# INSTITUTE OF MICROELECTRONICS AND OPTOELECTRONICS

# ANNUAL REPORT

# 2007

Edited by Agnieszka Mossakowska-Wyszyńska

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**From the Director**

This Annual Report summarizes the research activities of the Institute In 2007, as well as the teaching activities in the academic year 2006/2007. The activities of the Institute in the field of electronics and computer engineering are concentrated in the area of broadly defined microelectronics and optoelectronics. These include VLSI systems, microelectronic and nanoelectronic semiconductor devices, hybrid circuits (e.g. microwave, optoelectronic), sensors, microsystems, laser optoelectronics, electronic imaging and image processing. It is worth to emphasize that research activities of the Institute span modelling, CAD, manufacturing and diagnostics.

The Institute of Microelectronics & Optoelectronics (IMiO) was founded in 1970. It evolved from the Chair of Radio Engineering established by Professor Janusz Groszkowski in 1929. Our Institute is linked with the beginnings of the Faculty of Electronics and Information Technology through the person of Prof. Groszkowski, who worked in IMiO until his death, as well as the territory – half of the Institute is situated in the Building of Radio Engineering on the Warsaw University of Technology campus. Here the Institute's Technology Centre is located. It includes laboratories of silicon processing (clean-room), hybrid technologies and assembly techniques, fibre optic and integrated optoelectronic device fabrication, laser optoelectronics, characterization of new electronic and photonic materials and manufacturing processes.These laboratories developed their activities based on research projects financed by Polish government as well as those within 5$^{th}$, 6$^{th}$ and 7$^{th}$UE Framework Programme.

In the field of teaching (three-level structure – B.Sc., M.Sc. and Ph.D. studies) the Institute continued to improve its contribution in the Electronics and Computer Engineering area (led together with the Institute of Electronic Systems) for on-campus studies. The involvement of the Institute in distance learning studies of Electronics and Telecommunications is also worth mentioning, especially post-diploma studies in the domain of tools and techniques of virtual education that began in 2004. The Institute aims for its teaching activities to meet the challenge of the development of modern technology and information society.

I express my sincere appreciation to all colleagues for your achievements which determined the position of our Institute in the Faculty of Electronics and Information Technology. Thank you very much for your cooperation in the creative development of the Institute.

Warsaw, January 2008

Professor Andrzej Jakubowski, Prof., Ph.D., D.Sc.

## CONTENTS:

# 1. GENERAL INFORMATION

## *1.1. Organisation of the Institute and Areas of its Activities*

The Institute of Microelectronics and Optoelectronics is a part of the Faculty of Electronics and Information Technology - the largest Faculty of the Warsaw University of Technology.

Our Institute consists of six divisions:

- Microelectronics and Nanoelectronics Devices Division;
- VLSI Engineering and Design Automation Division;
- Microwave Electronics and Photonics Division;
- Microsystem and Electronic Material Technology Division;
- Optoelectronics Division;
- Image Processing Division.

During the past thirty-three years of research in the area of microelectronics and optoelectronics the Institute has built its competence in:

- modelling of physical effects in modern semiconductor devices;
- silicon processing and its modelling, non-standard dielectric layer deposition techniques;
- developing methods and measurement systems to characterize electronic materials and devices;
- generation of microwaves, microwave measurement techniques, and numerical methods for electromagnetism;
- processing, designing, optimisation techniques and development of VLSI (very large scale integration of circuits) computer-aided tools;
- design and technology of thick-film hybrid circuits, fabrication of thick-film microsystems;
- modelling and design of sensors and optical-waveguide microsystems;
- laser physics (Fabry-Perot and distributed feedback lasers), laser spectroscopy of solid state active materials, and applications of lasers in medicine, manufacturing and telecommunications;
- fabrication and characterisation of optoelectronics elements and devices including fibre sensors, photovoltaics;
- silicon carbide processing for high-temperature, high-power and high-frequency electronics
- computer-aided design of photo electronic image devices, image processing and visualisation of results of experiments with image devices;
- vacuum science and technology - computer-aided design of vacuum systems, modelling of the gas flow in vacuum systems, studies of gas parameter distribution in calibration chambers (vacuum metrology).

The research activities are supported by projects financed by the State Committee for Scientific Research and those within 5$^{th}$, 6$^{th}$ and 7$^{th}$ UE Framework Programme, e.g. REASON, TUF, SINANO, EUROSOI, BIPV-CIC, NEMO, IDESA.

The results of our scientific activities were published in many papers submitted to prestigious international scientific journals and presented at national and mostly at international conferences in the form of communications as well as the invited lectures.

## *1.2. Board of Directors*

**Director of the Institute**
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## *1.3. Microelectronics and Nanoelectronics Devices Division*

**Head of the Division**

Romuald B. Beck, Ph.D., D.Sc. Professor
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**Senior academic staff**

| | |
|---|---|
| Andrzej Jakubowski, Ph.D., D.Sc. | Tenured Professor |
| Bogdan Majkusiak, Ph.D., D.Sc. | Tenured Professor |
| Lidia Łukasiak, Ph.D., D.Sc. | Professor |
| Zbigniew Pióro, Ph.D. | Assistant Professor |
| Sławomir Szostak, Ph.D. | Assistant Professor |
| Jakub Walczak, Ph.D. | Assistant Professor |
| Agnieszka Zaręba, M.Sc. | Assistant Professor |
| Jan Gibki, Ph.D. | Senior Lecturer |
| Józef Maciak, M.Sc. | Senior Lecturer |
| Antoni Siennicki, Ph.D. | Senior Lecturer |

**Junior academic staff**

| | |
|---|---|
| Marcin Iwanowicz, M.Sc. | Ph.D. Student |
| Jakub Jasiński, M.Sc. | Ph.D. Student |
| Małgorzata Kalisz, M.Sc. | Ph.D. Student |
| Arkadiusz Malinowski, M.Sc. | Ph.D. Student |
| Andrzej Mazurak, M.Sc. | Ph.D. Student |
| Robert Mroczyński, M.Sc. | Ph.D. Student, Assistant |
| Piotr Pływaczewski, M.Sc. | Ph.D. Student |
| Michał Rakowski, M.Sc. | Ph.D. Student |
| Jędrzej Stęszewski, M.Sc. | Ph.D. Student |

**Technical and administrative staff**

Witold Ciemiewski,
Kazimierz Dalbiak,
Krzysztof Krogulski,
Małgorzata Trzaskowska.

The research carried out in the Microelectronics and Nanoelectronics Devices Division falls into three main areas, namely: technology, diagnostics and modelling of semiconductor structures, as well as applications of microelectronics in digital signal processing.

To name a few examples of its research topics:

- Modelling and investigation on kinetics of silicon oxidation (particularly of the beginning stages of the process);
- Diagnostics and characterisation of properties of single and double insulating layers (gate stack including ultra thin oxide layers) by means of electrical measurements analysis;
- Wear-out and degradation processes in MOS structures (breakdown of dielectrics layers, hot carriers effects, radiation damage effects);
- Transport mechanism and quantum effects in MOS structures (transistor, tunnel diode) with ultra thin oxide;
- New materials (semiconductors and dielectrics) for microelectronics applications (e.g.: silicon carbide, gallium nitride, silicon-germanium, germanium)
- Theoretical studies on MOS-SOI (silicon-on-insulator) and Si:Ge (silicon-germanium) MOS structure physics (modelling of devices behaviour and modelling for characterisation and diagnostics);
- Nanoelectronic phenomena and devices (e.g. tunnel and resonance tunnel diodes and transistors, Coulomb blockade diode, single-electron transistors, memories);
- PECVD deposition of ultra thin dielectric layers for MOSFET gate dielectric ($SiO_2$, $Si_3N_4$, $SiO_xN_y$);
- Ultra shallow implantation from r.f. plasma;
- Very low temperature processing of test structure;
- MEMS/MOEMS processing.

## *1.4. VLSI Engineering and Design Automation Division*

**Head of the Division**

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**Senior academic staff**

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| Piotr Szwemin, Ph.D., D.Sc. | Professor |
| Elżbieta Piwowarska, Ph.D. | Docent |
| Grzegorz Janczyk, Ph.D. | Assistant Professor |
| Zbigniew Jaworski, Ph.D. | Assistant Professor |
| Dominik Kasprowicz, Ph.D. | Assistant Professor |
| Marek Niewiński, Ph.D. | Assistant Professor |
| Witold Pleskacz, Ph.D. | Assistant Professor |
| Andrzej Wielgus, Ph.D. | Assistant Professor |
| Adam Wojtasik, Ph.D. | Assistant Professor |

**Junior academic staff**

| | |
|---|---|
| Tomasz Borejko, M.Sc. | Ph.D. Student |
| Alicja Droszcz, M.Sc. | Ph.D. Student |
| Arkadiusz Łuczyk, M.Sc. | Ph.D. Student, Assistant |
| Michał Maciąg, M.Sc. | Ph.D. Student |
| Piotr Markowski, M.Sc. | Ph.D. Student |
| Grzegorz Wąchała, M.Sc. | Ph.D. Student |

**Technical and administrative staff**

Jerzy Gempel, M.Sc.
Stanisław Jeszka, M.Sc.

The research carried out in the division falls into several main areas: development of IC design methodologies and tools, design of digital and analog integrated circuits for nonstandard demanding applications and application of microelectronics in signal processing.

Current research projects in the Division include:

- methodologies of integrated circuit design for manufacturability: application of statistical process and device simulation in IC design, investigations of spatial on-chip correlation of random process disturbances, analysis of layout sensitivity to spot defects;
- design of analogue VLSI circuits: analogue implementations of fuzzy logic controllers for biomedical applications, methodologies of testing and design for testability of analogue VLSI integrated circuits;
- development of CAD tools for integrated circuit design

and verification, with special emphasis on analogue full custom ASICs design;
- investigations of signal propagation and crosstalk in long interconnections in deep submicron VLSI circuits;
- design of digital and mixed VLSI circuits for special applications: CNN, data processing in physical experiments, etc.;
- modeling and control of leakage currents in nanometer CMOS digital circuits.

## *1.5. Microwave Electronics and Photonics Division*

**Head of the Division**

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**Senior academic staff**

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|---|---|
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| Jerzy Piotrowski, Ph.D. | Assistant Professor |
| Agnieszka Szymańska, Ph.D. | Assistant Professor |
| Piotr Witoński, Ph.D. | Assistant Professor |
| Jerzy Skulski, M.Sc. | Senior Lecturer |

**Junior academic staff**

| | |
|---|---|
| Daniel Paluch, M.Sc. | Ph.D. Student |

**Technical and administrative staff**

Bożena Janus

The research activity of the Microwave Electronics and Photonics Division is concerned with propagative electronics and microwave photonics. The characteristic feature of the electronics branch is the comparability between the time of system state change and the time of signal propagation between particular system points.

The research activity of the Microwave Electronics and Photonics Division is concentrated on:
- an analysis of the oscillation conditions, frequency stabilisation and synthesis in microwave bands;
- measurement techniques of microwave circuits and devices parameters with emphasis on automation and computerisation of measurement methods;
- analysis methods of transmission lines for modern mm-wave microwave integrated circuits.

From the new topics of research activity we can mention:
- modelling and computer aided design of microwave devices and circuits;
- microwave sensors for industrial applications;
- controlling of microwave circuits parameters by means of optical signals;
- investigations and modelling of optical-microwave frequency conversion processes;
- modelling of optically controlled microwave devices, as photodiodes, photo-varactors, phototransistors;
- modelling of semiconductor optical devices for telecommunication;
- optoelectronic and microwave devices for data transmission networks.

## *1.6. Electronic Materials and Microsystem Technology Division*

**Head of the Division**

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**Senior academic staff**

| | |
|---|---|
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| Mikołaj Baszun, Ph.D. | Assistant Professor |
| Michał Borecki, Ph.D. | Assistant Professor |
| Jerzy Kalenik, Ph.D. | Assistant Professor |
| Ryszard Kisiel, Ph.D. | Assistant Professor |
| Zdzisław Mączeński, Ph.D. | Assistant Professor |
| Mateusz Śmietana, Ph.D. | Assistant Professor |
| Aleksander Werbowy, Ph.D. | Assistant Professor |

**Junior academic staff**

| | |
|---|---|
| Piotr Caban, M.Sc. | Ph.D. Student |
| Piotr Firek, M.Sc. | Ph.D. Student, Assistant |
| Ryszard Gronau, M.Sc. | Ph.D. Student |
| Konrad Kiełbasiński, M.Sc. | Ph.D. Student |
| Krzysztof Kłos, M.Sc. | Ph.D. Student |
| Norbert Kwietniewski, M.Sc. | Ph.D. Student |
| Paweł Śniecikowski, M.Sc. | Ph.D. Student |

**Science research staff**

Małgorzata Jakubowska, Ph.D., D.Sc.
Mariusz Sochacki, Ph.D.
Artur Szczęsny, M.Sc.

**Technical and administrative staff**

Ryszard Biaduń.

The research activity of the Division concentrates on optoelectronic and hybrid devices. Fundamental and applied research are carried out. Research groups are organised for defined tasks.

The main research areas are as follows:
- fabrication and investigation of the following optoelectronic devices: integrated passive and active light wave guiding structures (modulators, bistable switches etc.) and fibre optic sensors;
- computer engineering for fibre optics;
- new techniques of surface mounted devices on PCB (printed circuit boards);
- application of thin and thick film technology in hybrid devices and thick film sensors fabrication;
- investigation of the electronic structure, stability and optical properties of amorphous silicon and its devices (thin film transistors, solar cells, etc.);

- research, design and monitoring of photovoltaic systems, strategy for development of photovoltaic solar energy;
- electronic packaging technology;
- plasma deposition of nanocrystalline diamond (NCD), diamond-like carbon (DLC) thin films and their application in fibre optic and waveguide sensing structures.

## *1.7. Optoelectronics Division*

**Head of the Division**

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**Senior academic staff**

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| Marcin Kaczkan, Ph.D. | Assistant Professor |
| Jerzy Kęsik, Ph.D. | Assistant Professor |
| Agnieszka Mossakowska-Wyszyńska, Ph.D. | Assistant Professor |
| Robert Paszkiewicz, Ph.D. | Assistant Professor |
| Ryszard Piramidowicz, Ph.D. | Assistant Professor |
| Anna Tyszka-Zawadzka, Ph.D. | Assistant Professor |
| Piotr Warda, Ph.D. | Assistant Professor |

**Junior academic staff**

| | |
|---|---|
| Paweł Folaron, M.Sc. | Ph.D. Student |
| Mariusz Klimczak, M.Sc. | Ph.D. Student |
| Marcin Koba, M.Sc. | Ph.D. Student |
| Radosław Kreft, M.Sc. | Ph.D. Student |
| Kamila Leśniewska-Matys, M.Sc. | Ph.D. Student |
| Adam Rudziński, M.Sc. | Ph.D. Student |

**Technical and administrative staff**

Wojciech Kamiński, Ph.D.

The activity of the Optoelectronics Division is concentrated on education as well as on various areas of optoelectronic research in the field of laser physics, laser spectroscopy, laser construction and laser applications in medicine and air pollution monitoring.

The academic staff of the Division gives lectures in photonics, laser physics, laser technology, laser applications, laser spectroscopy, integrated optoelectronics and optical computing, all of which are accompanied by appropriate laboratory class activities.

The main research activity of the Division comprises:

- solid state laser construction and their applications in materials processing;
- spectroscopic research of new laser materials, investigation of the excitation processes in rare earth doped dielectric materials, research of blue up-conversion laser structures, waveguide lasers;
- theoretical research of laser generation in planar, fibre and hollow waveguide gas lasers, analysis of light generation in DFB (distributed feedback) structures, photonic crystals structures and in lasers with non-linear optical elements, investigation of the statistical properties of the light generated in various laser structures;
- nano-optical structures and photonic band-gap materials;
- research of light generation in metal vapour gas lasers, measurement of laser parameters, investigation of light generation in hollow cathode lasers, analysis of plasma discharge processes, research of the opto-galvanic effect;
- optimisation of the construction of ion gas lasers, investigation of the processes in discharge tube ceramic ion laser and laser operation in various cavity geometry, investigation of light generation in ion gas lasers for medical applications.

## *1.8. Image Processing Division*

**Head of the Division**

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**Senior academic staff**

| | |
|---|---|
| Janusz Parka, Ph.D., D.Sc. | Professor |
| Piotr Garbat, Ph.D. | Assistant Professor |
| Marek Sutkowski, Ph.D. | Assistant Professor |

**Technical and administrative staff**

Jerzy Domański, M.Sc.

The main areas of activity of the Division are education and research, both in the field of the technology of electronic imaging devices and of digital image processing.

Members of the academic staff are involved in research and development works on:

- theoretical principles of image modelling;
- numerical methods of image analysis;
- implementation of digital image processing for detection, inspection and identification of objects;
- application of image processing methods for diagnostic control and measurement systems in industry, medicine, research and commerce;
- image acquisition in Polarization Difference Imaging systems with use of liquid crystal based filter and it's numerical analysis;
- optical image processing;
- electro optic effects in liquid crystals and their applications to LCD;
- photo refractive phenomena's in liquid crystals for dynamic holography and optical data storage.

