**Kandó Kálmán Faculty of Electrical Engineering**

# Institute of Microelectronics and Technology

**Address:** Tavaszmező u. 17, H-1034 Budapest, Hungary
**Tel.:** +36-1-666-5181
**Fax:** +36-1-666-5181
**E-mail:** gangone.klara@kvk.bmf.hu
**Website:** http://www.mti.bmf.hu

**Head of Institute:** Péter Turmezei PhD

## 1 Introduction

**General Information about the Institute. The Formation of the Institute of Microelectronics and Technology, and its Predecessors**

At the time of the establishment of Kálmán Kandó Polytechnic (in 1969) the Department of Mechanical Engineering and Technology of the Telecommunication and Instrument Engineering College was divided into two: Department of Mechanical Engineering and Department of Component Technology. This was motivated by the fact that meeting the emerging demands of the industry (Tungsram factory) a Component manufacturing speciality was formed in the Polytechnic beside the already existing Telecommunication and Instrument Technology speciality. The task of the new speciality was to form young (works) engineers for the then emerging semiconductor manufacturing and for the already well prospering vacuum technological industry (vacuum tube and light source manufacturing).

During the reorganization in 1979 (i. e. formation of institutes) the Department of Component Technology was merged with the already existing Institute of Technology and Plant Organization under the new name Institute of Electronic Component Technology and Plant Organization. The staff of the Department of Sciences teaching physics was also transferred to this new Institute. Later the staff dealing with plant organization was transferred to an other institute, then due to the reorganization of the Mathematical Institute of the John von Neuman Faculty of Informatics in 2004, the staff teaching mathematics joined the Institute, with this the Institute reaching its present structure.

The name of the Institute refers to its origins in these two main sources, however the 25 years passed in the meantime changed and enriched the educational profile of the Institute according to the demands of the era and of the changing structure

of the industry. The former speciality in semiconductors based on construction and technology developed in the direction of sensor technology and electronic circuits. The light-source speciality, originally mainly serving the needs of the Tungsram factory, nowadays forms specialists for the whole branch of lighting technology, being a unique direction in the whole country.

As in the whole society the environment protection became more and more important, this is manifested also in the higher education. The professional background of the staff, and the existing laboratory facilities led logically to the fact the courses in environment protection and even a full module on environment protection were started and established in the Institute in 1994.

One of the important professional fields of our Institute is the teaching of quality and reliability. In the spirit of this the Institute was the first in the whole Faculty in introducing the course Quality assurance. The teaching of design and of quality assurance concerning all products characterize not only the broadened teaching profile of the Institute, but also the modern engineering education as a whole.

List of the heads of the Institute of Microelectronics and Technology (since 1970):

Heads of Department, Directors of Institute:

Béla Szabó (1969-1973)

Dr. Miklós Romhányi (Head of Department 1973-1979
Director of Institute 1979-1984)

Dr. Sándor Bárdos (1984)

Dr. Attila Pócza (1984-1985)

József Korom (1985-1993)

Dr. Péter Turmezei (since 1993)

Deputy Directors for Education:

Dr. János Borsányi (1979-1980)

Dr. Judit Bihari (1980-1984)

Dr. Lajos Izsó (1984-1987)

Dr. János Borsányi (1987-1993)

Dr. Marianna Lendvay (since 1993)

Deputy Directors for for Technics and Science:

József Bodnár (1979-1985)

Dr. János Borsányi (1985-1987)

Dr. Péter Turmezei (1987-1993)

József Korom (1993-1995)

József Bugyjás (since 1995).

The number of staff is 37, from this 27 is the academic staff (8 part-time).

## 2 Educational Profile

The courses effered by the Institute of Microelectronics and Technology give high level theoretical knowledge and as well as practical knowledge applicable immediately after graduation in the field of electrical engineering science, and in the speciality fields connected with it, i.e. lighting engineering, environmental protection, quality development, sensor technology and nanotechnics. The Institute gladly initiates its best student into the completion of professional tasks acknowledged by the industry.

The Institute deals with the formation of engineers in the following professional fields:

- The institute gives the following courses in the Electrical Engineering speciality: courses in the field of basic scientific and engineering knowledge, i.e. Mathematics, Physics, Material Science of Electrical Engineers, Basics of Safety Technics, of Environment Protection, and of Quality Assurance. The core courses of the speciality are the followings: Technical Documentation, Digital Techniques, Electronics, Electronic Technology, and General Engineering Knowledge.
- The Institute is responsible for the Electronic Devices speciality direction of the Electrical Engineering speciality.
- The Institute gives core courses in the Mechatronic Engineering speciality, and is responsible for the Nanotechnics Speciality direction.
- The Institute gives courses in the Technical Manager speciality (courses in the field of basic scientific and engineering knowledge), and courses in the Project Manager speciality direction.
- The Institute gives courses in the Environment Protection Engineering speciality (electrical engineering courses).

