconductor Converters with PWM</b> Maxim V. Balagurov, Andrey V. Sidorov, Dmitry V. Korobkov, Maxim A. Zharkov, Dmitry A. Shtein, Igor O. Bessonov	379
4.	<b>Current Source Matrix Converter</b> Vladimir Popov, Evgeny Baranov, Alexey Malnev	384
5.	<b>Neural Network Control Algorithm for Stand-Alone Solar Cell Electrical Energy Conversion System</b> Irina A. Belova, Miroslav V. Martinovich	387
6.	<b>Synthesis Of Circuit of Regulation Of Current For Buck DC-DC Converter. Methodical Aspect</b> Igor O. Bessonov, Sergey A. Kharitonov, Denis V. Makarov, Maksim A. Zharkov	391
7.	<b>Controlled Sensorless Electric Drive Based on the Thyristor Slip Recovery System for a Wound-Rotor Motor</b> Vladimir V. Vdovin, Denis A. Kotin	397
8.	<b>The Conversion Algorithm of Voltage Source Inverter Control Signals for Operating Current Source Inverter</b> Alexander G. Volkov, Denis V. Makarov, Maksim A. Zharkov, Maxim V. Balagurov	402
9.	<b>Power Losses and Thermal Modeling of AC Buck Converters</b> Roman L. Gorbunov, Ilia A. Kalinowski, Gennadiy I. Poskonnyy	407
10.	<b>Active Power Filter with Battery Energy Storage Based on NPC Inverters</b> Maxim A. Dybko, Sergey V. Brovanov	415
11.	<b>Mathematical Model of the Starter System Based on a Three-Stage Synchronous Generator with Damping Cage</b> Maksim A. Zharkov, Sergey A. Kharitonov, Vasiliy S. Simin, Dmitry V. Korobkov, Alexander G. Volkov, Igor O. Bessonov	422

12.	<b>Power Supply for Driver</b> Alexander N. Reshetnikov, Sergey V. Klassen	427
13.	<b>Three-Phase Current Source Inverter With Hysteresis Control In Voltage Source Mode</b> Nikolay M. Kolmakov, Igor A. Bakhovtsev	429
14.	<b>Investigation of the Lithium-Ion Battery Characteristics</b> Sergey V. Kuchak, Elizaveta F. Kuchak, Andrey S. Semyagin	433
15.	<b>Multilevel Autonomous Power Supply Systems Based on Resonance Structures with Switching Capacitors</b> Leonid G. Zотов, Ольга Е. Лунитсна	436
16.	<b>Full-Bridge Phase-Shifted Converter Design for Aircraft Rectifier Unit</b> Sergey V. Luft, Aleksey A. Khristolyubov	442
17.	<b>The Study of Cross Coupling Compensation Considering the Influence of Controller's Discrete Nature</b> Denis V. Makarov, Dmitri V. Korobkov, Alexander G. Volkov, Alexey A. Khristolyubov	446
18.	<b>Linearization Method of Voltage Gain for VSI-PWM in Overmodulation Area</b> Igor A. Bakhovtsev, Vladislav G. Mednya	451
19.	<b>Application of Sensitivity of Harmonic Distortion Factor of Output Curve of Multilevel Inverter</b> Pavel P. Govorukhin, Ekaterina E. Mirgorodskaya	455
20.	<b>Control Strategy of Shunt Active Power Filter Based on an Algebraic Approach</b> Oleg V. Nos	459
21.	<b>Modification of Quasi-Z-Source Inverter Operating in Stand-Alone Power System</b> Igor A. Bakhovtsev, Dmitry V. Panfilov	464
22.	<b>Modeling of Integrated Starter-Generator</b> Alexander N. Reshetnikov	470
23.	<b>Cycloconverter Based on Bridge Circuit for Power Supply Systems of Autonomous Objects</b> Regina Yu. Sarakhanova, Sergey A. Kharitonov	472
24.	<b>Power Electronic Transformer Based on AC Voltage Regulator</b> Gennady S. Zinoviev, Andrey V. Sidorov	477
25.	<b>Engineering Design of the Power Transient Voltage Suppressors for Network Protection Devices</b> Anna V. Sinica, Aleksandr V. Gluhov, Stanislav P. Skornjakov	482
26.	<b>Synthesis Methods of Hilbert Filters for Control Systems of Static Converters</b> Pavel N. Smirnov, Sergey A. Kharitonov, Evgeniy B. Preobrajensky	486
27.	<b>Analysis of Prospective Aviation Power Supply System with Multiphase Generator and Stabilized Rectifier</b> Igor S. Turchenko, Daniil A. Shevtsov	490
28.	<b>Investigation of Three Phase Two-Zone Thyristor AC Voltage Regulator with Capacitor Divider</b> Aleksey V. Udovichenko, Dmitry A. Rozhdenko	495
29.	<b>Development of Novel Aircraft Electrical Power Systems</b> Aleksey S. Khlebnikov, Valery A. Kaliy	499
30.	<b>High-voltage Power Supply System of Low-orbit Spacecraft</b> Mariya M. Chernaya, Yuriy A. Shinyakov, Aleksandr V. Osipov	502
31.	<b>Uninterruptible Power System with Parallel Operation of AC/DC and DC/DC Converters</b> Dmitry A. Shtein, Andrey V. Geist, Dmitry V. Korobkov, Maxim V. Balagurov, Alexander N. Reshetnikov, Viacheslav S. Konyhin	508
32.	<b>Overview of Impedance Source Networks for Voltage Source Inverters</b> Tatiana E. Shults, Student, Oleksandr O. Husev, Janis G. Zakis	514
33.	<b>Experimental Research of Multiple Switching in a Thyristor Controlled Phase Shifter</b> Michael A. Novikov, Pavel A. Rashitov, Michael G. Astashev, Sylvester C. Nnamchi	521
34.	<b>Electromagnetic Moment of BLDC with Nonmagnetic Anchor under 180-Degree Commutation</b> Anatoly V. Sapsalev, Olga B. Davidenko, Elena G. Kasatkina, Nikolay P. Savin, Sahbon A. Saidov	526
35.	<b>Extraction Algorithm of Symmetrical Components for Controlling Static Converters of Electric Energy</b> Pavel N. Smirnov, Sergey A. Kharitonov, Evgeniy B. Preobrajensky	530
36.	<b>Cascaded Control System Design for a Cuk Converter via Singular Perturbation Approach</b> Efim A. Aksenov, Valery D. Yurkevich	534
37.	<b>The pump current pulse generator for laser diodes</b> Kirill K. Kopylov, Alexey A. Khristolyubov, Alexandra I. Khristolyubova	542