### *1.9. Statistical Data*

| SPECIFICATION | 2006 | 2007 | DIFFERENCE |
|---|---|---|---|
| **Academic staff** | 85 | 79 | -6 |
| Tenured professors | 8 | 8 | 0 |
| Professors | 6 | 6 | 0 |
| Associate professors | 1 | 0 | -1 |
| Docent | 0 | 1 | +1 |
| Assistant professors | 32 | 31 | -1 |
| Senior lecturers | 4 | 4 | 0 |
| Lecturers | 1 | 0 | -1 |
| Assistants and Ph.D. students | 33 | 29 | -4 |
| **Science research staff** | 0 | 3 | +3 |
| **Technical staff** | 11 | 10 | -1 |
| **Administrative staff** | 5 | 5 | 0 |
| **Computers** | 313 | 345 | +32 |
| **Library resources - Books (number of volumes)** | 3432 | 3461 | +29 |
| **Teaching activities** | 55 | 59 | +4 |
| Basic courses | 38 | 39 | +1 |
| Advanced courses | 14 | 15 | +1 |
| Special courses | 3 | 5 | +2 |
| **Research projects** | 32 | 32 | 0 |
| Granted by the University | 8 | 10 | +2 |
| Granted by State Institutions | 15 | 14 | -1 |
| Granted by International Institutions | 6 | 5 | -1 |
| Other projects | 3 | 3 | 0 |
| **Degrees awarded** | 79 | 82 | +3 |
| D.Sc. degrees | 0 | 0 | 0 |
| Ph.D. degrees | 6 | 5 | -1 |
| M.Sc. degrees | 38 | 38 | 0 |
| B.Sc. degrees | 35 | 39 | +4 |
| **Publications** | 142 | 166 | +24 |
| Sci.-tech. books | 3 | 9 | +6 |
| Sci.-tech. papers in journals | 25 | 62 | +37 |
| Sci.-tech. papers in conference proceedings | 114 | 95 | -19 |
| **Reports** | 32 | 26 | -6 |
| **Patents** | 2 | 2 | 0 |
| **Conferences** | 45 | 30 | -15 |
| Organised by the Institute | 3 | 0 | -3 |
| Others | 42 | 30 | -12 |
| **Prizes** | 9 | 4 | -5 |

# 2. STAFF

## *2.1 Senior Academic Staff*

**Mikołaj Baszun,** M.Sc. ('69), Ph.D. ('77), Electronic Sensors, Assistant Professor, full time, Electronic Materials and Microsystem Technology Division, Rector's Award (’06).

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**Romuald B. Beck,** M.Sc. ('76), Ph.D. ('82), D.Sc. ('96), Microelectronics, Electronics, Professor, full time, Head of Microelectronics and Nanoelectronics Devices Division (’04), Leader of the Technology, Diagnostics and Modelling Group ('85-), Vice President of the Microelectronics Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('93-), Member od Programme Committee of: Diagnostics & Yield Conference (’88-), Co-chairman (’03-), Chairman (‘06); Member of Programme Committee of ELTE (’84, ’04, ‘07), Member of Technical Programme Committee ESSDERC (’05-), Senior Member of IEEE (’97-), Member of Electrochemical Society (’98-).

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**Michał Borecki,** M.Sc. ('91), Ph.D. (' 96), CAD, Optoelectronics, Assistant Professor, full time, Electronic Materials and Microsystem Technology Division, Member of Optoelectronics Section of the Electronics and Telecommunication Committee of the Polish Academy of Sciences ('99-), Member of Association of Polish Electrical Engineers SEP ('99-).

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**Jarosław Dawidczyk**, M.Sc. (’98) Ph.D. (’05) with distinction, Microwave Electronics, Optoelectronics, Assistant Professor, full time, Microwave Electronics and Photonics Division.

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**Bogdan Galwas,** M.Sc.('62), Ph.D. ('69), D.Sc. ('76), Microelectronics, Microwave Electronics, Tenured Professor, full time, Head of Microwave Electronics and Photonics Division (‘84-), Pro-Rector of WUT (‘87-'90), Member of Electronics and Telecommunications Committee of the Polish Academy of Sciences (‘88-), Member of Scientific Council of Industrial Institute of Telecommunications (‘90-), Chairman of the International Management Committee of the International Travelling Summer Schools (‘91-), Director of Ph.D. Studies in Electronics and Telecommunications (‘92-), Senior Member of IEEE (‘94-), Member of Scientific Council of Institute of Telecommunications (‘97-), Member of IACEE (’97-), Member of SEFI (‘97-), Rector's Plenipotentiary for New Technologies and Forms of Education (‘99-), Director of Warsaw University of Technology Center for Distance Learning – OKNO (‘00-), Dean of the Faculty of Electronics and Information Technology ('05-).

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**Piotr Garbat,** M.Sc.('00), Ph.D. ('05), Image and Video Processing, Techniques, Computer Vision, 3D Data Processing in Multimedia Applications. Assistant Professor, full time, Image Processing Division, Member of SPIE (’01-).

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**Jan Gibki,** M.Sc. (‘74), Ph.D. (’97), Electronics, Automatics, Senior Lecturer, full time, Microelectronics and Nanoelectronics Devices Division, Rector’s Award for Didactic Achievements (’04).

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**Andrzej Jakubowski,** M.Sc. ('63), Ph.D. ('73), D.Sc. ('83), Electronics, Microelectronics, Full Professor, full time, Microelectronics and Nanoelectronics Devices Division (‘01-), Head of the Insititute of Microelectronics and Optoelectronics (‘04-), Head of the Institute of Electron Technology in Warsaw (‘89-‘92), Chairman of the Section of Applied Research of Science and Technical Progress Government Committee (‘90-‘91), Head of Microelectronics Division (‘84-‘01), Member of Faculty Council (‘77-), Member and Vice-Chairman of the Electronics and Telecommunications Committee of the Polish Academy of Sciences, Head of its Microelectronics Section ('88-03), Pożaryski Award for Scientific Publications (‘86, ‘96), Member of Programme Committee of ELTE (‘84-), MiEL (‘94-), IWSPD (‘96-), MIXDES (‘97-), IEEE ICCDS (‘02-), Chairman of “Diagnostic and Yield” (‘88-), Editor-in-chief of “Electron Technology” (‘90-‘94).

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**Marcin Kaczkan,** M.Sc. ('98), Ph.D. ('04), Optoelectronic, Laser technology, Spectroscopy of solid state laser materials, Assistant Professor, full time, Optoelectronics Division, Adam Smoliński Prize of Polish Committee for Optoelectronics of Association of Polish Electrical Engineers SEP for his master thesis ('98).
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**Jerzy Kalenik,** M.Sc. ('79), Ph.D. ('89), Electron Technology, Assistant Professor, full time, Electronic Materials and Microsystem Technology Division, Member of IMAPS Poland Chapter ('84-), Dean's Plenipotentiary for Students Industrial Training ('91-).
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**Dominik Kasprowicz:** M.Sc. ('01), Ph.D. with honors ('06), Microelectronics, Assistant Professor (’07), full time, VLSI Engineering and Automation Division, Rector’s Award for Scientific Achievements (’07).
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**Jerzy Kęsik,** M.Sc. ('67), Ph.D. ('77), Optoelectronic, Laser technology, Assistant Professor, full time, Optoelectronics Division, Prime Minister Prize for remarkable technical and science national achievement (‘00).
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# 3. TEACHING ACTIVITIES

## *3.1. Basic Courses*

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[Edu2] **Application of Matlab in Calculation Methods** (Matlab w zastosowanych metodach obliczeniowych) **MZMO**, Mikołaj Baszun

[Edu3] **CAD and Fabrication of Microwave and Lightwave Circuits** (Komputerowe projektowanie i realizacja obwodów mikrofalowych i optofalowych), **KPROM**, Jerzy Skulski

[Edu4] **Computer-Aided Design of Printed-Board Circuits** (Wspomaganie komputerowe projektowania obwodów drukowanych), **PADS**, Ryszard Kisiel, Jerzy Kalenik

[Edu5] **Design of Integrated Systems in VLSI Technique** (Projektowanie systemów scalonych w technice VLSI), **PSSV**, Zbigniew Jaworski

[Edu6] **Design of Analog Circuits for VLSI Systems** (Projektowanie układów analogowych dla systemów VLSI), **PUAV** Wiesław Kuźmicz

[Edu7] **Electronic Elements and Circuits** (Elementy i układy elektroniczne), **ELIU**, Andrzej Pfitzner

[Edu8] **Equipment - Programming Synthesis of Digital Systems** (Synteza sprzętowo – programowa systemów cyfrowych), **SSP**, Elżbieta Piwowarska

[Edu9] **Fields and waves**, (Pola i fale), **POFA**, Jerzy Piotrowski

[Edu10] **Fundamentals of Circuit and System Technology** (Podstawy technologii układów i systemów), **PTUIS**, Romuald Beck

[Edu11] **Fundamentals of Lasers** (Lasery - kurs podstawowy), **LKP,** Paweł Szczepański

[Edu12] **Fundamentals of Microelectronics** (Podstawy mikroelektroniki), **PMK**, Wiesław Kuźmicz

[Edu13] **Fundamentals of Microprocessor Techniques** (Podstawy techniki mikroprocesorowej), **TMIK**, Lidia Łukasiak

[Edu14] **Fundamentals of Microwave Engineering** (Podstawy techniki w.cz.), **TWCZ**, Bogdan Galwas

[Edu15] **Fundamentals of Photonics** (Podstawy fotoniki), **FOT**, Michał Malinowski

[Edu16] **Fundamentals of Solid State Electronics** (Elektronika ciała stałego), **ELCS**, Jan Szmidt, Witold Pleskacz

[Edu17] **Hybrid Systems** (Układy hybrydowe), **UKH**, Ryszard Kisiel

[Edu18] **Integrated Optoelectronics** (Optoelektronika zintegrowana), **OZT**, Michał Malinowski, Agnieszka Mossakowska-Wyszyńska

[Edu19] **Introduction to Microsystems** (Wstęp do mikrosystemów), **WMS,** Zbigniew Pióro

[Edu20] **Introduction to Programming** (Podstawy programowania), **PRM**, Michał Borecki

[Edu21] **Introduction to the UNIX System** (Użytkowanie systemu UNIX), **USUX**, Andrzej Wielgus

[Edu22] **Laser Physics** (Fizyka laserów), **FLA**, Paweł Szczepański

[Edu23] **Logic Circuits** (Układy logiczne), **ULOGE**, Tadeusz Łuba

[Edu24] **Microelectronics Development Trends** (Kierunki rozwoju mikroelektroniki), **KRM**, Andrzej Jakubowski

[Edu25] **Models and Systems of Image Processing** (Modele i systemy przetwarzania obrazów), **MSPO**, Jerzy Woźnicki

[Edu26] **Numerical Methods** (Metody numeryczne), **MNM**, Institute of Electronic Fundamentals WUT, Jerzy Krupka

[Edu27] **Object Programming in Java** (Praktyka programowania obiektowego w Javie), **PPOJ**, Adam Wojtasik

[Edu28] **Object Programming** (Programowanie obiektowe), **PROBI**, Adam Wojtasik

[Edu29] **Operating Systems** (Systemy operacyjne), **SOE**, Andrzej Wielgus

[Edu30] **Optoelectronic Devices and Systems** (Elementy i systemy optoelektroniczne), **ESO**, Michał Malinowski

[Edu31] **Light wave Telecommunication** (Telekomunikacja optofalowa), **TEOP**, Bogdan Galwas

[Edu32] **Physical Fundamentals of Information Processing** (Fizyczne podstawy przetwarzania informacji), **FPPI**, Bogdan Majkusiak

[Edu33] **Physics of Solid State** (Fizyka ciała stałego), **FCSR**, Jan Szmidt

[Edu34] **Programming 8051 micro controller** (Programowanie mikrokontrolera), **PMIK**, Lidia Łukasiak

[Edu36] **Semiconductor Devices** (Przyrządy półprzewodnikowe), **PP**, Andrzej Jakubowski, Andrzej Pfitzner

[Edu35] **Standard cell based VLSI design e** (Projektowanie układów VLSI w stylu komórek standardowych), **PUVS**, Zbigniew Jaworski

[Edu37] **Surface Mounting Technology** (Technologia montażu powierzchniowego), **TMP**, Ryszard Kisiel

[Edu38] **Technology of Integrated Circuits Fabrication** (Technologia monolitycznych układów scalonych), **TWMUS**, Romuald Beck

[Edu39] **Thick film sensors** (Grubowarstwowe czujniki pomiarowe), **GCZP**, Zbigniew Szczepański

### *3.2. Advanced Courses*

[Edu40] **Advanced Methods of Optical Information Processing** (Zaawansowane metody optycznego przetwarzania informacji), **ZMOPI**, Janusz Parka

[Edu41] **Advanced Microelectronic and Optoelectronic Technologies** (Zaawansowane technologie mikroelektroniczne i optoelektronczne), **ZTMO**, Romuald Beck

[Edu42] **Advanced Physical Fundamentals of Optoelectronics** (Zaawansowane podstawy fizyczne optoelektroniki), **ZPFO**, Paweł Szczepański

[Edu43] **Design of VLSI Circuits** (Projektowanie struktur scalonych VLSI), **PSSCV**, Wiesław Kuźmicz

[Edu44] **Digital Image Processing** (Cyfrowe przetwarzanie obrazów), **CPOO**, Piotr Garbat

[Edu45] **Electronic and Photonic Devices for Telecommunication** (Przyrządy elektroniki i fotoniki dla telekomunikacji), **PEFT**, Bogdan Galwas

[Edu46] **Fundamentals of Photovoltaics** (Podstawy fotowoltaiki), **PFOT,** Stanisław Pietruszko

[Edu47] **Integrated and Logic Circuits for Optoelectronics** (Zintegrowane układy optoelektroniczne i optyczne układy logiczne), **ZOUL**, Michał Malinowski

[Edu48] **Lasers – Advanced Course** (Lasery - kurs zaawansowany), **LKZ,** Paweł Szczepański

[Edu49] **Monte Carlo Methods - Fundamentals and Applications** (Metody Monte Carlo - podstawy i zastosowania), **MMC**, Piotr Szwemin

[Edu50] **Nanotechnologies** (Nanotechnologie), **NAN**, Jan Szmidt

[Edu51] **Optical Waveguide Lasers and Amplifiers**(Wzmacniacze i lasery światłowodowe), **WLS**, Ryszard Piramidowicz

[Edu52] **Optoelectronics Techniques of Information Processing** (Optoelektroniczne techniki przetwarzania informacji) ,**OTZI**, Janusz Parka, Jerzy Woźnicki

[Edu53] **Photovoltaic Systems** (Systemy fotowoltaiczne), **SFOT,** Stanisław Pietruszko

[Edu54] **Semiconductor Structures for VLSI and ULSI Circuits** (Struktury półprzewodnikowe dla układów VLSI i ULSI), **SPVU**, Andrzej Jakubowski

### *3.3. Courses in English*

[Edu55] **Electronics 1, EELE1,** Bogdan Majkusiak

[Edu56] **Laser physics,** Robert Paszkiewicz**,** Athens Programme course

[Edu57] **Physics 3, A,** Bogdan Majkusiak

[Edu58] **Fundamentals of Nanoelectronics,** Bogdan Majkusiak, Athens Programme course

[Edu59] **Quality Management, EQUMA,** Zdzisław Mączeński

# 4. RESEARCH PROJECTS

Project definitions and descriptions - prepared by Project Leaders.

## *4.1. Projects Granted by the University*

[Pro1] **The Development of Processing and Testing Methods of Electronic Materials, and Design and Characterisation of the Devices for Microelectronics and Optoelectronics** (Rozwój metod wytwarzania i badania materiałów oraz modelowania i charakteryzacji przyrządów w dziedzinie mikroelektroniki i optoelektroniki), project leader: Paweł Szczepański, April 2006 - September 2007,

[Pro1.1] **Fabrication and characterisation of test strucutres with SiOxNy ultrathin dielectric layers high-K gtate stack on silicon substrates,** (Wytwarzanie i charakteryzacja struktur z układem ultracienkich warstw dielektrycznych zwierających warstwę $SiO_xN_y$ na oraz dielektryk o wysokiej przenikalności dielektrycznej na podłożach krzemowych), sub-project leader: R.B. Beck, co-workers: T. Bieniek, W Ciemiewski, K. Dalbiak, A. Jakubowski, M. Kalisz, L. Łukasiak, B. Majkusiak, R. Mroczyński, J. Szmidt, A. Werbowy, M. Trzaskowska

The project aims in integration ultrathin oxyntride layers withhigh-K gate stack technology.

[Pro1.2] **Investigation of photoconductive properties of interface polymer – liquid crystal in LC vision panels,** (Badania właściwości fotoprzewodzących złącza w układzie polimer-ciekły kryształ w ciekłokrystalicznych przetwornikach obrazowych), sub-project leader: Janusz Parka

Electrooptical and optical properties of fotorefractive polimer – liquid crystal panels have been investigated. LC panels with photoconductive PVK + TNF (polivinylocarbazol and trinitrofluorenon) were used in these investigations. Photocurrent in these panels have been measured. This photocurrent have strong influence on mechanisms of interference grating formation in LC panels, which is important from application point of view. Beam coupling processes in these panels were observed and described.

[Pro1.3] **Microwave Photonic Dispersive Filters** (Mikrofalowe fotoniczne filtry dyspersyjne), sub-project leader: Bogdan Galwas, co-workers: Agnieszka Szymańska, Jarosław Dawidczyk, Jerzy Piotrowski, Jerzy Skulski, Paweł Wojtyra

Conventional digital and analog signal-processing have limited signal bandwidth which does not exceed a gigahertz, and nowadays, when the need for high bandwidth signal processing is growing, some other solutions are required. Novel microwave photonic filters can process signals of high gigahertz bandwidth which is of great importance in real-time processing of radar signals and broadband wireless access networks. The aim of this work is the study of mathematical description of various microwave photonic filters with dispersive media, development of suitable for simulations models of filters, and investigations of filters' characteristics.

