

DEPARTMENT OF PHYSICS
<http://kf-lin.elf.stuba.sk/kf.html>

Head of Department

Doc. Ing. Július Cirák, PhD.

e-mail: julius.cirak@stuba.sk

Tel/Fax: ++421-2-654 27 427

I. STAFF

Professors	Prof. Ing. Drahoslav Barančok, DrSc., Prof. Ing. Štefan Barta, PhD., Prof. Ing. Rudolf Durný, DrSc., Prof. RNDr. Július Krempaský, DrSc., Prof. Ing. Ivan Štich, DrSc
Associate Professors	Doc. Ing. Peter Ballo, PhD., Doc. Ing. Otto Budke, PhD., Doc. Ing. Július Cirák, PhD., Doc. RNDr. Ivan Červeň, PhD., Doc. Ing. Peter Dieška, PhD., Doc. Ing. Ján Vajda, PhD., Doc. RNDr. Pavol Valko, PhD.
Visiting Associate Professor	Doc. Ing. Roman Martoňák, PhD.
Assistant Professors	Ing. Peter Bokes, PhD., Ing. Ondrej Foltin, PhD., Ing. Jozef Lasz, Ing. Pavol Tomčík, RNDr. Milan Valach, RNDr. Mária Valková, Mgr. Marek Vančo, Ing. Alfréd Vlnieška, Ing. Ivan Zelenay, PhD.
Senior Scientist	Ing. Jozef Bielek, PhD.
Research Workers	Doc. RNDr. Edmund Dobročka, PhD., Ing. Ľuboš Keleši, Mgr. Martin Konôpka, PhD., RNDr. Róbert Turanský.
Technical Staff	Zuzana Váciová (secretary), Štefan Kučera
PhD. Students	Ing. Karolína Kočíšková, Ing. Jana Röschlová, Ing. Martin Weis

II. EQUIPMENT

II.1 Teaching and Research Laboratories

- Laboratories of elementary and advanced physics
- Laboratory of ordered molecular layers and systems
- Laboratory of applied optics
- Laboratory of electrical transport
- Laboratory of X-ray diffraction
- Laboratory of thermophysical properties
- Laboratory of macrostructure of composites
- Laboratory of material simulation
- Laboratory of spectroscopy
- Center for computational materials science

II.2 Special Measuring Instruments and Computers

- Refrigerator cooled cryostat NOK-10-3D
- Langmuir - Blodgett deposition device, Nima, U.K.
- Electrostatic voltmeter Trek
- 7801 Solartron special multimeter
- Measuring microscope CZJ
- X-ray diffraction powder goniometer

- 4 numerical servers (clusters) and supporting infrastructure representing the largest numerical capacity in Slovakia (according the information by Sun Microsystems)

III. TEACHING

III.1 Undergraduate Study (Bc.)

Subject, semester, hours per week for lectures and for seminars or practical exercises, name of lecturer

Introduction to Technical Physics	(1st sem., 0-2h)	P. Ballo, O. Budke, P. Valko, A. Vlnieška
Physics	(2nd sem. 3-2h)	J. Cirák
Physics I	(2nd sem. 3-2h)	P. Ballo, O. Budke, P. Valko
Special Seminar - Physics I	(2nd sem., 0-2h)	P. Ballo, O. Budke, P. Valko
Physics II	(2nd sem., 3-3h)	P. Valko
Physics I	(3rd sem., 3-2h)	P. Dieška
Special Seminar - Physics I	(3rd sem., 0-2h)	P. Dieška
Physics II	(3rd sem., 3-2h)	P. Ballo, O. Budke, P. Valko
Special Seminar - Physics II	(3rd sem., 0-2h)	P. Ballo, O. Budke, P. Valko
Modern Physics	(5th sem., 3-2h)	J. Krempaský
Quantum and Statistical Physics	(6th sem., 3-2h)	I. Štich
Solid State Physics	(7th sem., 3-2h)	R. Durný
Computer Simulations	(7th sem., 2-3h)	P. Ballo
Conductors and Superconductors	(7th sem., 2-2h)	R. Durný
Selected Problems of Solid State Physics	(8th sem., 3-2h)	Š. Barta
Modern Methods of Material Diagnostics	(8th sem., 3-2h)	D. Barančok
Semiconductors	(8th sem., 2-2h)	P. Dieška

III.2 Graduate Study (Ing.)