38.	<b>Synthesis of the Control System for DC-DC Converters for Aircraft</b> Alexey A. Khristolyubov, Tatiana S. Sekushenko, Sergey V. Luft, Alexandra I. Khristolyubova, Denis V. Makarov	547
39.	<b>The Family of Extended Power Quality Factors</b> Vitaly A. Lipko, Gennady S. Zinov'yev	553
40.	<b>Modified Scheme of High-Voltage Buck DC-DC Converter for Electric Locomotive</b> Gennady S. Zinoviev, Pavel V. Kozlov	557

## Section VI. Medical Electronics

### Section Chair: **Vladimir K. Makukha**

1.	<b>Types of Skin Surface Luminescence Patterns in the Areas of Highly Active Points Observed After Acting on the Areas with Short Light Pulse</b> Leonid G. Navrotsky, Alexander A. Blokhin, Svetlana V. Belavskaya, Liliya I. Lisitsyna, Anna A. Lyutkevich, Gerhard Litscher	565
2.	<b>Comparative Analysis of Acoustic Voice-Quality Parameters</b> Darya V. Borovikova, Vladimir K. Makukha	569
3.	<b>Justification of the Possibility of Using Cold-Plasma Method in Surgery of Papillomatosis and Dupuytren's Contracture</b> Nabat A. Zhumantseva, Lilia I. Lisitsyna, Valery V. Pedder, Alexander N. Aleinik, Aleksandr Y. Kondrashov	572
4.	<b>Module for Visual Control of in vitro Results of the Joint Impact of Climatic and Electromagnetic Factors on Living Tissue</b> Maxim E. Komnatnov, Anna V. Busygina	576
5.	<b>Research on the Possibility of Efficiency Increase for Skin Surface Small Area Sponginess Estimation Using Ultrasonic Vibrations</b> Svetlana V. Belavskaya, Anton N. Kuzmin, Lilia I. Lisitsyna	580
6.	<b>Development of Carbon Dioxide Sensor for HVAC-system</b> Vladimir K. Makukha, Konstantin S. Morozov, Denis S. Volkov	582
7.	<b>Photometric Method of Estimation of Coagulation Process Parameters</b> Ekaterina V. Nosova, Alexander A. Aristov, Natalia S. Nefedova	586
8.	<b>Analysis of a Temperature Distribution in a Heating Area When Using a Complex for Local Hyperthermia</b> Denis O. Pakhmurin, Valery D. Semenov, Anatoly V. Kobzev, Alexander V. Litvinov, Victor N. Uchaev, Alexander Yu. Khutornoy	591
9.	<b>Evaluation of the Applicability of MEMS Microphone for Auscultation</b> Rinat K. Kusainov, Vladimir K. Makukha	595