[Pro1.4] **Modelling and investigation of amplifier and laser structures with limit dimension** (Modelowanie i badanie struktur wzmacniających i laserowych o ograniczonej wymiarowości), sub-project leader: Michał Malinowski

[Pro1.5] **Simulation of manufacturing processes in nanometer scale CMOS integrated circuits** (Metody symulacji procesów produkcji nanometrowych układów scalonych CMOS), sub-project leader: Wiesław Kuźmicz

The goal of this work is to develop new models of manufacturing processes and new methods of device modeling for nanometer scale CMOS intergated circuits. CMOS technologies with channel length below 100 nm require new approaches to process simulation and device modeling. The doping processes used and doping profiles obtained differ from those typical for older technologies. In nanometer scale MOS devices new physical phenomena, such as quantum effects and tunneling currents, are abserved and must be accounted for.

New process models and device modeling methods will be used in CLEAN, the European FP6 integrated project. In particular, new advanced postimplantation doping profiles will be investigated, methods of theoretical calculation of MOS device parameters will be developed as well as modeling methods for leakage currents.

[Pro1.6] **The characterization of electronic materials and proposals of construction for sensors technics, (**Charakteryzacja materiałów elektronicznych i propozycje konstrukcji dla techniki sensorowej**),** sub-project leader: Jan Szmidt

The work consist of two tasks:

. Microwave resonators – new technologies and their applications in measurements of ferroelectrics.
. The proposals of construction of optical components for sensors technics.

The main goals of Task 1 are: development of new dielectric resonators with Bragg reflectors and development of new techniques for the complex permittivity measurements of ferroelectrics. This work is related to Polish contribution in Polish-Australian linkage grant (LX0561280) entitled: „Microwave characterization of new magnetic and dielectric structures and materials" awarded by Australian Research Council to James Cook University (Townsville), University of Western Australia, Massey Universisy (New Zealand) and Warsaw University of Technology.

The Task 2 range are the study and proposal of components construction for sensors heads executed from modified optical fibers. Such constructions proclaim up, in investigation, the next step in the monitoring of specific proprieties

liquid with very small volumes. The method of valuation of sensibility of proposed constructions will be worked out. The additional study will be guided in sense of head of sensors from optical fibers with are covered with thin dielectric film. The experimental verification of proposed method will be done in Canadian Centre de recherche the en photonique Universite the du of Quebec en Outaouais.

[Pro2] **The Development of Design, Processing and Testing Methods of the Electronic Devices and Materials for Microelectronics and Optoelectronics** (Rozwój metod wytwarzania i badania materiałów oraz modelowania i charakteryzacji przyrządów w dziedzinie mikroelektroniki i optoelektroniki), project leader: Paweł Szczepański, April 2007 - August 2008, **sub-projects:**

[Pro2.1] **Analysis, modelling and investigation of active waveguide photonic structures and characterization of active materials,** (Analiza, modelowanie i badanie warunków wzmocnienia i generacji w światłowodowych i fotonowych strukturach aktywnych oraz charakteryzacja materiałów aktywnych**),** sub-project leader: Michał Malinowski

[Pro2.2] **Investigations of magnitude-phase characteristics and parameters of optical transmitters and receivers** (Badania charakterystyk i parametrów amplitudowo-fazowych nadajników i odbiorników optycznych), sub-project leader: Bogdan Galwas, co-workers: Jarosław Dawidczyk, Jerzy Piotrowski, Jerzy Skulski, Agnieszka Szymańska.

Commonly applied techniques to design the analog fibre link are based on magnitude of the frequency response of the optoelectronic devices used in the link. Omission of the phase relations between microwave signal at the input of optical transmitter and detected modulation envelope at the receiver's output limits design accuracy of the analog fibre link.

The aim of this project is elaboration and verification of concept of the electo-optical twoport which enables determination of magnitude and phase frequency response of optical transmitter as well as optical receiver.

[Pro2.3] **Methods of simulation of manufacturing of nanometer scale CMOS integrated circuits** (Metody symulacji procesów produkcji nanometrowych układów scalonych CMOS), sub-project leader: Wiesław Kuźmicz

The goal of this project is to extend the simulation software developed previously by implementing new process models and new device modeling algorithms enabling simulation of nanometer scale CMOS integrated circuits. New process models include complex 3D ion implants as doping processes, and modeling of CMOS devices with BSIM4 Spice model with parameters generated directly from the results of process simulation.

[Pro2.4] **Photonic devices and electronic materials investigation for sensors application,** (Konstrukcje fotoniczne dla techniki sensorowej i charakteryzacja materiałów elektronicznych), sub-project leader:Jan Szmidt, co-workers: M.Borecki, M.Bebłowska, P.Wrzosek, R.Biaduń

Optical capillaries are used in capillary gas and liquid chromatography, capillary electrophoresis, absorbance spectroscopy, Raman spectroscopy etc. The use of optical capillaries in these micro-fluidic methods has emerged in the 1990s and generated new applications in biotechnologies, medical diagnostic, drug discovery and environmental sciences. The wide range of possible capillary constructions allows them to be aimed advantageously at specific applications. In the presented work we discuss some spects of integration of photonic heads that use optical capillaries in micro-fluidic systems. The field of research is multidisciplinary, comprising aspects of physics of micro fluid sample motion, the task of optical detection and integration of the technology with practical applications.

[Pro2.5] **3D Data precessing in visional monitoring system,** (Przetwarzanie danych 3D w systemach monitoringu wizyjnego), sub-project leader: Piotr Garbat, July 2007 – September 2008

[Pro3] **Application of optimization methods to globar extraction of electrophysical parameters of MOS devices** (Zastosowanie metod optymalizacji w globalnej ekstrakcji elektrofizycznych paramaterów przyrządów półprzewodnikowych typu MOS), project leader: Sławoimr Szostak, co-workers: Jan Arabas, Lidia Łukasiak, April 2007 – December 2007

The aim of the project is to improve the reliability and accuracy of global extraction of MOS-device parameters

[Pro4] **Bragg gratings on active fluorozirconate fibers,** (Siatki braggowskie na aktywnych światłowodach fluorocyrkonowych), project leader: Ryszard Piramidowicz, April 2007 – December 2007

The aim of this work, realized in co-operation of Institute of Microelectronics and Optoelectronics and Institute of Electronics Systems, is to investigate and analyze the feasibility of Bragg gratings inscription in active optical fibers. Scope of work encompasses versatile feasibility study of periodic structures inscription in active optical fibers made either of silica or fluorozirconate glass. Development of software tools allowing theoretical estimation of coupling coefficient of Bragg Gratings is to be followed by experiments aimed at verification of both modeling results as well as elaborated technological procedures. As a final result – a proposal and development of technology (or technologies) of periodic structures writing in active (both silica and fluorozirconate) fibers is expected.

[Pro5] **Electropassivating oxide films deposited with plasma surface engineering methods for electronic structures,** (Elektropasywujące warstwy tlenkowe w strukturach elektronicznych wytwarzane metodami plazmowej inżynierii powierzchni), project leader: Jan Szmidt, co-worker: Piotr Firek, April 2007 – December 2007

The main goal of the project was to examine electrophisical parameters of $Al_2O_3$ layers produced by means of magnetron sputtering and impulse plasma deposition (IPD) methods.

Selective "wet" etching process was analyzed. Simple microelectronic structures (MIS capacitors) with aluminum oxide were produced and investigated.

[Pro6] **Miniaturised biochemical system with optical and electrochemical detection, part II - integration and microsystem optimisation**, (Miniaturowy system biochemiczny z detekcją optyczną i elektrochemiczną, część II: integracja i optymalizacja mikrosystemu), project leader: R.B. Beck, co-workers: L. Łukasiak, Z. Pióro, J. Walczak, J. Maciak, J. Gibki, W. Ciemiewski, K. Dalbiak, K. Krogulski, May 2007 – December 2007

The project aims in studying and fabricating of miniaturized biochemical systems that allow in-situ optical and electrochemical detection

[Pro7] **Study and characterization of photonic structures by remote measurement tools,** (Badania i charakteryzacja struktur fotonicznych z wykorzystaniem zdalnych narzędzi pomiarowych), project leader: Ryszard Piramidowicz, April 2007 – December 2007

The aim of this work is the design, set-up and internet commissioning of a virtual laboratory dedicated to photonics research support. The long-shot goal is establishing at Warsaw University of Technology of an international measurements platform, enrolling to European Research Area in the field of optoelectronics and photonics. The project is to be realized in co-operation of three research groups of WUT: Optoelectronics Division of Institute of Microelectronics and Optoelectronics, Optical Engineering Division of Institute of Micromechanics and Photonics and the Faculty of Physics.

[Pro8] **Synthesis and properties of niobium doped barium titanate thin films,** (Wytwarzanie i właściwości warstw tytanianu baru domieszkowanych niobem), project leader: Aleksander Werbowy, April 2007 - December 2007

Thin (80 nm) nanocrystalline dielectric films of niobium doped barium titanate (BT) were deposited on Si substrates in the course of Ar radio frequency (13.56 MHz) plasma sputtering of a ceramic $BaTiO_3$ + 2 wt.% $Nb_2O_5$ target. Then on top of so produced layers a metallization in a form of round Al dots of 1 mm diameter was vacuum evaporated resulting in creation of metal-insulator-semiconductor (MIS) structures. Subsequently their current-voltage (*I-V*) and high frequency capacitance-voltage (*C-V*) measurements were carried out enabling extraction of some important electronic parameters of studied BT films. Scanning electron microcopy (*SEM*) and secondary ion mass spectroscopy (*SIMS*) whereas allowed to investigate layers morphology and chemical composition.

[Pro9] **Visible fiber laser – study on laser action in fluorozirconate fibers activated with praseodymium and ytterbium ions,** (Laser włóknowy na zakres widzialny – badania generacyjne światłowodów fluorocyrkonowych aktywowanych jonami prazeodymu), project leader: Ryszard Piramidowicz, co-workers: IMiO Student Association of Optoelectronics, April 2007 – December 2007

The main goal of the project is to design and realize a prototype up-conversion pumped fiber laser system. The scope of work includes spectroscopic characterization of $Pr^{3+}$+$Yb^{3+}$ doped ZBLAN fibers, investigation of possible pumping schemes leading to visible laser action in double clad fibers, power optimization of designed system, as well as designing and preparing power units and temperature control systems for pump laser diodes, development of procedures for fluoride fiber termination and connectorization, setting up of laser cavity and performing visible laser action experiments.

[Pro10] **Investigation of anisotropy properties of ferroelectric liquid crystal materials in microwave frequency range in flat panels,** (Badania właściwości anizotropowych ferroelektrycznych materiałów ciekłokrystalicznych w zakresie częstotliwości mikrofalowych w płaskich przetwornikach), project leader: Janusz Parka, April 2007 – December 2007

Anisotropy properties and tangent of losses for different liquid crystal materials in GHz frequency range have been investigated. The most measurements ware made in 10 GHz resonators. Tangent of losses for different materials change value about one order. It was shown that is possible to find liquid crystal materials with relatively small tangent of losses and high dielectric anisotropy. For investigated materials smestics have less losses then nematics.

## *4.2. Projects Granted by the Ministry of Education and Science*

[Pro11] **Charge pumping as a tool for characterization of electrophysical parameters of new-generation MIS devices** (Metoda pompowania ładunku jako narzędzie do charakteryzacji parametrów elektrofizycznych nowych generacji przyrządów typu MIS), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: L. Łukasiak, co-workers: A. Jakubowski, S. Szostak, R.B. Beck, B. Majkusiak, J. Walczak, Z. Pióro, J. Gibki, D. Tomaszewski, A. Zaręba, J. Maciak, A. Linkowski, May 2005 – May 2008.

The aim of this project is to adapt the charge pumping method for new-generation MIS devices (e.g. in the presence of strong coupling between front and back semiconductor-dielectric interfaces in SOI structures or in the presence of SiGe or strained Si layer in the MOS structure). The next step is to perform detailed characterization of these devices using this method to assess the quality of the dielectric-semiconductor interface which is very important, especially in view of new gate-stack materials.

[Pro12] **Coherence properties of light generated by photonic crystal lasers** (Zagadnienie koherencji promieniowania generowanego w laserach z ośrodkiem aktywnym w postaci kryształu fotonowego), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Paweł Szczepański, co-workers: Anna Tyszka-Zawadzka,

Adam Rudziński, May 2005 – November 2007

The main aim if this grand is to develop the semi classical model of light generation in planar Fabry-Perot and DBR lasers having an active medium in the form of photonic crystal. This study takes into account modification of density of quantum states as well as the effect of non-orthogonality of laser modes. We use a stochastic approach based on Fokker-Planck equation. With the help of this model it is possible to investigate the influence of geometric parameters and local defects of photonic crystal on coherence of laser light. The analysis of spontaneous emission rate will take into consideration two cases: the first one when spontaneous emission is Markovian process and is described by Fermi's Golden rule, and the second one when spontaneous emission includes atom-field interaction (so called "memory" effect). Additionally, the study of the influence of localized defects on spontaneous emission rate is predicted.

[Pro13] **Contact and assembly technologies for high temperature, high power and high frequency applications of SiC devices**, (Technologia kontaktów i montażu dla przyrządów z węglika krzemu do zastosowań wysokotempearturowych, wysokomocowych i wysokoczęstotliwościowych) Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Ryszard Kisiel, co-workers: Zbigniew Szczepański, Marek Guziewicz, Norbert Kwietniewski, Ryszard Biaduń, April 2007 - March 2010

The aim of the project is to elaborate the ohmic contact technology for SiC devices as well as assembly technique for electrical and mechanical connection between SiC structure and package. An elaborated package shall be able to work in high temperature (up to 400°C), high power and high frequency application.

[Pro14] **Deposition and measurements of thin metal and dielectric films intended for nanoelectronics and microwave technique,** (Wytwarzanie i charakteryzacja cienkich warstw metalicznych i dielektrycznych dla potrzeb nanoelektroniki i techniki mikrofalowej), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jerzy Krupka, co-workers: Jan Szmidt, Marek Guziewicz, Zdzislaw Mączeński, Mikolaj Baszun, Norbert Kwietniewski, April 2007 - April 2010

New nanotechnologies require not only high resolution photolithographic processes but also deposition of very thin (the order of few nanometers) metal and dielectric films having repeatable and electromagnetic properties. When film thickness becomes very thin their physical properties may be different than the properties of bulk materials or thin films having thickness in the range of microns. In the addition traditional measurements methods may be not adequate for very thin films characterization. The main goal of this project is deposition and characterization of extremely thin metal and dielectric films. Single post and split post dielectric resonator techniques will be used for measurements of the surface resistance of thin metal films deposited on low loss dielectric substrates. Al, Cu, Ag, Au, Fe, Mo, W, Pd, Pt and ITO films will be measured employing those resonators. For comparison DC and low frequency measurement techniques will be also employed.

[Pro15] **Dielectric layers fabricated by means of plasma methods for AIII-N (GaN, AlGaN) semiconductor structures' technology, (**Warstwy dielektryczne wykonane metodami plazmowymi na potrzeby technologii struktur półprzewodnikowych wytwarzanych w azotkach pierwiastków III grupy układu okresowego (GaN i AIGaN)), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, co-worker: Artur Szczęsny, February 2007 – October 2008

The project focuses on $Si_3N_4$, AlN and diamond-like films, which are used as passivation or Shottky contacts underlying layers. Two types of devices are fabricated as test structures: GaN- based Shottky diodes and AlGaN/GaN HEMTs.

[Pro16] **Electronic detectors and chemical sensitive devices with diamond and diamon-like carbon (dlc) films, (**Elektroniczne detektory i przyrządy chemoczułe z warstwami diamentowymi i diamentopodobnymi**)**, Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, September 2006 – September 2009

The main goal of the project is designing the structure and subsequent fabrication of at least 3 prototypes of an ionizing radiation detector and chemical sensitive devices, where the role of active (i.e. detecting) regions play diamond and diamond-like carbon (DLC) films of varied phase composition, structure and surface morphology.

Diamond and DLC layers will be produced by means of radio frequency (RF) or/and microwave (MW) plasma chemical vapor deposition (CVD) techniques as well as using hot filament chemical vapor deposition (HF CVD) and impulse plasma deposition (IPD) methods.

Fabrication of optical fiber and planar waveguide-based detectors as well as microelectronic devices (open-gate field effect transistor, diamond film/metal or diamond film/silicon heterojunction structures) is anticipated.

[Pro17] **Modeling and characterization of multigate MOS SOI structures** (Modelowanie i charakteryzacja wielobramkowych struktur MOS SOI), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: A. Jakubowski, co-workers: B. Majkusiak, L. Łukasiak, R.B. Beck, J. Gibki, S. Szostak, J. Walczak, A. Zaręba, G. Głuszko, D. Tomaszewski, October 2007 – October 2010

The aim of the project is analysis of electrical characteristics of multi-gate MOS structures and development of methods of characterization, as well as modeling of selected physical phenomena present in multigate MOS devices and their parameters and electrical characteristics.