Applied Optics	(1st sem., 3-2h)	J. Vajda
Biomaterials and Biosystems	(1st sem., 2-2h)	J. Cirák
Physics of Dynamic Systems	(1st sem., 2-2h)	P. Bokes
Physics of Processes	(1st sem., 3-2h)	P. Bokes
Superconductivity and Low Temperature Physics	(1st sem., 2-2h)	R. Durný
Nanotechnologies	(1st sem., 2-2h)	J. Cirák
Bioelectronics	(1st sem., 2-1h)	J. Cirák
Principles of Applied Optics	(2nd sem., 3-2h)	J. Vajda
Non-equilibrium Systems and Chaos	(2nd sem., 3-2h)	J. Krempaský
Bioelectronics	(2nd sem., 3-2h)	J. Cirák

III.3 Undergraduate and Graduate Study for Foreign Students (in English Language)

Seminar - Physics I

(1st sem., 1-0h)

P. Ballo

IV. RESEARCH PROJECTS

- Study of organic molecular systems responsive to physical-chemical factors for biosensor applications. G1/0277/03, J. Cirák
- Practical application of modified electrodes for selective electroanalysis of metallic complexes and organics in environmental components. Greek/Slovak Science and Technology Cooperation, J. Cirák
- Cluster of advanced studies ESF. J. Cirák
- Manufacture and properties of particulate composite systems based on carbon and modified by outstandingly conductive particles, diverse in size. G 1/7269/20, Š. Emmer, J. Bielek
- Sound, image and biomedical signals digital processing. 102/VTP/2000, P. Fuchs, J. Bielek
- Physical interrelation in the sun-magnetosphere system and sunshine. VEGA 2/2009, A. Prigancová, J. Bielek
- Analysis of kinetics of reactions connected with charge transfer in solid and liquid systems. 2/1013/22, R. Durný
- New techniques of scanning probe microscopy and nanostructure analysis spectroscopy. APVT-51-013904, R. Durný
- Center of excellency of SAS – Center of electronic and electrotechnical components of new generation. SENG, R. Durný
- Computer aided design in nanotechnology: Selfassembled monolayers and molecular electronics. AVPT, 20-019202, I. Štich
- Stress controlled molecular electronics (Stressmol). Supported by Volkswagen Stiftung + Nem/Slov/FEI STU 2/03, I. Štich
- Analysis and manipulation of materials at atomic scale, using AFM. APVT-20-21505, I. Štich
- Interactive multimedial project of teaching physics in technical universities. KEGA 3/108003 P. Ballo, J. Krempaský, I. Červeň
- Integrated teaching of natural science. KEGA 3/0003/02, Ľ. Held, J. Krempaský
- Quantum transport in focus. MERG-CT-2004-510615, P. Bokes
- Ab-initio approach to conductance of quantum junctions accounting for dynamical correlation of electrons. NATO EAP.RIG 981521, P. Bokes
- Calculation of conductance of quantum junctions at ab-initio level. VEGA 1/2020/05, P. Bokes
- Study and modelling of thermophysical properties of composites. VEGA 2/5100/25, V. Boháč, P. Dieška
- Study of fast phase transitions, resulting in a topology defects creation. VEGA 1/2019/05, P. Valko

V. COOPERATION

V.1 Cooperation in Slovakia

- Faculty of Chemical and Food Technology, STU, Bratislava
- Faculty of Informatics and Information Technologies, STU, Bratislava
- Faculty of Mechanical Engineering, STU, Bratislava
- Faculty of Material Technology, STU, Trnava
- University of Trnava, Trnava
- Natural Science Faculty, Comenius University, Bratislava
- Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava
- Faculty of Industrial Technologies, University of Trenčín, Púchov

- Electrotechnical Faculty, University of Žilina, Žilina
- Institute of Physics, Slovak Academy of Sciences, Bratislava
- Institute of Electrical Engineering, Slovak Academy of Sciences, Bratislava
- Institute of Anorganic Chemistry, Slovak Academy of Sciences, Bratislava
- Geophysical Institute, Slovak Academy of Sciences, Bratislava
- Institute of Materials and Machine Mechanics, Bratislava
- Welding Institute, Bratislava
- Research Institute of Nuclear Power Plants, Trnava
- IBOK, Bratislava