[Pro18] **Modeling of silicon structures with low-dimensional electron gas, (**Modelowanie struktur krzemowych z niskowymiarowym gazem elektronowym**),** Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: J. Walczak, co-workers: B. Majkusiak, R.B. Beck, A. Mazurak, May 2007 – May 2010

The project relates to modeling Si and also SiGe structures with 2DEG (two dimensional electron gas – quantum plane) and 1DEG (quantum wire). The main goal is the developement and implementation of physical models of complex structures comprising a plurality of ultrathin semiconductor and dielectric layers, along with the analysis of obtained electrical characteristics of the modeled devices.

[Pro19] **New possibilities of the UV generation in ion lasers in the noble gases and its mixtures** (Nowe możliwości generacji promieniowania UV w jonowych laserach pracujących na gazach szlachetnych i ich mieszaninach), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jerzy Kęsik, May 2005 – May 2008

Significant progress observed in last years in structure and technology of ion laser discharge tubes created new possibilities of the continuous and multi-pulse generation of the ultraviolet radiation. The main goal of this project is optimization of laser tube construction and laser working conditions (discharge current, gas pressure, axial magnetic field intensity) to obtain maximum output power in a UV range. The measurements of active medium parameters (unsaturated gain coefficient, saturation parameter) and optimum mirror transmissions will be also executed. The investigations will be performed in a pure noble gases (Ar, Kr, Ne) and its mixtures. The significant part of investigations is determination of multi-pulse (quasi-continuous) operation on laser output power.

[Pro20] **Optoelectronic mikrosystem to make research of samples about nano-liters volumes with using the optical capillaries,** (Mikrosystem optoelektroniczny do badania próbek o nanolitrowych objętościach z wykorzystaniem kapilar optycznych), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, co-worker: Paweł Wrzosek, October 2007 – October 2010

The main aim the project is to study the new, original method to make research of liquid samples about 10 – 9 liters volume, it means possibility of the analysis physics-chemical drop.

Final measurable work effect will be laboratory computer system to analysis chosen liquid parameters together with software to visualization of measuring results.

[Pro21] **Plasma Enhanced Chemical Vapor Deposition (PECVD) as a method of fabrication of ultrathin silicon oxynitride layers for CMOS-ULSI technology,** Chemiczne osadzanie z fazy lotnej wspomagane plazmą (PECVD) jako metoda wytwarzania ultracienkich warstw tlenkowo-azotków krzemu dla technologii CMOS-ULSI (PROMOTORSKI**),** Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: R.B. Beck, co-workers: R. Mroczyński, March 2007 – March 2008

[Pro22] **Polarization sensitive liquid crystal filter in the digital image processing system** (Spektralno – polaryzacyjny filtr ciekłokrystaliczny w systemie cyfrowego przetwarzania i analizy obrazu), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jerzy Woźnicki, co-workers: Andrzej Walczak, Edward Nowinowski-Kruszelnicki, Janusz Parka, Hanna Górkiewicz-Galwas, Marek Sutkowski, Piotr Garbat, Jerzy Domański; October 2004 – April 2007

The project is devoted to preparation and investigation of the new liquid crystal filter and its application in the digital image processing system. Analysed filter is polarization sensitive because of special – hybrid, planar, circular or planar-homeotropic - alignment of the liquid crystal layer placed between crossed polarizes. Properties of the filter depend on applied liquid crystal. It is analysed in detail. It will be shown that such filter while joined with digital acquisition of the scene provides new possibilities in the optical signal processing. Proper system for that task will be constructed.

[Pro23] **Thin film $BaTiO_3$ ceramics for metal-ferroelectric-semiconductor (MFS) structures** (Cienkowarstwowa ceramika $BaTiO_3$ dla struktur metal-ferroelektryk-półprzewodnik (MFS)), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Aleksander Werbowy, co-workers: J.Szmidt, W.Ciemiewski, K.Dalbiak, A. Olszyna, P. Niedzielski, P. Firek, M.Trzaskowska, May 2004 – May 2007

The main goal of the project is development of the fabrication method of ultra-fine grained, high-k and high-resistive thin film $BaTiO_3$ ceramics as well as investigation of its properties from the viewpoint of the material's applicability as a dielectric layer for electronic devices. The attempt will be made to develop the technology (proper semiconductor surface pre-treatment, $BaTiO_3$ selective etching, metal contacts forming) that would enable producing test electronic structures, like MFS capacitors and field-effect transistors (FETs) with discussed ceramics playing the role of ferroelectric gate insulator.

[Pro24] **Unipolar devices and transistors for high-temperature electronics, (**Przyrządy unipolarne I struktury tranzystorowe na potrzeby elektroniki wysokotemperaturowej), Warsaw University of Technology, Institute of Microelectronics and Optoelectronics, project leader: Jan Szmidt, co-worker: Mariusz Sochacki. May 2007 – April 2010

Schottky diodes and field effect transistors (MOSFET and JFET) for high-temperature electronics have been designed, developed, measured and characterized. The abovementioned structures have been tested within temperature range from 20°C up to 400°C.

### *4.3. Projects Granted by International Institutions*

[Pro25] **Controlling Leakage Power in NanoCMOS SoCs, European Commission 6 Framework Programme - Integrated Project CLEAN (FP6 – 4 – IST – 4 – 026980 – IP – CLEAN),** Projekt zintegrowany w ramach 6-tego Programu Ramowego UE, project leader: Wiesław Kuźmicz, November 2005 – October 2008

Today's greater than ever functionality of electronic devices is possible only by integrating an increasing number of highly complex tasks into the so called embedded systems on chip (SoC). According to "Moore's Law" the complexity of hardware systems doubles itself exponentially over time. This trend is still holding on, already enabling chips integrating one billion transistors. The required technology shrink - now below 65nm - rises the problem of dramatically increasing power consumption, especially in consequence of so called leakage currents.

CLEAN is a project, in which the problem of leakage currents in the upcoming technologies (65nm and below) is addressed. Main targets of the CLEAN project are:

- analysis and development of design techniques for leakage reduction,
- development of EDA tools for leakage aware design using the design techniques,
- development of EDA tools for high level leakage prediction, supporting leakage aware design.

[Pro26] **IC design skills for advanced DSM technologies, European Commission 7 Framework Programme – Project IDESA (contract No. 215180)**, Projekt 7 Programu Ramowego UE, project leader: Wiesław Kuźmicz, December 2007 – November 2009

The mission of this project is to bridge the gap between the industrial design flows, methodologies and tools that have already reached maturity for the 90 nm technology node and are being quickly extended to 65 nm, 45 nm and beyond, and the design knowledge, competences and skills at European universities, which are insufficient to introduce these industrial design methods and flows to university curricula. A European-scale supporting action will help to acquire quickly the necessary knowledge and skills, in this way reducing by many orders of magnitude the total efforts that would be needed if the European universities tried to cope with new design problems and master new design techniques and tools individually and independently.

[Pro27] **Network of Excellence for Micro-Optics – NEMO, Network of Excellence within 2nd IST 6FP of UE** (Mikronowe i sub-mikronowe przyrządy dla fotoniki - NEMO), Sieć doskonałości w ramach 6-tego Programu Ramowego UE, project responsible person in IMiO: Paweł Szczepański, co-workers: Paweł Czuma, Piotr Firek, Marcin Kaczkan, Wojciech Kamiński, Mariusz Klimczak, Kamila Leśniewska-Matys, Michał Malinowski, Agnieszka Mossakowska-Wyszyńska, Robert Paszkiewicz, Ryszard Piramidowicz, Adam Rudziński, Jan Szmidt, Mateusz Śmietana, Paweł Śniecikowski, Anna Tyszka-Zawadzka, Piotr Warda, Aleksander Werbowy, Piotr Witoński, September 2004 – August 2008

NEMO is running since 1 September 2004 and aims at providing Europe with a complete Micro-Optics food-chain by setting up durable service and technology centres and long-term research centres. NEMO will be the networking platform of 30 European partners for the next 4 years and beyond. Each of the 30 institutes involved in NEMO is a key role player in micro-optics. NEMO's main objective is to structure and integrate the expertise and core-competences of its partners while strengthening their R&D activities in the emerging field of micro-optics.

The main types of activities in which the Institute of Microelectronics and Optoelectronics actively participates within this project are:

- Centre for Modelling and Design;
- Centre for Measurement and Instrumentation;
- Infra-Red Micro-Optics.

More information are at http://consortium.micro-optics.org/

[Pro28] **PULLing the limits of NANOCmos electronics - PULLNANO, Integrated Project 6FP UE**, project leader: Bogdan Majkusiak, co-worker: J. Walczak, A. Mazurak, June 2006 – November 2008

PULLNANO is a very powerful integrated project focussed on the advanced research and technology activites necessary to push forward limits of CMOS technologies. It focuses on RTD activities necessary to develop the 32nm and 22nm technoliges node and open the way to the long term future of CMOS based technologies. To help to achieve this objective, PULLNANO gathers the best competences existing in Europe: IC manufactureres, technological research institutes, equipment suppliers, and a large number of academic teams. The Warsaw team is engaged in quantum-mechanics based simulation of devices that contribute to prediction of CMOS limits, design of device and architecture solutions beyond traditional planar CMOS.

[Pro29] **Silicon-based Nanodevices – SINANO, Network of Excellence within IST 6FP of UE** (Przyrządy naonelektroniki oparte na krzemie – SINANO), Sieć doskonałości w ramach 6-tego Programu Ramowego UE, project leader: Romuald B.Beck, co-workers: B.Majkusiak, L.Łukasiak, K.Dalbiak, W.Ciemiewski, T.Bieniek, R.Mroczyński, D.Tomaszewski, J.Grabowski, G. Głuszko, January 2004 – March 2007

SINANO project is devoted to wide range of issues concerning silicon – based nanodevices. The main types of activities in which the Division actively participates within this project are:

- manufacturing of CMOS device based on classical approach, as well as on SOI, multigate or strained (SiGe) platforms;

- characterization of the manufactured test devices and diagnostics of problems that should be solved either by technology or device design modifications;
- modelling of all types of structures under investigation in this project.

## *4.4. Other Projects*

[Pro30] **Elaboration of upconversion fiber laser for visible wavelengths** (Opracowanie i wykonanie modułu lasera włóknowego na zakres widzialny z konwersją wzbudzenia), project leader: Michał Malinowski, July 2004 – June 2007

Diode pumped $Pr^{3+}$ activated visible fibre laser is investigated. Single spatial mode laser diode is used as a pump source in double doped $Pr^{3+}$+$Yb^{3+}$:ZBLAN up conversion fibre laser. Lasing by up conversion means applying two infra red photons to a medium that responds by emitting one photon in the visible. Theoretical analysis and modelling of energy transfer processes in Pr/Yb double doped fibre lasers are performed. Experimental work is oriented on the construction and investigation of fibre lasers based on Pr/Yb:ZBLAN glass.

[Pro31] **Study of technology and construction as well as realization of micro mechanical switch** (Opracowanie technologii i konstrukcji oraz wykonanie przełącznika mikromechanicznego), project leader: Jerzy Kruszewski, co-workers: Michał Borecki, Maria Bebłowska, Paweł Wrzosek, Ryszard Biaduń, July 2004 – June 2007

Work relates micro - optical switches. Proposed switch consists from head and optical fibres. The components of switch were mathematical modelling in aim of study of construction. The actuator is the key component of switch head. The construction of electromagnetic actuator with magnetic latch of show on exceptional usefulness under conducted analysis.

[Pro32] **The sensor module study and realization for measurement of vibration** (Opracowanie i wykonanie modułu czujnika do pomiaru wibracji), project leader: Jerzy Kruszewski, co-workers: Michał Borecki, Maria Bebłowska, Paweł Wrzosek, Ryszard Biaduń, July 2004 – June 2007

The work concerns the micro mechanical optical sensor of vibration. The sensor module consists from the following optoelectronic components: head, fibres track, supply and detection scheme. Optical track is open in the head for sensing purposes. The modulation of optical radiation happens in this place through a micro mechanical component. The method of optical and mechanical parameters characterization for the head was worked out.

# 5. DEGREES AWARDED

## *5.1. Ph.D. Degrees*

[PhD1] Tomasz Bieniek, **Influence of silicon surface-r.f. plasma interaction on oxidation rate,** Wpływ interakcji powierzchnia krzemu-plazma w.cz. na szybkość utleniania, supervisor: Romuald B. Beck, 5 June 2007

[PhD2] Leszek Książek, **Optimalization of ultrasonic piezoelectric transducer for application in obiects location,** Optymalizacja ultradźwiękowych przetworników piezoelektrycznych do zastosowań w lokalizacji obiektów, supervisor: Jerzy Krupka, 20 March 2007

[PhD3] Magdalena Nakielska, **The luminescent properities of thin monocrystaline YAG:Pr3+ epitaksial films**, Właściwości luminescencyjne cienkich monokrystalicznych warstw epitaksjalnych z YAG:Pr3+, supervisor: Michał Malinowski, 4 December 2007

[PhD4] Mariusz Sochacki, **Passivation of silicon carbide devices by plasma deposition methods**, Plazmowe metody pasywacji przyrządów wytwarzanych na węgliku krzemu. supervisor: Jan Szmidt, 19 June 2007

[PhD5] Mateusz Śmietana, **Diamond-like carbon films applied in optical waveguide sensing techniques,** Warstwy diamentopodobne w światłowodowej technice czujnikowej, supervisor: Jan Szmidt, 9 January 2007

## *5.2. M.Sc. Degrees*

[MSc1] Błażej Amarowicz, **Inteligentny system dozoru bazujący na cyfrowych metodach przetwarzania obrazu,** advisor: Piotr Garbat, very good

[MSc2] Wojciech Antonik, **Koncepcja systemu indeksowania obrazów z wykorzystaniem korelogramów,** advisor: Piotr Garbat, good

[MSc3] Piotr Bejm, **Very high frequency sampling,** advisor: Wiesław Kuźmicz, very good

[MSc4] Krzysztof Bolczak, **Analiza i modelowanie uszkodzeń warstw przewodzących w układach scalonych,** advisor: Witold Plaskacz, good

[MSc5] Sławomir Czekański, **Badanie izomorfizmu grafów w procesie weryfikacji projektu topografii układu scalonego,** advisor: Adam Wojtasik, good

[MSc6] Alina Demianiuk, **Badanie centrów defektowych w epitaksjalnych warstwach GaN metodą niestacjonarnej spektroskopii fotoprądowej,** advisor: Antoni Siennicki, very good

[MSc7] Alicja Droszcz, **Specjalizowany mikrokontroler do zastosowania w układzie System-on-Chip mikronadajnika RF,** advisor: Elżbieta Piwowarska, very good

[MSc8] Paweł Dunaj, **Zastosowanie bezprzewodowej sieci czujników inteligentnych w systemach wczesnego wykrywania, lokalizacji i gaszenia pozarów obiektów wielkokubaturowych,** advisor: Zbigniew Pióro, excellent

[MSc9] Tomasz Gałażewski, **Metoda szybkiej analizy projektu topografii układów VLSI dla potrzeb wyznaczania wektorów testowych,** advisor: Adam Wojtasik, excellent

[MSc10] Oliwia Gąbka, **Modelowanie półizolujących własności monokryształów Sic,** advisor: Antoni Siennicki, very good

[MSc11] Paweł Gdula, **Zagadnienie transferu energii Nd3+-Yb3+ w planarnych warstwach YAG,** advisor: Michał Malinowski, very good

[MSc12] Michał Hacia, **Projekt pętli fazowej dla mikronadajnika RF,** advisor: Elżbieta Piwowarska, good

[MSc13] Piotr Kijek, **Badania właściwości emisyjnych w zakresie widzialnym aktywnych falowodów planarnych Dy:YAG/YAG,** advisor: Ryszard Piramidowicz, very good

[MSc14] Karol Korszeń, **Pomiary odległości metodą FSCW,** advisor: Jarosław Dawidczyk, excellent

[MSc15] Norbert Kwietniewski, **Wytwarzanie i charakteryzacja cienkich warstw BaTiO3 dla struktury metal - ferroelektryk - półprzewodnik (MFS),** advisor: Aleksander Werbowy, very good

[MSc16] Katarzyna Ławniczak, **Badanie właściwości emisyjnych i generacyjnych w zakresie UV aktywnych falowodów planarnych Pr:YAG/YAG,** advisor: Ryszard Piramidowicz, very good

[MSc17] Maciej Łepkowski, **Pamęci holograficzne i możliwości ich realizacji na przykładzie przetworników ciekłokrystalicznych,** advisor: Janusz Parka, very good

[MSc18] Mariusz Machnik, **Elektroniczny skaner przenośny do diagnostyki pojazdów wyposażonych w system OBD II – oprogramowanie,** advisor: Zbigniew Pióro, excellent

[MSc19] Michał Maciąg, **Automat rozmyty w cyfrowych realizacjach sterowników rozmytych,** advisor: Andrzej Wielgus, very good

[MSc20] Arkadiusz Malinowski, **Analiza rozrzutów niektórych procesów technologicznych na podstawie pomiarów elektrycznych struktur próbnych,** advisor: Andrzej Jakubowski, excellent

[MSc21] Sebastian Pawlak, **Przetwarzanie danych obrazowych w systemach zarządzania treścią multimedialną,** advisor:Jerzy Woźnicki, good

[MSc22] Paweł Pazderski, **Elektroniczny skaner przenośny do diagnostyki pojazdów wyposażonych w system OBDZ – sprzęt,** advisor: Zbigniew Pióro, excellent

[MSc23] Łukasz Raczkowski, **Analogowe realizacje bloków funkcjonalnych sterownika rozmytego,** advisor: Zbigniew Jaworski, very good

[MSc24] Janusz Rokicki, **Adaptacja technologii wirtualnej rzeczywistości do budowy interfejsu dla bezprzewodowej, inteligencji sieci czujnikowej,** advisor: Zbigniew Pióro, very good

[MSc25] Marcin Romaniuk, **Właściwości fotorefrakcyjne przetworników ciekłokrystalicznych w zakresie bliskiej podczerwieni,** advisor: Janusz Parka, good

[MSc26] Wojciech Rybak, **Badanie możliwości zastosowania optycznych włókien fotonicznych i kapilarnych w czujnikach światłowodowych,** advisor: Michał Borecki, very good

[MSc27] Paweł Sawicki, **Badanie wpływu obciążenia, oraz punktu pracy tranzystora na zniekształcenia intermodulacyjne we wzmacniaczach w.cz.,** advisor: Jerzy Skulski, good

[MSc28] Artur Sobczyk, **Analiza sieci globalnego rozprowadzenia sygnału zegara w układach scalonych wielkiej skali integracji pod kątem poboru mocy,** advisor: Witold Plaskacz, very good

[MSc29] Tomasz Sochacki, **Mikrofalowy czujnik ruchu z mieszaczem samo-drgającym,** advisor: Jerzy Skulski, fairly good

[MSc30] Jarosław Sroka, **Badanie i analiza własności emisyjnych aktywnych kryształów Tb3Sc2Al3O12 - TbScO3 o periodycznych uporządkowaniu,** advisor: Marcin Kaczkan, very good

[MSc31] Andrzej Stefański, **Badanie zespolonej przenikalności elektrycznej cieczy o dużych stratach na częstotliwościach mikrofalowych,** advisor: Jerzy Krupka, good

[MSc32] Tomasz Szabłowski, **Proste struktury fotonowe - charakterystyka i technologie,** advisor: Jan Szmidt, good

[MSc33] Karol Szacki, **Charakteryzacja komórek standardowych z wykorzystaniem języka Skill dla potrzeb testowania cyfrowych układów CMOS,** advisor: Andrzej Wielgus, very good

[MSc34] Piotr Szczurowski, **Analiza właściwoSci osiowo-symetrycznych rodzajów pola e.m. w uwarstwionych falowodach kołowych,** advisor: Jerzy Piotrowski, excellent

[MSc35] Maciej Urban, **Układ do dwuczęściowego badania charakterystyk przetworników ciekłokrystalicznych wykorzystujących interfejs GPIB,** advisor: Janusz Parka, very good

[MSc36] Grzegorz Wąchała, **Przybliżenia początkowe dla symulacji struktur półprzewodnikowych określane metodą ewolucyjną,** advisor: Andrzej Pfitzner, very good

[MSc37] Grzegorz Wieremiejuk, **Wpływ procesu napraw i składowania na właściwości połączeń wykonywanych lutami bezołowiowymi,** advisor: Ryszard Kisiel, good

[MSc38] Radosław Wojtowicz, **Realizacje CMOS cyfrowych bloków funkcjonalnych w technice CSL,** advisor: Zbigniew Jaworski, very good

### *5.3. B.Sc. Degrees*

[BSc1] Paweł Adameczek, **Obwody zabezpieczające przeciw skutkom wyładowań ESD w układach scalonych,** advisor: Grzegorz Janczyk, good

[BSc2] Michał Banach, **Badania reaktywności chemoczułych warstw grubych opartych na SnO2 dla czujnika gazu,** advisor: Zbigniew Szczepański, fairly good

[BSc3] Iwona Berlińska, **Symulacja komputerowa charakterystyk elektrycznych struktur MOS SOI,** advisor: Lidia Łukasiak, fairly good

[BSc4] Patryk Bernatowski, **Implementacja generatora liczb losowych w środowisku MATHCAD,** advisor: Michał Borecki, good

[BSc5] Grzegorz Betiuk, **Badania możliwości stosowania kart dźwiękowych jako interfejsu pomiarowego do czujników światłowodowych,** advisor: Michał Borecki, good

[BSc6] Anna Bok, **Wizualizacja poprzecznego rozkładu modów światłowodowych przy użyciu kamery CCD,** advisor: Marcin Kaczkan, very good

[BSc7] Marcin Chmielewski, **Projekt jednostki arytmetyczno - logicznej dla prpocesora o architekturze MOVE,** advisor: Arkadiusz Łuczyk, very good

[BSc8] Łukasz Chudzian, **Zastosowanie łącza USB w aplikacjach czujnikowych,** advisor: Michał Borecki, good

[BSc9] Magdalena Chudzik, **Siatki Bragga na światłowodach aktywnych,** advisor: Ryszard Piramidowicz, very good

[BSc10] Patryk Cybulski, **System mikroprocesorowy do sterowania temperaturą w budynku,** advisor: Mikołaj Baszun, fairly good

[BSc11] Marcin Dudek, **Oprogramowanie w LabVIEW stanowiska pomiarowego do charakteryzacji tranzystorów metodą pompowania ładunku,** advisor: Zbigniew Pióro, very good

[BSc12] Kamil Klimasiński, **System do badania modułów fotowoltaicznych,** advisor: Sławomir Szostak, fairly good

[BSc13] Krzysztof Główka, **Opracowanie sposobu rejestracji i projekcji stereoskopowego obrazu wideo,** advisor: Piotr Garbat, good

[BSc14] Piotr Górowski, **Wykorzystanie algorytmów śledzenia ruchu i gestów w sterowaniu zdarzeniami w intstalacji "Inteligentnego domu,"** advisor: Marek Sutkowski, good

[BSc15] Łukasz Grądzki, **Bezprzewodowy system przesyłania danych pomiarowych w paśmie 433 MHz,** advisor: Sławomir Szostak, fairly good

[BSc16] Robert Jaworski, **Badanie właściwości kapilar optycznych do zastosowań w czujnikach obecności cieczy,** advisor: Maria Bebłowska, fairly good

[BSc17] Marcin Jusza, **Opracowanie i wykonanie stanowiska do pomiaru właściwości spektroskopowych dielektrycznych ośrodków laserowych w funkcji temperatury,** advisor: Marcin Kaczkan, good

[BSc18] Piotr Kierejewski, **Badanie właściwości elektrooptycznych przetworników ciekłokrystalicznych typu VAN,** advisor: Janusz Parka, good

[BSc19] Piotr Knyps, **Analiza wpływu promieniowania słonecznego na parametry pracy systemu fotowoltaicznego,** advisor: Stanisław Pietruszko, good

[BSc20] Jerzy Kocerka, **Oprogramowanie stanowiska do spetroskopii centrów pułapkowych,** advisor: Antoni Siennicki, very good

[BSc21] Konrad Korzyński, **Cyfrowe metody przetwarzania obrazu w systemach inteligentnego domu,** advisor; Piotr Garbat, good

[BSc22] Angelika Kowalska, **Badanie wpływu filtracji barwnej na reprodukcję skali szarości przy rejestracji obrazów detekowanych optoelektronicznie,** advisor: Marek Sutkowski, good

[BSc23] Paweł Kurant, **Badanie połczeń flio chip na podłożach ceramicznych i polimerowych realizowanych przez lutowanie i klejenie,** advisor: Zbigniew Szczepański, fairly good

[BSc24] Piotr Lasecki, **Analiza przydatności monitorów ciekłokrystalicznych do zastosowań w systemach obróbki i przetwarzania obrazów,** advisor; Marek Sutkowski, good

[BSc25] Paweł Leszcz, **Automatyczne sterowanie ogrzewaniem,** advisor: Zbigniew Pióro, good

[BSc26] Magdalena Ługowska, **Konstrukcja i badanie optrod czujników światłowodowych z pokryciem diamentopodobnym,** advisor: Mateusz Jakub Śmietana, fairly good

[BSc27] Tomasz Małachowski, **Efekt modulacji bazy w tranzystorze HBT z bazą krzemogrmanową,** advisor: Agnieszka Zaręba, good

[BSc28] Mateusz Mroczkowski, **Badanie wybranych właściwości grubych warstw dielektrycznych z węglikiem krzemu,** advisor: Jerzy Kalenik, very good

[BSc29] Paweł Perczak, **Analiza czynników ograniczających zasięg łączy światłowodowych,** advisor: Agnieszka Szymańska, good

[BSc30] Piotr Pędziwiatr, **Zastosowanie jednostki GPU do sprzętowego wspomagania cyfrowego przetwarzania obrazu,** advisor; Piotr Garbat, good

[BSc31] Łukasz Pytlarczyk, **Opracowanie modułu analizy reprodukcji kolorystycznej w systemach cyfrowej rejestracji obrazu,** advisor; Marek Sutkowski, very good

[BSc32] Michał Rozenberg, **Analiza drgań w czujniku z głowicą światłowodową,** advisor: Michał Borecki, good

[BSc33] Łukasz Stankowski, **Modelowanie współczynnika wzmocnienia prądowego tranzystora HBT (SiGe) w zakresie niskich prądów,** advisor: Agnieszka Zaręba, good

[BSc34] Michał Tybel, **Projekt układów pamięciowych dla procesora o architekturze MOVE,** advisor: Arkadiusz Łuczyk, good

[BSc35] Viki Szortyka, **Mikrofalowy wzmacniacz przeciwsobny na pasmo L,** advisor: Jerzy Piotrowski, excellent

[BSc36] Łukasz Tomala, **Opracowanie stanowiska i pomiary analogowych układu acalonego Educhip,** advisor: Elżbieta Piwowarska, good

[BSc37] Maciej Tywończuk, **Charakteryzacja cyfrowych komorek standardowych pod kątem poboru mocy statycznej dla technologii CMOS 0,35 um,** advisor: Arkadiusz Łuczyk, very good

[BSc38] Mateusz Zimoląg, **System kontroli ciśnienia tętniczego z wykorzystaniem łącza GSM,** advisor: Mikołaj Baszun, good

[BSc39] Bartłomiej Żmijewski, **Ograniczenia częstotliwościowe układów scalonych opartych o technologię MIS,** advisor: Antoni Siennicki, good

# 6. PUBLICATIONS

## *6.1. Scientific and Technical Papers published in Journals Included in the ISI[1] Database*

| Number | Journal | Authors | Title | Volume | Pages |
|---|---|---|---|---|---|
| [Pub1] | Acta Physica Polonica A | A.Rudziński | Orthonormalization of Radiation Modes in Effective Resonator Model of Dielectric Multilayer Structure | 112 | 495-504 |
| [Pub2] | Acta Physica Polonica A | A.Rudziński | Orthonormalization of Substrate and Guided Modes in Effective Resonator Model of Dielectric Multilayer Structure | 112 | 505-511 |
| [Pub3] | Acta Physica Polonica A | A.Rudziński | Analytic Expressions for Electromagnetic Field Envelopes in a 1D Photonic Crystal | 111 | 323-333 |
| [Pub4] | Applied Physics Letters | M.Sakowicz, J.Łusakowski, K.Karpierz, M.Grynberg, B.Majkusiak | Transport and quantum scattering time in field-effect transistors | 90 | 172104-(1-3) |
| [Pub5] | Applied Physics Letters | J.Breeze, J.Krupka, N.McN.Alford | Enhanced quality factors in aperiodic reflector resonators | 91 | 152902-(1-3) |
| [Pub6] | Applied Physics Letters | J-M. le Floch, M.E.Tobar, D.Mouneyrac, D.Cros. J.Krupka | Discovery of Bragg confined hybrid modes with high Q factor in a hollow dielectric resonator | 91 | 142907-(1-3) |
| [Pub7] | Applied Physics Letters | C.Beer, T.Whall, E.Parker, D.Leadley, B.De Jaegger, G.Nicholas, P.Zimmerman, M.Meuris, S.Szostak, G.Głuszko, L.Łukasiak | Low temperature mobility in hafnium-oxide gated germanium p-channel metal-oxide-semiconductor field-effect transistors | 91 | 263512-(1-3) |
| [Pub8] | Diamond & Related Materials | M.Śmietana, J.Szmidt, M.L.Korwin-Pawłowski, W.J.Bock, J.Grabarczyk | Application of diamond-like carbon films in optical fibre sensors based on long-period gratings | 16 | 1374 - 1377 |
| [Pub9] | IEEE Transactions on Electron Devices | P.Palestri, N.Barin, C.Busseret, A.Campera, P.A.Childs, F.Driussi, C.Fiegna, G.Fiori, R.Gusmeroli, G.Iannaccone, M.Karner, H. Kosina, A.L.Lacaita, E.Langer, B. Majkusiak, C.Monzio Compagnoni, A.Poncet, E.Sangiorgi, L.Selmi, A.S.Spinelli, J.Walczak | Comparison of modeling approaches for the Capacitance-Voltage and Current-Voltage Characteristics of advanced gate stacks | Vol. 54, No 1 | 106 - 113 |
| [Pub10] | IEEE Transactions on Instrumentation and Measurement | J.Krupka, J.Mazierska | Contactless measurements of resistivity of semiconductor wafers employing single-post and split-post dielectric-resonator techniques | Vol. 56, no 5 | 1839-1844 |
| [Pub11] | Journal of Applied Physics | J.Hartnett, M.E.Tobar, J.Krupka | Dependence of the dielectric permittivity of single-crystal quartz on thermal deformation at cryogenic temperatures | 102 | Art. No 074103 |
| [Pub12] | Journal of Phase Equilibria and Diffusion | Z.Moser, W.Gąsior, K.Bukat, J.Pstruś, R.Kisiel, J.Sitek, K.Ishida, I.Ohnuma | Pb-Free Solders: Part III. Wettability Testing of Sn-Ag-Cu-Bi Alloys with Sb Additions | Vol. 28 No. 5 | 433-438 |
| [Pub13] | Journal of the European Ceramic Society | J.Parka, J.Krupka, R.Dąbrowski, J.Wosik | Measurements of anisotropic complex permittivity of liquid crystals at microwave frequencies | 27 | 2903 - 2905 |
| [Pub14] | Journal of the European Ceramic Society | J.Krupka, K.Derzakowski, T.Zychowicz, B.L.Givot, W.C.Egbert, M.M.David | Measurements of the surface resistance and conductivity of thin conductive filmsat frequency about 1 GHz employing dielectric resonator technique | 27 | 2823 - 2826 |

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| [Pub15] | Journal of the European Ceramic Society | C.P.Yang, P.A.Smith, J.Krupka, T.W.Button | The losses of microwave ferrites at communication frequenceies | 27 | 2765-2770 |
| [Pub16] | Measurement Science and Technology | C.D.Easton, M.V.Jacob, J.Krupka | Non-destructive complex permittivity measurement of low permittivity thin film materials | 18 | 2869-2877 |
| [Pub17] | Microelectronics Reliability | R.Kisiel, J.Felba, J.Borecki, A.Mościcki | Problems of PCB microvias filling by conductive paste | 47 | 335 - 341 |
| [Pub18] | Optical and Quantum Electronics | A.Rudziński, A.Tyszka-Zawadzka, P.Szczepański | Spatial and frequency domain effects of defects in 1D photonic crystal | | 501-510 |
| [Pub19] | Optics Communications | R.Paszkiewicz, A.Tyszka-Zawadzka, P.Szczepański | Effect of mode non-orthogonality on statistical properties of light generated by circular grating DBR laser | 270 | 314-322 |
| [Pub20] | Physica Status Solidi (C) | M.Śmietana, J.Szmidt, M.L.Korwin-Pawlowski, W.J.Bock | Optical diamond-like carbon film coating of long-period optical fiber gratings | Vol. 4, No 4 | 1574 - 1577 |
| [Pub21] | Physical Review B | J.G.Hartnett, M.E.Tobar, JM Le Floch, J.Krupka, PY.Bourgeois | Anisotropic paramagnetic susceptibility of crystalline ruby at cryogenic temperatures | 75 | 024415-(1-6) |
| [Pub22] | Sensors | M.Borecki | Intelligent Fober Optic Sensor for Estimating the Concentration of a Mixture-Design and Working Principle | 7 | 384-399 |
| [Pub23] | Spectroscopy Letters | M.Malinowski, M.Nakielska, R.Piramidowicz, J.Sarnecki | Energy transfer processes in highly rare-earth-doped planar YAG waveguides | 40 | 271-292 |
| [Pub24] | Vacuum | R.Mroczyński, R.B.Beck | The influence of dilution of the reactive gases in argon on electro-physical properties of ultra-thin silicon oxynitride layers formed by PECVD | 81 | 695-699 |