V.2 International Cooperation

- Tomáš Baťa University, Zlín, CzR
- Institute of Macromolecular Chemistry, AVČR, Prague, CzR
- Institute of Physics, AVČR, Prague, CzR
- Chemical Laboratory, H.C.Ørsted Institute, UC, Copenhagen, Denmark
- Institute of Materials Science - Demokritos, Athens, Greece
- Tokyo Institute of Technology, Tokyo, Japan
- Fukuoka University, Fukuoka, Japan
- Cavendish Laboratory, University of Cambridge, U.K.
- University of York, U.K.
- Universidad Autonoma de Madrid, Spain
- Centro de Fisica Nuclear, Lisbon, Portugal
- International School for Advanced Studies (SISSA), Trieste, Italy
- Ruhr Universitat, Bochum, Germany
- Max-Planck-Institut, Stuttgart, Germany
- Physikalisches Institut, Universitat Munster, Germany
- Institute of Physical Chemistry, ETH Zurich, Switzerland
- Delft University, Delft, The Netherlands

V.3 Membership in International Organizations and Societies

- P. Bokes, J. Cirak, I. Štich: American Physical Society
- P. Ballo, D. Baranok, Š. Barta, P. Bokes, J. Cirak, I. erve, R. Durny, J. Krempasky :
Europhysical Society
- J. Cirak: IEEE
- P. Bokes: Institute of Physics

VI. THESES

VI.1 Master Theses

Master thesis supervised at the Department of Physics. The name of supervisor is in brackets.

- [1] R. Miunek: MgB₂ superconducting thin layers for cryogenic applications. (J. Cirak)

VII. OTHER ACTIVITIES

- Organizing the 11th international workshop - Applied Physics of Condensed Matter, APCOM '05. Mal Luivna, 15.-17.6.2005, J. Vajda, P. Ballo, M. Weis
- Task group for physics - Accreditation commission, I. Štich
- Academic ranking and rating agency, I. Štich
- Club of physicists, D. Baranok
- Obtaining "The grand prix in education 2005", M. Weis

VIII. PUBLICATIONS**VIII.1 Journals**

- [1] BALLO, P., DEGMOVÁ, J., SLUGENĚ, V.: Grain Boundary Sliding and Migration in Copper: Vacancy Effect. In: *Physical Review B*. - Vol.72 (2005) - pp. 064118.1-5. (in English)
- [2] BALLO, P., SLUGENĚ, V.: Grain Boundary Sliding and Migration in Copper: the Effect of Vacancies. In: *Computational Materials Science*. - Vol.33 (2005) - pp. 491-498. (in English)
- [3] BARTA, Š., DIEŠKA, P., BIELEK, J., ŠMIDA, T., MAGULA, V.: Dependence of Resistivity on a Component of the Plastic Part of Strain Tensor. In: *Acta Materialia*. - Vol.53 (2005) - pp. 3511-3515. (in English)
- [4] BOKES, P., MERA, H., GODBY, R.W.: Current-Constraining Variational Approaches to Quantum Transport. In: *Physical Review B*. - Vol.72 (2005) - pp. 165425.1-10. (in English)
- [5] ČERVENĚ, I.: Supercapacitors in Automobiles. In: *EE - časopis pre elektrotechniku a energetiku*. - Vol.11, No.3 (2005) - pp. 10-11. (in Slovak)
- [6] ČERVENĚ, I.: The Beginnings of Electrotechnical Terminology. In: *EE - časopis pre elektrotechniku a energetiku*. - Vol.11, No.1 (2005) - p. 36-37. (in Slovak)
- [7] DIEŠKA, P., ŠTICH, I., PÉREZ, R.: Nanomanipulation Using Only Mechanical Energy. In: *Physical Review Letters*. - Vol.95 (2005) - pp. 126103.1-4. (in English)
- [8] KONÔPKA, M., ROUSSEAU, R., ŠTICH, I., MARX, D.: Electronic Origin of Disorder and Diffusion at a Molecule-Metal Interface: Self Assembled Monolayers of CH₃S on Cu(111). In: *Physical Review Letters*. - Vol.95 (2005) - pp. 096102.1-4. (in English)
- [9] MARTOŇÁK, R., DONADIO, D., PARRINELLO, M.: Evolution of the Structure of Amorphous Ice: From Low-Density Amorphous through High-Density Amorphous to Very High-Density Amorphous Ice. In: *Journal of Chemical Physics*. - Vol.122 (2005) - pp. 134501.1-10. (in English)
- [10] MARTOŇÁK, R., LAIO, A., BERNASCONI, M., CERIANI, CH., RAITERI, P., ZIPOLI, F., PARRINELLO, M.: Simulation of Structural Phase Transitions by Metadynamics. In: *Zeitschrift für Kristallographie*. - Vol.220 (2005) - pp. 489-498. (in English)
- [11] MERA, H., BOKES, P., GODBY, R.W.: Asymptotic Self-Consistency in Quantum Transport Calculations. In: *Physical Review B*. - Vol.72 (2005) - pp. 085311.1-6. (in English)
- [12] NEDEV, N., MANOLOV, E., IVANOV, T., PANTCHEV, B., BESHKOV, G., DURNÝ, R., GMUCOVÁ, K., NÁDAŽDY, V.: Density of Localized States in Hydrogenated Amorphous Silicon Determined by Quasistatic Capacitance of Metal/a-Si:H/SiO₂/e-Si Structures. In: *Journal of Optoelectronics and Advanced Materials*. - Vol.7, No.1 (2005) - pp. 507-511. (in English)
- [13] NISHIDA, A., TAKA, C., CHROMIK, Š., DURNÝ, R.: Critical Properties of MgB₂ Thin Films on NbN/Si Substrate Under Perpendicular Magnetic Fields. In: *Physica C*. - Vol.426-431 (2005) - pp. 340-344. (in English)
- [14] VAJDA, J., WEIS, M., BARANČOK, D., CIRÁK, J., TOMČÍK, P.: Study of Relaxation Processes in Monomolecular Films by the Step Compression Experiment. In: *Central European Journal of Physics*. - Vol.3, No.1 (2005) - pp. 139-146. (in English)