### *6.2. Scientific and Technical Papers Published in Journals not Included in the ISI Database*

| Number | Journal | Authors | Title | Volume | Pages |
|---|---|---|---|---|---|
| [Pub25] | Elektronika | A.Rudziński, P.Szczepański, A.Tyszka-Zawadzka | Analityczny model gęstości stanów w strukturze jednowymiarowego kryształu fotonicznego | 7 | 49-53 |
| [Pub26] | Elektronika | B.Galwas | Fotonika mikrofalowa | 6 | 5 – 9 |
| [Pub27] | Elektronika | R.Kisiel, J.Felba, J.Borecki, T.Fałat, A.Mościcki | Kompozycje elektrycznie przewodzące w produkcji płytek drukowanych | 6 | 31-38 |
| [Pub28] | Elektronika | Z.Szczepański, J.Kalenik | Zastosowanie klejów anizotropowych w postaci folii w technologii flip chip oraz montażu paneli wyświetalczy ciekłokrystalicznych | 12 | 56 – 59 |
| [Pub29] | Global SMT & Packaging | R.Kisiel, K.Bukat, J.Sitek, W.Gąsior, Z.Moser, J.Pstruś | SnAgCuBi and SnAgCuBiSb solder joint properties investigations | Vol. 7, No. 11 | 34-35 |
| [Pub30] | Journal of Computational Electron | B.Majkusiak | Modeling the inelastic scattering effect on the resonant tunneling current | 6 | 207 – 210 |
| [Pub31] | Journal of Superhard Materials | T.Bieniek, R. B.Beck, A.Jakubowski, P.Konarski, M.Ćwil, P.Hoffmann, D.Schmeisser | Formation of Oxynitride Layers in a RF Plasma Planar Reactor for Future Si and SiC MOS Structures | Vol. 29, No. 3 | 177-180 |
| [Pub32] | Journal of Telecommunications and Information Technology | T.Bieniek, R.B.Beck, A.Jakubowski, G.Głuszko, P.Konarski, M.Ćwil | Applying shallow nitrogen implantation from rf plasma for dual gate oxide technology | 3 | 3-8 |
| [Pub33] | Journal of Telecommunications and Information Technology | M.Iwanowicz, Z.Pióro, L.Łukasiak, A.Jakubowski | Arbitrary waveform generator for charge-pumping | 3 | 78 – 83 |
| [Pub34] | Journal of Telecommunications and Information Technology | G.Głuszko, S.Szostak, H.Gottlob, M.Lemme. L.Łukasiak | Characterization of SOI MOSFETs by means of charge-pumping | 3 | 67 – 72 |

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|---|---|---|---|---|---|
| [Pub35] | Journal of Telecommunications and Information Technology | G.Głuszko, L.Łukasiak, E.Gili, P.Ashburn | Charge-pumping characterization of FILOX vertical MOSFETs | 3 | 73 – 77 |
| [Pub36] | Journal of Telecommunications and Information Technology | G.Głuszko, L.Łukasiak, V.Kilchytska, Tsung Ming Chung, B.Olbrechts, D.Flandre, J-P.Raskin | Charge-pumping characterization of SOI devices fabricated by means of wafer bonding over pre-patterned cavities | 3 | 61 – 66 |
| [Pub37] | Journal of Telecommunications and Information Technology | J.Stęszewski, A.Jakubowski, M.L.Korwin-Pawłowski | Comparison of 4H-SiC and 6H-SiC MOSFET I-V charcterisctics simulated with Silvaco Atlas and Crossligth Apsys | 3 | 93-95 |
| [Pub38] | Journal of Telecommunications and Information Technology | R.Mroczyński, T.Bieniek, R.B.Beck, M.Ćwil, P.Konarski, P.Hoffmann, D.Schmeißer | Comparison of composition of ultra-thin silicon axynitride layers' fabricated by PECVD and ultrashallow rfplasma ion implantation | 3 | 20 – 24 |
| [Pub39] | Journal of Telecommunications and Information Technology | T. Bieniek, R.B.Beck, A.Jakubowski, P.Konarski, M.Ćwil, P.Hoffann, D.Schmeißer | Composition and electrical properties of ultra-thin SiOxNy layers formed by rf plasma nitrogen implantation/plasma oxidation processes | 3 | 9 – 15 |
| [Pub40] | Journal of Telecommunications and Information Technology | R.Gronau, J.Szmidt, E.Czerwosz | Correlation between electric parameters of carbon layers and their capacity for field emission | 3 | 37 – 38 |
| [Pub41] | Journal of Telecommunications and Information Technology | J.Walczak, B.Majkusiak | Electron mobility and drain current in strained-Si MOSFET | 3 | 84 – 87 |
| [Pub42] | Journal of Telecommunications and Information Technology | P.Firek, A.Werbowy, J.Szmidt, N.Kwietniewski | Influence of the deposition process parameters on electronic properties of BN films obtained by means of RF PACVD | 3 | 33 – 36 |
| [Pub43] | Journal of Telecommunications and Information Technology | A.Zaręba, L.Łukasiak, A.Jakubowski | Modeling of the inverse base width modulation effect in HBT transistor with graded SiGe base | 3 | 88 – 92 |
| [Pub44] | Journal of Telecommunications and Information Technology | J.Grabowski, R.B.Beck | Oxidation kinetics of silicon strained by silicon germanium | 3 | 30 – 32 |
| [Pub45] | Journal of Telecommunications and Information Technology | R.Mroczyński, G.Głuszko, R.B.Beck, A.Jakubowski, M.Ćwil, P.Konarski, P.Hoffmann, D.Schmeißer | The influence of annealing (900oC) of ultra-thin PECVD silicon oxynitride layers | 3 | 16 – 19 |
| [Pub46] | Journal of Telecommunications and Information Technology | M. Rakowski, W. Pleskacz | The influence of yield model parameters on the probability of defect occurrence | 3 | 101 -104 |
| [Pub47] | Journal of Telecommunications and Information Technology | M.Kalisz, R.B.Beck, A.Barcz, M.Ćwil | The role of fluorine-containing ultra-thin layer in controlling boron thermal diffusion into silicon | 3 | 25 – 29 |
| [Pub48] | Polish Journal of Otolatryngotogy (Otolaryngologia Polska) | K.Dżaman, W.Pleskacz, A.Wałkanis, P.Rapiejko, D.Jurkiewicz | Ocena zmysłu smaku i węchu u pacjentów z polipami nosa | 5 | 831-837 |
| [Pub49] | Proceedings of SPIE | M.Borecki, M.L.Korwin-Pawłowski, M.Bebłowska | A method of examination of liquids by neural network analysis of reflectometric time domain data from optical capillaries and fibers | 6619 | 66193M-1-66193M-4 |
| [Pub50] | Proceedings of SPIE | K.Korszeń, J.Dawidczyk | Algorithms for data processing in FSCW systems | 6937 | 43-(1-6) |
| [Pub51] | Proceedings of SPIE | P.Czuma, P.Szczepański | Analysis of Light Generation in 2D Photonic Crystal Laser – semiclassical approach | 6599 | 65990I-(1-5) |

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|---|---|---|---|---|---|
| [Pub52] | Proceedings of SPIE | J.Kęsik, W.Kamiński, M.Osiniak, J.Lipkowski, P.Warda | Current pulse operation of an argon-krypton ion laser | 6599 | 65990O-(1-5) |
| [Pub53] | Proceedings of SPIE | M.Kaczkan, M.Borowska, K.Kołodziejak, T.Łukasiewicz, M.Malinowski | Infra-red to visible up-conversion in Yb3Al5O12:Er3+ crystal | 6599 | 659902-(1-4) |
| [Pub54] | Proceedings of SPIE | J.Kęsik, M.Osiniak | Measurement of active medium parameters for ion gas laser operationg in UV range | 6599 | 65990N-(1-5) |
| [Pub55] | Proceedings of SPIE | J.Kęsik, W.Kamiński, M.Osiniak | Method for regulating pressure in ion laser discharge tubes | 6599 | 65990P-(1-3) |
| [Pub56] | Proceedings of SPIE | P.Szczepański, A.Mossakowska-Wyszyńska, A.Tyszka-Zawadzka | Modeling of light generation in photonic crystal lasers | 6599 | 65990H-(1-12) |
| [Pub57] | Proceedings of SPIE | M.Klimczak, P.Witoński, M.Malinowski, R.Piramidowicz | Operating schemes for Pr3+ and Pr3++Yb3+ activated fluorozirconate fiber lasers in the visible | 6599 | 65990J-(1-7) |
| [Pub58] | Proceedings of SPIE | M.Borecki, M.L.Korwin Pawłowski, M.Bebłowska, A.Jakubowski | Short capillary tubing as fiber optic sensor of viscosity of liquids | 6585 | 65851G-(1-6) |
| [Pub59] | Proceedings of SPIE | M.Klimczak, M.Cieślik, M.Kaczkan, P.Witoński, R.Piramidowicz | UV-violet optical transitions and excitation schemes in Ho3+:ZBLAN fibers | 6937 | 18-(1-6) |
| [Pub60] | Przyszłość Świat - Europa - Polska | B.Galwas | Problemy rozwoju szkolnictwa wyższego | 1/15/2007 | |
| [Pub61] | Stomatologia Współczesna | K.Zadroga, W.Kamiński, P.Warda, P.Szczyrek | Adhezyjne cementowanie licówek ceramicznych – badanie absorpcji mocy promieniowania lampy polimeryzacyjnej przez próbki materiału ceramicznego Empress 2 | 6 | 12-17 |
| [Pub62] | Zeszyty Naukowe Wydziału Elektroniki, Telekomunikacji i Informatyki Politechniki Gdańskiej | A.Rudziński, T.Keller, S.Wydra | Projekt zintegrowanego narzędzia do testowania i weryfikacji układów konwersji częstotliwości | | 399-402 |

### *6.3. Scientific and Technical Papers Published in Conference Proceedings*

| Number | Conference | Authors | Title | City, Country | Pages |
|---|---|---|---|---|---|
| [Pub63] | 3DTV-Conference, The True Visioncapture, Transmission and Display of 3D Video, 7-9 May | P.Garbat | Data Processing in 3D Video System based on Data from Structured Light measurement System | Kos Island, Greece | 1-4 |
| [Pub64] | 6th Electronic Circuits and Systems Conference – ECS'07, 6-7 September | M.Tywończuk, A.W.Łuczyk, W.A.Pleskacz | Estimation of Static Power Consumption of CMOS Digital Circuits with Respect to Input Data | Bratislava, Slovakia | 83-87 |
| [Pub65] | 6th Electronic Circuits and Systems Conference – ECS'07, 6-7 September | G.Janczyk, T.Bieniek, P.Janus, J.Szynka, P.Grabiec, A.Kociubiński, S.Reitz, P.Schneider, J.Weber, E.Kaulfresh | The High Level Thermo-Electrical Modeling of the Complex 3D IC Structures | Bratislava, Slovakia | 181-184 |
| [Pub66] | 13th Canadian Semiconductor Technology Conference CSTC – CCTS'2007, 14-17 August | G.Głuszko, L.Łukasiak, S.Szostak, J.-P. Raskin, B.Olbrechts, H.Gottolb, M.C.Lemme, E.Gili, P.Ashburn, M.L.Korwin-Pawłowski, A.Jakubowski | Charge pumping characterization of SOI and vertical MOS structures | Montreal, Canada | 139-140 |

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|---|---|---|---|---|---|
| [Pub67] | 14th International Conference: "Mixed Design of Integrated Circuits and Systems" – MIXDES 2007, 21-23 June | A.Jarosz, A.Pfitzner | Accuracy of analytical evaluation of interconnection capacitances in crossing buses | Ciechocinek, Poland | 403-406 |
| [Pub68] | 14th International Conference: "Mixed Design of Integrated Circuits and Systems" – MIXDES 2007, 21-23 June | A.Sobczyk, A.W.Łuczyk, W.A.Pleskacz | Analysis of Basic Pausable Local Clock Signal Generator | Ciechocinek, Poland | 237-242 |
| [Pub69] | 14th International Conference: "Mixed Design of Integrated Circuits and Systems" – MIXDES 2007, 21-23 June | A.Wielgus, M.Maciąg | Digital implemetation of a programmable recofigurable fuzzy automation for control applications | Ciechocinek, Poland | 270-273 |
| [Pub70] | 17th International Travelling Summer School on Microwaves and Lightwaves, July 7-13 | H.Hartnagel, F.Giannini, B.Galwas | International Travelling Summer School on Microwaves and Lightwaves – the common successful initiative of the European Universities | Pforzheim, Germany | |
| [Pub71] | 17th International Travelling Summer School on Microwaves and Lightwaves, July 7-13 | K.Madziar | Optoelectronic oscillators idea and solutions | Pforzheim, Germany | 1-29 |
| [Pub72] | 17th International Travelling Summer School on Microwaves and Lightwaves, July 7-13 | P.Szczepański, R.Paszkiewicz | Photonic crystals – applications in lasers | Pforzheim, Germany | 1 - 49 |
| [Pub73] | 17th International Travelling Summer School on Microwaves and Lightwaves, July 7-13 | B.Galwas | Radio-over-Fiber Systems | Pforzheim, Germany | |
| [Pub74] | 17th International Travelling Summer School on Microwaves and Lightwaves, July 7-13 | D.Paluch | Scattering matrix description of an analog fiber optical link | Pforzheim, Germany | 1-9 |
| [Pub75] | CMS'07 – VI International Conference - Computer Methods and Systems, 21-23 November | A.Malinowski, D.Tomaszewski, A.Jakubowski | Software application based on Matlab system for analysis of of ICs fabrication dispersion | Kraków, Poland | 213-216 |
| [Pub76] | EOS Topical Meeting on Diffractive Optics, 20-23 November | A.Tyszka-Zawadzka, A.Rudziński, M.Koba, P.Szczepański | Theory of intensity fluctuations of photonic crystal laser | Barcelona, Spain | 232-233 |
| [Pub77] | EUROCON'2007 The International Conference on "Computer as a Tool", 9-12 September | A.Rudziński, P.Szczepański | Degeneration of One-dimensional Photonic Crystal by Random Layer Thickness Imperfections | Warsaw, Poland | 1269-1273 |
| [Pub78] | EUROCON'2007 The International Conference on "Computer as a Tool", 9-12 September | A.Rudziński, S.Wydra, T.Keller | Software Tool for Design and Simulations of Wideband RF Upconverters | Warsaw, Poland | 1023-1027 |

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|---|---|---|---|---|---|
| [Pub79] | EUROSOI'2007 – Thrid Workshop of the Thematic Network on Silicon On Insulator, 24-26 March | J.Walczak, B.Majkusiak | Channel engineering simulation in a double-gate field effect transistor | Leuven, Belgium | 49 - 50 |
| [Pub80] | I Krajowa Konferencja Nanotechnologii, 26-28 April | A.Jakubowski, L.Łukasiak | Ewolucja CMOS – granice rozwoju | Wrocław, Poland | 11-12 |
| [Pub81] | I Krajowa Konferencja Nanotechnologii, 26-28 April | A.Mazurak, J.Walczak, B.Majkusiak | Modelowanie prądu tunelowego w strukturach MOS z dielektrykami o dużej stałej dielektrycznej | Wrocław, Poland | 142 |
| [Pub82] | I Krajowa Konferencja Nanotechnologii, 26-28 April | B.Majkusiak | Tunelowanie rezonansowe w nanoelektronicznych strukturach na bazie krzemu | Wrocław, Poland | 28 |
| [Pub83] | I Krajowa Konferencja Nanotechnologii, 26-28 April | M.Borecki, M.L.Korwin-Pawłowski, P.Wrzosek, M.Bebłowska | Właściwości optyczne tub kapilarnych częściowo wypełnionych nano-litrowymi próbkami cieczy | Wrocław, Poland | 184 |
| [Pub84] | IEEE Design and Diagnostics of Electronic Circuits and Systems, 11-13 April | Z.Piątek, J.Kołodziejski, W.Pleskacz | ESD Failures of Integrated Circuits and Their Diagnostics Using Transmission Line Pulsing | Kraków, Poland | 423-427 |
| [Pub85] | IEEE Design and Diagnostics of Electronic Circuits and Systems, 11-13 April | M.Jenihhin, J.Raik, R.Ubar, W.Pleskacz, M.Rakowski | Layout to Logic Defect Analysis for Hierarchical Test Generation | Kraków, Poland | 35 - 40 |
| [Pub86] | IEEE Design and Diagnostics of Electronic Circuits and Systems, 11-13 April | W.Jońca | Open Defects Caused by Scratches and Yield Modelling in Deep Sub-Micron Integrated Circuit | Kraków, Poland | 365-368 |
| [Pub87] | IEEE Design and Diagnostics of Electronic Circuits and Systems, 11-13 April | A.Sobczyk, A.Łuczyk, W.Pleskacz | Power dissipation in Basic Global Clock Distribution Networks | Kraków, Poland | 231-234 |
| [Pub88] | IEEE East_West Design & Test Symposium (EWDTS'07), 7-10 September | W.Kuźmicz, E.Piwowarska, A.Pfitzner, D.Kasprowicz | Leakage Currents and Static Power Consumption in Nanometer CMOS ICs | Yerevan, Armenia | 152-157 |
| [Pub89] | IEEE MTT-S International Microwave Symposium, 3-8 June | J.Krupka | Complex Permittivity Measurement with a Split-Post Resonator | Honolulu, Hawaii | 1 - 41 |
| [Pub90] | IEEE MTT-S International Microwave Symposium, 3-8 June | A.Abramowicz, J.Krupka, K.Derzakowski | High Quality Ferrite-Loaded Dielectrioc Resonator Tunable Filters | Honolulu, Hawaii | 1-46 |
| [Pub91] | IEEE MTT-S International Microwave Symposium, 3-8 June | J.Krupka | Measurement of the Surface Resistance and the Effective Conductivity of Copper Cladded Laminates Employing Dielectric Resonator Technique | Honolulu, Hawaii | 515-518 |
| [Pub92] | II Konferencja Naukowo-Techniczna Doktorantów i Młodych Naukowców, 24-26 September | A.Rudziński | Modelowanie emisji spontanicznej w kryształach fotonicznych metodą efektywnego rezonatora | Warsaw, Poland | 102-109 |
| [Pub93] | International Conference - Thermal Problems in Electronics MICROTHERM'2007, 25-27 June | R.Kisiel, M.Sochacki, A.Piotrowska, E.Kamińska, M.Guziewicz | Ni, Ni-TaSi and Si/Ni ohmic contacts to n-type 4h SiC | Łódź, Poland | 261-262 |

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|---|---|---|---|---|---|
| [Pub94] | International Conference - Thermal Problems in Electronics MICROTHERM'2007, 25-27 June | J.Szmidt | Silicon carbide and its applications in high-frequency, high-power and high-temperature electronics – competition project, the genesis, assumptions and expected results | Łódź, Poland | 223-226 |
| [Pub95] | International Conference - Thermal Problems in Electronics MICROTHERM'2007, 25-27 June | J.Szmidt, M.Sochacki, A.Piotrowska, E.Kamińska, K.Gołaszewska, M.Guziewicz, N.Kwietniewski | Silicon carbide Schottky diodes – performance, passivation and termination problems | Łódź, Poland | 267 |
| [Pub96] | International Conference - Thermal Problems in Electronics MICROTHERM'2007, 25-27 June | M. Jakubowska, A. Młożniak, E. Zwierkowska, J. Kalenik, K. Kiełbasiński | Thick film conductors for high temperature electronics | Łódź, Poland | 89-96 |
| [Pub97] | International Conference - Thermal Problems in Electronics MICROTHERM'2007, 25-27 June | J.Kalenik | Thick film hybrid circuits substrates for high temperatures applications | Łódź, Poland | 97-103 |
| [Pub98] | International Conference on Nanoscience and Technology, 2-6 July | M.Niewiński | Comparison of the high vacuum standard parameters computed from two models | Stockholm, Sweden, | 300 |
| [Pub99] | ISSE'2007 – 30th Int. Spring Seminar on Electronics Technology, 9-13 May | R.Kisiel, K.Bukat, Z.Drozd, M.Szwech, P.Syryczyk, A.Girulska | Quality Management in Electronics Manufacturing after Implementation of RoHS Directive | Cluj-Napoca, Romania | 46-47 |
| [Pub100] | ISSE'2007 – 30th Int. Spring Seminar on Electronics Technology, 9-13 May | Z.Drozd, M.Swech, R.Kisiel | Thermal and Mechanical Reliability Tests of Lead – free soldered SMT Joints | Cluj-Napoca, Romania | 98-99 |
| [Pub101] | IX Electron Technology Conference ELTE'2007 4-7 September | P.Śniecikowski, M.Sochacki, J.Szmidt, P.Kamiński, N.Kwietniewski | Aluminium and nitrogen implantation in 6H-SiC | Kraków, Poland | 167 |
| [Pub102] | IX Electron Technology Conference ELTE'2007 4-7 September | A.Malinowski, P.Grabiec, M.Grodner, K.Kucharski, D.Tomaszewski, A.Jakubowski | Analysis of technological processes dispersion based on electrical measurements of test stuctures | Kraków, Poland | 67 |
| [Pub103] | IX Electron Technology Conference ELTE'2007 4-7 September | M.Niewiński | Analysis of the properties the high vacuum standards based on the global model | Kraków, Poland | 233 |
| [Pub104] | IX Electron Technology Conference ELTE'2007 4-7 September | T.Bieniek, R.B.Beck, A.Jakubowski, P.Konarski, M.Ćwil, P.Hoffmann, D.Schmeisser | Application of R.F. plasma ultrashallow nitrogen ion implantation for pedestal oxynitride layer formation | Kraków, Poland | 55 |
| [Pub105] | IX Electron Technology Conference ELTE'2007 4-7 September | M.Borecki, P.Wrzosek, M.L.Korwin-Pawłowski, J.Szmidt | Capilaries as elements of optoelectronic measuring microsystems | Kraków, Poland | 121 |
| [Pub106] | IX Electron Technology Conference ELTE'2007 4-7 September | J.Stęszewski, M.Bąkowski, G.Głuszko, L.Łukasiak, A.Schöner, A.Jakubowski | Characterization of 3C-SiC VDMOSFETS with I-V and charge pumping methods | Kraków, Poland | 69 |
| [Pub107] | IX Electron Technology Conference ELTE'2007 4-7 September | G.Głuszko, L.Łukasiak, Jean-pierre Raskin, Max Lemme, A.Jakubowski | Characterization of SOI structures by means of 3-level charge pumping | Kraków, Poland | 61 |
| [Pub108] | IX Electron Technology Conference ELTE'2007 4-7 September | T.Bieniek, P.Janus, A.Kociubiński, P.Grabiec, G.Janczyk, J.Szynka | Coupled thermo-electro-mechanical modeling and simulation of 3D micro- and nanostructures | Kraków, Poland | 137 |
| [Pub109] | IX Electron Technology Conference ELTE'2007 4-7 September | J.Gibki, P.Pływaczewski, L.Łukasiak, A.Jakubowski | C-V and I-V measurement procedures for finfets | Kraków, Poland | 54 |
| [Pub110] | IX Electron Technology Conference ELTE'2007 4-7 September | L.Łukasiak, B.Majkusika, R.B.Beck, S.Szostak, G.Głuszko, A.Jakubowski | Electrical characterization of modern MOS devices | Kraków, Poland | 44 |

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|---|---|---|---|---|---|
| [Pub111] | IX Electron Technology Conference ELTE'2007 4-7 September | P.Firek, A.Werbowy, M.Ćwil, J.Szmidt, A.Olszyna, P.Konarski | Electronic properties of barium titanate thin films deposited by means of radio frequency plasma sputtering | Kraków, Poland | 170 |
| [Pub112] | IX Electron Technology Conference ELTE'2007 4-7 September | G.Wąchała, A.Pfitzner | Evolutionary approach to finding initial solutions for semiconductor device simulation | Kraków, Poland | 46 |
| [Pub113] | IX Electron Technology Conference ELTE'2007 4-7 September | R.Gronau, J.Szmidt, P.Firek, E. Czerwosz, D.Jarzyńska, E.Staryga, W.Kaczorowski | Field emission in diamond – like carbon layers deposited by different plasma methods | Kraków, Poland | 171 |
| [Pub114] | IX Electron Technology Conference ELTE'2007 4-7 September | M.Iwanowicz, Z.Pióro, L.Łukasiak, A.Jakubowski | Gate-signal generator for charge-pumping characterization of MOS devices | Kraków, Poland | 60 |
| [Pub115] | IX Electron Technology Conference ELTE'2007 4-7 September | R.Mroczyński, N.Kwietniewski, M.Ćwil, P. Hoffmann, R.B.Beck, A.Jakubowski | Improvement of electro-physical properties of ultra-thin PECVD silicon oxynitride layers by high temperature annealing | Kraków, Poland | 52 |
| [Pub116] | IX Electron Technology Conference ELTE'2007 4-7 September | D.Tomaszewski, G.Głuszko, A.Sawicka, L.Łukasiak, A.Jakubowski | Influence of the parameters of thin SOI structures on surface potential and carrier concentration | Kraków, Poland | 59 |
| [Pub117] | IX Electron Technology Conference ELTE'2007 4-7 September | J.Grabowski, R.Beck | Low thermal budget technology for strained channels devices | Kraków, Poland | 58 |
| [Pub118] | IX Electron Technology Conference ELTE'2007 4-7 September | P.Janus, A.Kociubiński, T.Bieniek, P.Grabiec, G.Schröpfer | Methodology of modern microsystems co-design and modeling | Kraków, Poland | 139 |
| [Pub119] | IX Electron Technology Conference ELTE'2007 4-7 September | A.Malinowski, K.Domański, P.Grabiec | Modeling and characterization of piezoresistive gauge | Kraków, Poland | 136 |
| [Pub120] | IX Electron Technology Conference ELTE'2007 4-7 September | A.Mazurak, B.Majkusiak | Modeling based characterization of multilayer high-K gate stacks | Kraków, Poland | 49 |
| [Pub121] | IX Electron Technology Conference ELTE'2007 4-7 September | T.Pisarkiewicz, J.Szmidt | Nanomaterials in microelectronics – selected issues | Kraków, Poland | 148 |
| [Pub122] | IX Electron Technology Conference ELTE'2007 4-7 September | J.Szmidt, A.Konczakowska, Z.Lisik, Z.Łuczyński, A.Olszyna, M.Tłaczała | New silicon carbide technologies for high temperature, high power and high frequency applications | Kraków, Poland | 154 |
| [Pub123] | IX Electron Technology Conference ELTE'2007 4-7 September | T.Łukasiewicz, M.Świrkowicz, M.Malinowski, R.Piramidowicz | Perspectives of solid state laser materials development | Kraków, Poland | 151 |
| [Pub124] | IX Electron Technology Conference ELTE'2007 4-7 September | T.Bieniek, R.B.Beck, A.Jakubowski | Practical realization of Dual-gate-oxide technology concept using ultrashallow nitrogen R.F. Plasma implantation with plasma and thermal oxidation | Kraków, Poland | 56 |
| [Pub125] | IX Electron Technology Conference ELTE'2007 4-7 September | J.Gibki, P.Pływaczewski, A.Jakubowski | Procedures for CV measurements and their practical verification | Kraków, Poland | 53 |
| [Pub126] | IX Electron Technology Conference ELTE'2007 4-7 September | M.Kalisz, R.B.Beck, M.Ćwil | Reactive ion etching process (RIE) in $CF_4$ plasma as a method fluorine implantation | Kraków, Poland | 66 |
| [Pub127] | IX Electron Technology Conference ELTE'2007 4-7 September | M.Śmietana, M.Korwin-Pawłowski, W.J.Bock, J.Szmidt | Sensing applications of fiber optic long-period gratings coated with thin films | Kraków, Poland | 87 |
| [Pub128] | IX Electron Technology Conference ELTE'2007 4-7 September | M.Niewiński, P.Szwemin | Sensitivity of the high vacuum standard parameters to the share of molecule specular reflections in gas scattering | Kraków, Poland | 245 |
| [Pub129] | IX Electron Technology Conference ELTE'2007 4-7 September | M.Borecki, J.Szmidt, L.Dobrzański | Silicon carbide (SiC) in optoelectronics | Kraków, Poland | 85 |
| [Pub130] | IX Electron Technology Conference ELTE'2007 4-7 September | Z.Lisik, M.Bąkowski, M.Sochacki, P.Śniecikowski, J.Szmidt, A.Jakubowski | Silicon carbide microelectronics – Technology and design challenges | Kraków, Poland | 43 |

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|---|---|---|---|---|---|
| [Pub131] | IX Electron Technology Conference ELTE'2007 4-7 September | B.Majkusiak | Silicon nanoelectronics | Kraków, Poland | 41 |
| [Pub132] | IX Electron Technology Conference ELTE'2007 4-7 September | P.Szczepański, R.B.Beck, M.Malinowski, J.Szmidt | Silicon photonic platform | Kraków, Poland | 33 |
| [Pub133] | IX Electron Technology Conference ELTE'2007 4-7 September | J.Arabas, S.Szostak, L.Łukasiak, A.Jakubowski | Studies of the feasibility of using global and local optimization methods in MOSFET characterization | Kraków, Poland | 62 |
| [Pub134] | IX Electron Technology Conference ELTE'2007 4-7 September | M.Śmietana, M.L.Korwin-Pawłowski, N.Miller, A.A.Elmustafa, J.Szmidt | Studies on relations between RF PACVD process parameters of diamond-like carbon films and their optical and mechanical properties | Kraków, Poland | 197 |
| [Pub135] | IX Electron Technology Conference ELTE'2007 4-7 September | A.Kociubiński, K.Domański, P.Prokaryn, P.Janus, T.Bieniek, P.Grabiec | Technology of hybrid integration of silicon MEMS/CMOS structures using polymer | Kraków, Poland | 138 |
| [Pub136] | IX Electron Technology Conference ELTE'2007 4-7 September | K.Kiełbasiński, M.Jakubowska, J.Kalenik, A.Młożniak | The influence of terminations of lead-free thick film resistors on electrical properties | Kraków, Poland | 190 |
| [Pub137] | IX Electron Technology Conference ELTE'2007 4-7 September | M.Jakubowska, J.Kalenik, J.Szmidt | Thick materials for hybrid circuits technology – state of art. And prospective development | Kraków, Poland | 152 |
| [Pub138] | IX Electron Technology Conference ELTE'2007 4-7 September | J.Kalenik, J.Szmidt | Ultrasonic bonding of SMD electronic components in printed circuit boards | Kraków, Poland | 189 |
| [Pub139] | IX Electron Technology Conference ELTE'2007 4-7 September | Z.Mączeński, J.Rogowski, M.Baszun | Zero-magnetisation status extortion for precise material investigation | Kraków, Poland | 168 |
| [Pub140] | Konferencja Naukowa Polska Wszechnica Informatyczna, 18-19 October | B.Galwas | Otwarte Uniwersytety, Otwarte Zasoby Edukacyjne – Edukacja na progu XXI wieku | Warsaw, Poland | 38 |
| [Pub141] | Konferencja Polskiego Towarzystwa Informatycznego, 16 May | B.Galwas | Społeczeństwo informacyjne przyszłości – wyzwania dla świata, Europy i Polski | Warsaw, Poland | 31 |
| [Pub142] | MSE'07 Int. Conference Microelectronic Systems Education, 3-4 June | E.Piwowarska, W.Kuźmicz, G.Farkas, A.Poppe, M.Hristov, E.Manolov, B.Beber, J.Butas, G.Jablonski, A.Jarosz, A.Kos, A.Golda, R.Dlugosz | AnaDig – an Educational Chip for VLSI Device Characterization | San Diego, Kalifornia, USA | 19-20 |
| [Pub143] | Network of Excellence on Micro-Optics, 16-18 May 2007, | A.Rudziński, A.Tyszka-Zawadzka, M.Koba, P.Szczepański | Spontaneous emission rate into radiation modes of 1D photonic crystal laser - K | Sesto Fiorentino, Italy | |
| [Pub144] | Przetwarzanie informacji w społeczeństwie informacyjnym, 13-14 September | M.Sutkowski, P.Garbat, T.Grudniewski, A.Walczak, J.Parka, J.Woźnicki | System rozpoznawania obrazów z filtrem z przestrzenną funkcją polaryzacji | Grabanów, Poland | 1-7 |
| [Pub145] | The 14th International Conference: "Mixed Design of Integrated Circuits and Systems" – MIXDES 2007, 21-23 June | W.Kuźmicz, E.Piwowarska, A.Pfitzner, D.Kasprowicz | Static power consumption in NANO-CMOS circuits: physics and modelling | Ciechocinek, Poland | 163-168 |
| [Pub146] | The 14th International Conference: "Mixed Design of Integrated Circuits and Systems" – MIXDES 2007, 21-23 June | A.W.Łuczyk | Superscalar move aechitecture for power-aware computing | Ciechocinek, Poland | 349-354 |

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|---|---|---|---|---|---|
| [Pub147] | The 14th International Conference: "Mixed Design of Integrated Circuits and Systems" – MIXDES 2007, 21-23 June | M.Rakowski, W.A.Pleskacz, P.Borkowski | The Influence of Defect Distribution Function Parameters on Test Patterns Generation | Ciechocinek, Poland | 545-550 |
| [Pub148] | The Thirteenth Canadian Semiconductor Technology Conference CSTC – CCTS'2007, 14-17 August | L.Łukasiak, A.Jakubowski, M.L.Korwin-Pawłowski | Investigation of the influence of SiGe channel parameters on the CV and IV characteristics of a MOS structure | Montreal, Canada | 183-184 |
| [Pub149] | VI Krajowa Konferencja Elektroniki KKE'2007, 11-13 June | R.Kisiel, M.Sochacki, A.Piotrowska, E.Kamińksa, M.Guziewicz | Kontakty omowe Ni oraz Ni-TaSi do podoży SiC typu n | Darłówko Wschodnie, Poland | 575 |
| [Pub150] | VI Krajowa Konferencja Elektroniki KKE'2007, 11-13 June | J.Szmidt, A.Konczakowska, M.Tłaczała, Z.Lisik, Z.Łuczyński, A.Olszyna | Nowe technologie na bazie węglika krzemu i ich zastosowania w elektronice wielkich częstotliwości, dużych mocy i wysokich temperatur | Darłówko Wschodnie, Poland | 67 |
| [Pub151] | VI Krajowa Konferencja Elektroniki KKE'2007, 11-13 June | J.Szmidt, M.Sochacki | Przyrządy unipolarne i struktury tranzystorowe na potrzeby elektroniki wysokotemperaturowej | Darłówko Wschodnie, Poland | 533 |
| [Pub152] | VI Krajowa Konferencja Elektroniki KKE'2007, 11-13 June | R.Kisiel | Technologia kontaktów i montażu dla przyrządów z węglika krzemu do zastosowań wysokotemperaturowych, wysokomocowych i wysokoczęstotliwościowych | Darłówko Wschodnie, Poland | 551 |
| [Pub153] | VI Krajowa Konferencja Elektroniki KKE'2007, 11-13 June | J.Szmidt, M.Sochacki, A.Piotrowska, E.Kamińska, K.Gołaszewska, M.Guziewicz, N.Kwietniewski | Wykonanie, pasywacja i terminacja kontaktów Schottky'ego na podłożach SiC | Darłówko Wschodnie, Poland | 553 |
| [Pub154] | XXXI Int. Conference of IMAPS Poland Chapter, 23-26 September | Z.Szczepański, J.Kalenik, M.Bogusławski | Anisotropic Conductive Films in Flip Chip Assembly and LCD Modules Connection | Rzeszów-Krasiczyn, Poland | 315-318 |
| [Pub155] | XXXI Int. Conference of IMAPS Poland Chapter, 23-26 September | M.Jakubowska, J.Kalenik, K.Kiełbasiński, A.Młożniak | Electrical Properties of New Lead-Free Thick Film Resistors | Rzeszów-Krasiczyn, Poland | 323-326 |
| [Pub156] | XXXI Int. Conference of IMAPS Poland Chapter, 23-26 September | R.Kisiel | Influence of Storage and Repair Processes on Lead-Free Solder Joint Properties | Rzeszów-Krasiczyn, Poland | 265-268 |
| [Pub157] | XXXI Int. Conference of IMAPS Poland Chapter, 23-26 September | J.Kalenik, J.Szmidt | Ultrasonic Bonding of SMD Components in Thick Film Hybrid Circuits | Rzeszów-Krasiczyn, Poland | 319-322 |