- [15] WEIS, M., KOPÁNI, M., MICHALKA, P., BIRÓ, Cs., CELEC, P., DANIŠOVIČ, E., JAKUBOVSKÝ, J.: Conformation Study of the Membrane Models by the Maxwell Displacement Current Technique and Oxidative Stress. In: Journal of Biochemical and Biophysical Methods. - Vol.65 (2005) - pp. 81-87. (in English)

VIII.2 Conferences

- [1] BARANČOK, D., CIRÁK, J., TOMČÍK, P., VAJDA, J., WEIS, M.: Measurement of Molecular Orientational Order in Cell Membrane Models by the MDC Technique. In: Fröhlich Centenary International Symposium "Coherence and Electromagnetic Fields in Biological Systems" : Prague, Czech Republic, 1.-4.7.2005. pp. 103-105. (in English)
- [2] CIRÁK, J., BARANČOK, D., TOMČÍK, P., VAJDA, J., WEIS, M.: Study of Molecular Ordering in the Langmuir Film Mechanically Stimulated. In: 11th International Conference on Organized Molecular Films : Sapporo, Japan, 26.-30.6.2005. p. 128. (in English)
- [3] CIRÁK, J., WEIS, M., VITOVÍČ, P., TOMČÍK, P.: Langmuir Monolayer - a Model System for the Study of Biomembrane Properties. In: 15th Conference of Slovak and Czech Physicists : Košice, Slovak Republic, 5.-8.9.2005. p. S901. (in English)
- [4] GMUCOVÁ, K., NÁDAŽDY, V., DURNÝ, R.: Electrochemical Approach to Degradation Processes in a-Si:H. In: 11th Euregional Workshop on Thin Silicon Devices. Book of Abstracts : Delft, The Netherlands, 2.-4.2.2005. pp. 17-18. (in English)
- [5] GMUCOVÁ, K., NÁDAŽDY, V., DURNÝ, R.: The Nature of Mobile Hydrogen in a-Si:H - Electrochemical Studies. In: Solar Renewable Energy News - Research and Applications 2005 International Conference : Firenze, Italy, 2.-8.4.2005. pp. 18-19. (in English)
- [6] HARMATHA, L., ŤAPAJNA, M., DONOVAL, D., BALLO, P., PÍSEČNÝ, P.: Analysis of Selected Electro-Physical Properties of Nitrogen-Doped Czochralski-Grown Si Wafers. In: 5th International Conference on Measurement "Measurement 2005" : Smolenice Castle, Slovak Republic, 15.-19.5.2005. pp. 459-462. (in English)
- [7] HIANIK, T., VITOVÍČ, P., RYBÁR, P., CIRÁK, J., MELICHERČÍK, M., URBAN, J.: The Mechanisms of the Interaction of Model Peptides with Lipid Bilayers and Monolayers. In: 18th International Symposium on Bioelectrochemistry and Bioenergetics : Coimbra, Portugal. p. O-49. (in English)
- [8] JANÍČEK, F., VAJDA, J.: Distance Education at the Faculty of Electrical Engineering and Information Technology of the Slovak University of Technology in Bratislava: Experience and Prospects. In: 6th International Conference "Virtual University VU'05" : Bratislava, Slovak Republic, 15.-16.12.2005. pp. 290-293. (in English)
- [9] KOČIŠKOVÁ, K.: Graphical Presentation of FCC Metal Structures for Embedding Atom Method. In: 7th Conference for PhD Students ELITECH 2005 : Bratislava, Slovak Republic, 9.2.2005. pp. 100-102. (in English)
- [10] KOČIŠKOVÁ, K., BALLO, P.: Simulation of Grain Boundary Cleavage in Copper Using Embedding Atom Potential and Effect of Temperature. In: 11th International Workshop on Applied Physics and Condensed Matter : Malá Lučivná, Slovak Republic, 15.-17.6.2005. pp. 21-24. (in English)