### *6.4. Scientific and Technical Books*

| Number | Authors | Publisher | Title, volume, pages |
|---|---|---|---|
| [Pub158] | M.Borecki, A.Bartosiewicz | Wyższa Szkoła Techniczno-Ekonomiczna | Zeszyty Naukowe - Programowanie serwerów http – aspekt wydajności komponentów internetowych, 2, pp. 7 - 21 |
| [Pub159] | Z.Drozd, M.Szwech, R.Kisiel | Springer-Verlag | Recent Advantes in Mechatronice: Accelerated Fatigue Tests of Lead-free soldered SMT Joint, pp. 293 - 297 |
| [Pub160] | B.Galwas, J.Dawidczyk, A.Szymańska, R.Michalak | Ośrodek Kształcenia na Odległość OKNO - PW, Warszawa 2007 | Telekomunikacja optyczna, Seria: Akademickie podręczniki multimedialne - Edycja 5 |
| [Pub161] | P.Garbar, M.Sutkowski, J.Woźnicki | Pomorskie Wydawnictwo Naukowo-Techniczne | Inteligentne wydobywanie informacji w celach diagnostycznych: Pozyskiwanie i obrazowanie obiektów trójwymiarowych, pp. 49 - 70 |

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|---|---|---|---|
| [Pub162] | R.Kisiel, K.Bukat, Z.Drozd, M.Szwech, P.Syryczyk, A.Girulska | Springer-Verlag | Recent Advantes in Mechatronice: Implementation of RoHS Technology in Electronic Industry, pp. 313 - 317 |
| [Pub163] | B.Majkusiak | Springer | FinFETs and Other Multi – Gate Transistors: Physics of the Multigate MOS System, pp. 155-189 |
| [Pub164] | B.Majkusiak | Springer | Nanoscaled Semiconductor-on-Insulatir Structures and Devices: Resonant Tunneling Devices on SOI Basis, pp. 341-356 |
| [Pub165] | M.Sutkowski | ARW FOTO.KURIER s.c. | NIKON system tradycyjny i cyfrowy, p. 270 |
| [Pub166] | Z.Szczepański, S.Okoniewski | Wydawnictwa Szkolne i Pedagogiczne S.A. | Technologia i materiałoznawstwo dla elektroników, 14/2007, pp.1 - 278 |

## 7. PATENTS

[Pat1] J.Kalenik, **The method for attaching electronics elements with the hybrid printed circuits** (Sposób dołączania elementów elektronicznych do obwodów drukowanych układów hybrydowych), Zgłoszenie patentowe nr P.383230 złożone w Urzędzie Patentowym RP 31.08.2007

[Pat2] J.Kęsik, W.Kamiński, **Ion laser discharge tube** (Rura wyładowcza jonowego lasera gazowego), Patent PL 195236 B1, 31.08.2007 WUP 08/07

# 8. REPORTS

[Rep1] **Charge pumping as a tool for characterization of electrophysical parameters of new-generation MIS devices** (Metoda pompowania ładunku jako narzędzie do charakteryzacji parametrów elektrofizycznych nowych generacji przyrządów typu MIS), project leader: L. Łukasiak

[Rep2] **Coherence properties of light generated by photonic crystal lasers** (Zagadnienie koherencji promieniowania generowanego w laserach z ośrodkiem aktywnym w postaci kryształu fotonowego), project leader: Paweł Szczepański

[Rep3] **Controlling Leakage Power in NanoCMOS SoCs, European Commission 6 Framework Programme - Integrated Project CLEAN** (FP6 – 4 – IST – 4 – 026980 – IP – CLEAN), Projekt zintegrowany w ramach 6-tego Programu Ramowego UE, project leader: Wiesław Kuźmicz

[Rep4] **Elaboration of upconversion fiber laser for visible wavelengths** (Opracowanie i wykonanie modułu lasera włóknowego na zakres widzialny z konwersją wzbudzenia), project leader: Michał Malinowski

[Rep5] **Electrical charcterization of MOS SOI structures,** (Charakteryzacja struktur MOS SOI metodami elektrycznymi), project leader: L. Łukasiak

[Rep6] **Electronic detectors and chemical sensitive devices with diamond and diamon-like carbon (dlc) films, (**Elektroniczne detektory i przyrządy chemoczułe z warstwami diamentowymi i diamentopodobnymi**)**, project leader: Jan Szmidt

[Rep7] **Electronics properties of c-BN thick films on silicon p-type substrate,** (Właściwości elektryczne grubych warstw kubicznego azotku boru (c-BN) na podłożach krzemowych typu n), project leader: Aleksander Werbowy

[Rep8] **Fabrication and characterisation of test strucutres with SiOxNy ultrathin dielectric layers high-K gtate stack on silicon substrates,** (Wytwarzanie i charakteryzacja struktur z układem ultracienkich warstw dielektrycznych zwierających warstwę $SiO_xN_y$ na oraz dielektryk o wysokiej przenikalności dielektrycznej na podłożach krzemowych), project leader: R.B. Beck

[Rep9] **Investigation of photoconductive properties in polymer - liquid crystal image transducers,** (Badania właściwości fotoprzewodzących złącza w układzie polimer-ciekły kryształ w ciekłokrystalicznych przetwornikach obrazowych), project leader: Janusz Parka

[Rep10] **Microwave Photonic Dispersive Filters** (Mikrofalowe fotoniczne filtry dyspersyjne), project leader: Bogdan Galwas

[Rep11] **Microwave reasonable cells with anisotropic properties of liquid crystals,** (Mikrofalowe przestrajalne rezonatory wykorzystujące właściwości anizotropowe ciekłych kryształów), project leader: Janusz Parka

[Rep12] **Miniaturised biochemical system with optical and electrochemical detection,** (Miniaturowy system biochemiczny z detekcją optyczną i elektrochemiczną), project leader: R.B. Beck

[Rep13] **Modeling of manufacturing defects of arbitrary shape in interconnections in deep submicron integrated circuits,** (Modelowanie defektów o dowolnym kształcie występujących w połączeniach w głęboko submikrometrowych układach scalonych), project leader: Wiesław Kuźmicz

[Rep14] **Modelling and investigation of amplifier and laser structures with limit dimension** (Modelowanie i badanie struktur wzmacniających i laserowych o ograniczonej wymiarowości), project leader: Michał Malinowski

[Rep15] **Network of Excellence for Micro-Optics – NEMO, Network of Excellence within 2nd IST 6FP of UE** (Mikronowe i sub-mikronowe przyrządy dla fotoniki - NEMO), Sieć doskonałości w ramach 6-tego Programu Ramowego UE, project responsible person in IMiO: Paweł Szczepański

[Rep16] **New possibilities of the UV generation in ion lasers in the noble gases and its mixtures** (Nowe możliwości generacji promieniowania UV w jonowych laserach pracujących na gazach szlachetnych i ich mieszaninach), project leader: Jerzy Kęsik

[Rep17] **Polarization sensitive liquid crystal filter in the digital image processing system** (Spektralno – polaryzacyjny filtr ciekłokrystaliczny w systemie cyfrowego przetwarzania i analizy obrazu), project leader: Jerzy Woźnicki

[Rep18] **PULLing the limits of NANOCmos electronics - PULLNANO, Integrated Project 6FP UE**, project leader: Bogdan Majkusiak

[Rep19] **PV Enlargement – Technology Transfer, Demonstration and Scientific Exchange Action for the Establishment of a strong European PV Sector,** project leader: Stanislaw M. Pietruszko

[Rep20] **Silicon-based Nanodevices – SINANO, Network of Excellence within IST 6FP of UE** (Przyrządy naonelektroniki oparte na krzemie – SINANO), Sieć doskonałości w ramach 6-tego Programu Ramowego UE, project leader: Romuald B.Beck

[Rep21] **Simulation of manufacturing processes in nanometer scale CMOS integrated circuits** (Metody symulacji procesów produkcji nanometrowych układów scalonych CMOS), project leader: Wiesław Kuźmicz

[Rep22] **Study of technology and construction as well as realization of micro mechanical switch** (Opracowanie technologii i konstrukcji oraz wykonanie przełącznika mikromechanicznego), project leader: Jerzy Kruszewski

[Rep23] **The characterization of electronic materials and proposals of construction for sensors technics, (**Charakteryzacja materiałów elektronicznych i propozycje konstrukcji dla techniki sensorowej**),** project leader: Jan Szmidt

[Rep24] **The sensor module study and realization for measurement of vibration** (Opracowanie i wykonanie modułu czujnika do pomiaru wibracji), project leader: Jerzy Kruszewski

[Rep25] **Thin film $BaTiO_3$ ceramics for metal-ferroelectric-semiconductor (MFS) structures** (Cienkowarstwowa ceramika $BaTiO_3$ dla struktur metal-ferroelektryk-półprzewodnik (MFS)), project leader: Aleksander Werbowy

[Rep26] **Verification of the system of electrical characterization of MOS devices,** (Weryfikacja systemu charakteryzacji elektrycznej przyrządów MOS), project leader: L. Łukasiak

# 9. CONFERENCES, SEMINARS AND MEETINGS

## *9.1. International Conferences*

[Con1] **CMS'07 – VI International Conference - Computer Methods and Systems,** Kraków, Poland, 21-23 Novembe
participants: A.Jakubowski, A.Malinowski

[Con2] **EOS Topical Meeting on Diffractive Optics,** Barcelona, Spain, 20-23 November
participants: P.Szczepański, A.Tyszka-Zawadzka

[Con3] **EUROCON'2007 The International Conference on "Computer as a Tool",** Warsaw, Poland, 9-12 September
participant: A.Rudziński

[Con4] **EUROSOI'2007 – Thrid Workshop of the Thematic Network on Silicon On Insulator,** Leuven, Belgium, 24-26 March
participants: B.Majkusiak, J.Walczak

[Con5] **IEEE Design and Diagnostics of Electronic Circuits and Systems,** Kraków, Poland, 11-13 April
participants: A.Łuczyk, W.Pleskacz

[Con6] **IEEE East_West Design & Test Symposium (EWDTS'07),** Yerevan, Armenia, 7-10 September
participants: D.Kasprowicz, W.Kuźmicz, A.Pfitzner, E.Piwowarska

[Con7] **IEEE MTT-S International Microwave Symposium,** Honolulu, Hawai, 3-8 June
participant: J.Krupka

[Con8] **International Conference - Thermal Problems in Electronics MICROTHERM'2007,** Łódź, Poland, 25-27 June
participants: M.Jakubowska, J.Kalenik, K.Kiełbasiński, R.Kisiel, M.Sochacki, J.Szmidt

[Con9] **International Conference on Nanoscience and Technology,** Stockholm, Sweden, 2-6 July
participant: M.Niewiński

[Con10] **ISSE'2007 – 30th Int. Spring Seminar on Electronics Technology,** Cluj-Napoca, Romania, 9-13 May
participant: R.Kisiel

[Con11] **MSE'07 Int. Conference Microelectronic Systems Education,** San Diego, Kalifornia, USA, 3-4 June
participants: W.Kuźmicz, E.Piwowarska

[Con12] **Network of Excellence on Micro-Optics,** Sesto Fiorentino, Italy, 16-18 May 2007
participants: M.Kaczkan, M.Klimczak, M.Koba, R.Piramidowicz, P.Szczepański, A.Tyszka-Zawadzka

[Con13] **Optical Sensing Technology and Applications – SPIE Conference, Prague, Czech Republic, 16 April**
participants: M.Borecki, A.Jakubowski

[Con14] **Photonics Applications in Astronomy, Communications, Industry, and High-Energy Physics Experiments,** Wilga, Poland, 21-27 May
participants: J.Dawidczyk, M.Kaczkan, M.Klimczak, R.Piramidowicz, P.Witoński

[Con15] **3DTV-Conference, The True Visioncapture, Transmission and Display of 3D Video,** Kos Island, Grece, 7-9 May
participant: P.Garbat

[Con16] **6th Electronic Circuits and Systems Conference – ECS'07,** Bratislava, Slovakia, 6-7 September
participants: T.Bieniek, G.Janczyk, W.A.Pleskacz

[Con17] **13th Canadian Semiconductor Technology Conference CSTC – CCTS'2007,** Montreal, Kanada, 14-17 August
participants: A.Jakubowski, L.Łukasiak, S.Szostak

[Con18] **14th International Conference: "Mixed Design of Integrated Circuits and Systems" – MIXDES 2007,** Ciechocinek, Poland, 21-23 June
participants: D.Kasprowicz, W.Kuźmicz, A.W.Łuczyk, M.Maciąg, A.Pfitzner, E.Piwowarska, W.A.Pleskacz, A.Wielgus

[Con19] **XXXI Int. Conference of IMAPS Poland Chapter,** Rzeszów-Krasiczyn, Poland, 23-26 September
participants: M.Jakubowska, J.Kalenik, K.Kiełbasiński, J.Szmidt

### *9.2. Local Conferences*

[Con20] **Konferencja Polskiego Towarzystwa Informatycznego,** Warszawa, Poland, 16 May
participant: B.Galwas

[Con21] **Konferencja Naukowa Polska Wszechnica Informatyczna,** Warszawa, Poland, 18-19 October
participant: B.Galwas

[Con22] **Przetwarzanie informacji w społeczeństwie informacyjnym,** Grabanów, Poland, 13-14 September
participants: P.Garbat, J.Parka, M.Sutkowski, J.Woźnicki

[Con23] **I Krajowa Konferencja Nanotechnologii,** Wrocław, Poland, 26-28 April
participants: M.Borecki, A.Jakubowski, L.Łukasiak, B.Majkusiak, A.Mazurak, J.Walczak

[Con24] **II Konferencja Naukowo-Techniczna Doktorantów i Młodych Naukowców,** Warsaw, Poland, 24-26 September
participant: A.Rudziński

[Con25] **VI Krajowa Konferencja Elektroniki KKE'2007,** Darłówko Wschodnie, Poland, 11-13 June
participants: R.Kisiel, N.Kwietniewski, M.Sochacki, J.Szmidt

[Con26] **IX Electron Technology Conference ELTE'2007,** Kraków, Poland 4-7 September
participants: M.Baszun, R.B.Beck, T.Bieniek, M.Borecki, P.Firek, J.Gibki, R.Gronau, M.Jakubowska, A.Jakubowski, J.Kalenik, M.Kalisz, K.Kiełbasiński, N.Kwietniewski, L.Łukasiak, B.Majkusiak, A.Malinowski, M.Malinowski, A.Mazurak, Z.Mączeński, R.Mroczyński, M.Niewiński, A.Pfitzner, Z.Pióro, R.Piramidowicz, P.Pływaczewski, M.Sochacki, J.Stęszewski, P.Szczepański, J.Szmidt, S.Szostak, P.Szwemin, M.Śmietana, P.Śniecikowski, G.Wąchała, A.Werbowy

### *9.3. Schools, Seminars and Meetings*

[Con27] **17th International Travelling Summer School on Microwaves and Lightwaves,** Pforzheim, Germany, July 7-13
participants: B.Galwas, R.Paszkiewicz, P.Szczepański

[Con28] **Institute Seminar:** Minimalizacja poboru mocy w procesorze o superskalarnej architekturze przesłań SMOVE, 11 May
participants: G.Janczyk, A.Łuczyk, D.Kasprowicz, W.Kuźmicz, P.Markowski, M.Niewiński,A. Pfitzner, E.Piwowarska, W.Pleskacz, A.Rudziński, P.Szwemin, G.Wąchała

[Con29] **Institute Seminar:** Proces emisji spontanicznej w kryształach fotonicznych, 17 January
participants: M.Kaczkan, W.Kamiński, M.Koba, A.Rudziński, P.Szczepański, A.Tyszka-Zawadzka

[Con30] **Third European Workshop on Optical Fibre Sensors,** Napoli, Italy, 4 July
participant: M.Borecki

## 10. PRIZES

[Prize1] Dominik Kasprowicz, **Warsaw University of Technology Rector's Individual Prize for Scientific Achievements,** (Nagroda Indywidualna JM Rektora PW za wyróżnioną rozprawę doktorską pt.: „Modelowanie rozproszenia sygnału zegara (clock skew) w układach scalonych CMOS z uwzględnieniem wpływu rozrzutów produkcyjnych")

[Prize2] Jerzy Krupka, **Prime Minister Prize for Outstanding Technical Achievements,** (Nagroda Prezesa Rady Ministrów za wybitne osiągnięcia naukowo-techniczne)

[Prize3] Jan Szmidt, **Golden cross,** (Złoty Krzyż Zasługi)

[Prize4] Jan Szmidt, **Medal of National Education Commission,** (Medal Komisji Edukacji Narodowej)