- [11] NÁDAŽDY, V., DURNÝ, R., PLECENÍK, A., KÚŠ, P., GREGOR, M., PLECENÍK, T.: Preparation of a Very Thin Oxide Layer in the Surface Region of a-Si:H. In: 11th Euregional Workshop on Thin Silicon Devices. Book of Abstracts : Delft, The Netherlands, 2.-4.2.2005. p. 23. (in English)
- [12] NÁDAŽDY, V., DURNÝ, R., PLECENÍK, A., KÚŠ, P., GREGOR, M., PLECENÍK, T.: Preparation of a Very Thin Oxide Layer in the Surface Region of Si:H. In: 11th International Workshop on Applied Physics and Condensed Matter : Malá Lučivná, Slovak Republic, 15.-17.6.2005. pp. 13-16. (in English)
- [13] NÁDAŽDY, V., GMUCOVÁ, K., DURNÝ, R.: Study of Mobile Hydrogen in a-Si:H. In: 11th International Workshop on Applied Physics and Condensed Matter : Malá Lučivná, Slovak Republic, 15.-17.6.2005. pp. 17-20. (in English)
- [14] OŽVOLDOVÁ, M., ČERŇANSKÝ, P., ČERVENÝ, I., BUDINSKÝ, J., RIEDLMAJER, R.: Introduction into Engineering Physics - A Multimedia CD Tool for Students Entering the Slovak Engineering Universities. In: INEER Conference for Engineering Education and Research "Exploring Innovation in Education and Research" : Teinan, Taiwan, 1.-5.3.2005. (in English)
- [15] RÖSCHLOVÁ, J., NEČAS, V., CIRÁK, J.: Radiotoxicity and Risk of Nuclear Materials after Neutron Irradiation. In: 11th International Workshop on Applied Physics and Condensed Matter : Malá Lučivná, Slovak Republic, 15.-17.6.2005. pp. 140-144. (in English)
- [16] RÖSCHLOVÁ, J., WEIS, M., CIRÁK, J., TOMČÍK, P., BARANČOK, P., PIŠTORA, J., PETRIDIS, D., ŠATKA, A.: Ordered Arrays of Magnetic Nanoparticles-LB Preparation and Physical Properties. In: 15th Conference of Slovak and Czech Physicists : Košice, Slovak Republic, 5.-8.9.2005. p. S7P3. (in English)
- [17] STUHLÍKOVÁ, E., BALLO, P., HARMATHA, L., NOVOTNÝ, I., ŘEHÁČEK, V.: DLTS Characterization of Oxide Doped CZ Silicon Schottky Structures. In: 11th International Workshop on Applied Physics and Condensed Matter : Malá Lučivná, Slovak Republic, 15.-17.6.2005. pp. 50-53. (in English)
- [18] VAJDA, J., WEIS, M., BARANČOK, D., CIRÁK, H., TOMČÍK, P.: Orientational Polarization in 2-Dimensional Molecular Systems. In: 14th Conference of Slovak Physicist : Smolenice, Slovak Republic, 10.-15.10.2004. pp. 27-28. (in English)
- [19] VAJDA, J., WEIS, M., BARANČOK, D., CIRÁK, J., TOMČÍK, P.: Study of Photopolymerization in Diacetylene Monomolecular Films by MDC Technique. In: 11th International Workshop on Applied Physics and Condensed Matter : Malá Lučivná, Slovak Republic, 15.-17.6.2005. pp. 188-191. (in English)
- [20] VANČO, M., CIRÁK, J., BARANČOK, D., TOMČÍK, P.: Langmuir Monolayer - A Tool for Studying Phenomena in 2D Molecular Systems. In: 15th Joint Seminar "Development of Materials Science in Research and Education" : Kežmarské Žľaby, Slovak Republic, 5.-9.9.2005. pp. 74-75. (in English)
- [21] VITOVÍČ, P., WEIS, M., TOMČÍK, P., CIRÁK, J., HIANIK, T.: Changes of Surface Potential and Maxwell Currents of Lipid Monolayer at Presence of Gramicidin A. In: Fröhlich Centenary International Symposium "Coherence and Electromagnetic Fields in Biological Systems" : Prague, Czech Republic, 1.-4.7.2005. p. 102. (in English)

- [22] VITOVÍČ, P., WEIS, M., TOMČÍK, P., CIRÁK, J., HIANIK, T.: Interactions of Gramicidin A with Lipid Monolayers. In: 15th Conference of Slovak and Czech Physicists : Košice, Slovak Republic, 5.-8.9.2005. p. S907. (in English)
- [23] VITOVÍČ, P., WEIS, M., TOMČÍK, P., CIRÁK, J., HIANIK, T.: Physical Properties of Lipid Monolayers at Presence of Gramicidin A. In: 15th IUPAB & EBSA International Biophysics Congress : Montpellier, France, 27.8.-1.9.2005. p. 656. (in English)
- [24] WEIS, M., VAJDA, J., BARANČOK, D., CIRÁK, J., TOMČÍK, P.: Slow Collapse Process in the Langmuir Film as a Phase Transition from Two to Three Dimensions. In: 11th International Workshop on Applied Physics and Condensed Matter : Malá Lučivná, Slovak Republic, 15.-17.6.2005. pp. 192-195. (in English)
- [25] WEIS, M., VAJDA, J., BARANČOK, D., CIRÁK, J., TOMČÍK, P.: Dynamic Processes in the Monomolecular Film. In: International Conference on Advanced Materials, Micro-and Nanotechnology : Smolenice, Slovak Republic, 17.-29.4.2005. pp. 59-60. (in English)

VIII.3 Textbooks

- [1] ČERVENŇ, I.: Physics in Chapters. Dynamics of System of Particles. - Bratislava: FEI STU, 2005. (in Slovak)
- [2] ČERVENŇ, I.: Physics in Chapters. Electric Current. - Bratislava: FEI STU, 2005. (in Slovak)
- [3] ČERVENŇ, I.: Physics in Chapters. Electromagnetic Field. - Bratislava: FEI STU, 2005. (in Slovak)
- [4] ČERVENŇ, I.: Physics in Chapters. Electrostatic Field. - Bratislava: FEI STU, 2005. (in Slovak)
- [5] ČERVENŇ, I.: Physics in Chapters. Oscillations and Waves. - Bratislava: FEI STU, 2005. (in Slovak)
- [6] ČERVENŇ, I.: Physics in Chapters. Quantum Effects. - Bratislava: FEI STU, 2005. (in Slovak)
- [7] ČERVENŇ, I.: Physics in Chapters. Magnetic Field. - Bratislava: FEI STU, 2005. (in Slovak)
- [8] ČERVENŇ, I.: Physics in Chapters. Heat and Thermodynamics. - Bratislava: FEI STU, 2005. (in Slovak)

VIII.4 Patent

- [1] Cu-C, Ag-C and Au-C Compounds for the Application onto Sliding Electric Contacts with the Highest Current Density. / Aut.: BIELEK, J., EMMER, Š., KOVÁČIK, J. - No. SK 284768. Date: 06.09.2005. - 5 pp. (in Slovak)