Workshop practice and computer laboratories support the teaching activity. The facilities of the Open Learning Centre (OLC) of the Institute of Microelectronics and Technology is available for all students. The OLC is a computer laboratory functioning as an electronic library. Its aim in not solely serving the demands of a narrow special field, but providing up-to-date computer background and facilities for the academic staff and for the students as well (language educational

softwares, electronic encyclopedia, CD writing, preparation of hyper/text materials, etc.).

For the students choosing the Electronic Devices speciality direction the Institute gives the following courses: Passive Electronic Circuits, Basics of Microelectronics, Analog and Telecommunication Circuits, CAD Basics, and Component Assembly Technology.

Optional subjects are the followings: Experimental Physics, Complex Electrical Systems, Ecological Design and Construction, Instrument Technology, Self-Organizing Low-Dimensional Systems, Industrial Design, Microelectronic Sensors.

*In the Electronic Devices speciality direction one of the following modules are to be obligatory elected.*

- ***Lighting and Environment Module***

The aim of this module to form engineers having solid professional knowledge in lighting technology, who, by integrating economical, environmental aspects, are prepared to design, manufacture, and operate in a way, which is material- and energy-saving, and economic. The students will be acquainted with the operation and application of all of the important kinds of light sources. They will learn the practical aspects of colour technical measurements, the design of internal and external lighting systems, all with the application of up-to-date computer methods and softwares. In addition they will acquire the power engineering knowledge necessary to operate lighting equipments and systems. They will also get acquainted with environment protection investigations, with the means of environmental management and with the possibilities of application of renewable energies.

- ***Sensors and Quality Module***

In this module the students will be acquainted with up-to-date sensor technology, including microelectronic integrated sensors, measuring and signal processing circuits. A thorough presentation of the structure and operation of sensors, as well as of the signal processing circuits and of sensor applications is given. Students will also be acquainted with the design of microcircuits, and with the use and application of up-to-date computer softwares on the design process, including computer aided design of CMOS digital circuits. The students, beside courses on electronics, circuit design and equipment construction will be given courses on the finished design of electronic equipments including design for quality. In addition the students will also be acquainted with the problems concerning

interrelationships between electronic equipments and environment, also with the methods of printed circuit board design, design of components, sub-systems and complex systems, and with the engineering methods and means of quality design and quality development.

In the Nanotechnics speciality direction of Mechatronic Engineering speciality students will be acquainted with the physical and chemical basis and objects of nanoscience and nanotechnology, with the role and place of micro- and nanotechnologies among the top-level technologies. They will learn the special properties of micro- and nanometer structures, their mechanical, physical, electrical and optical, etc. characteristics, the investigation methods and measurement techniques of micro- and nanometer technologies. Course will be given on the operation and application of conventional and microelectronic sensors applicable to electrical measurements of non-electrical and electrical quantities. The student will be acquainted with the methods of fault analysis of sensors, with the determination of the causes and sources of faults, and with the effect of micro- and nanotechnologies on the reliability of products. The students will also be acquainted with the structure, characteristics and operation of microprocessors, microcomputers and microcontrollers, and with the application of microprocessor in robot techniques.

***Other Forms of Education***

In the framework of postgraduate education the Institute trains special engieneers in lighting technology, for which there is a great demand in the industry. This demand is fully served by the Institute in the Hungarian job market.

A popular form of education is the self-financed practical (cooperative training) education which is chosen by about 80 per cent of the graduating students. Most of the firms gladly accept or students for training and many of them obtain their first job after graduation at the place of their parctical training.

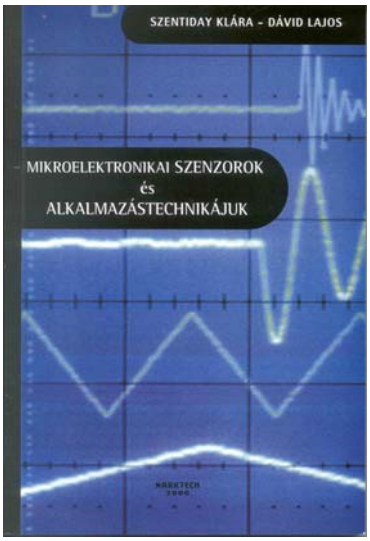
The Microelectronics and Technology Institute participates also in the distance learning programme, giving core and speciality courses in the Electrical Engineering and Technical Manager specialities.

## 3 Research and Scientific Activity

**Important Professional Accomplishments and Results**

The professional activity of the Institute is demonstrated by a large number of successfully completed external projects for the industry and more than hundred publications since 1970. External projects made on contract basis for Military Technology Institute, Telecommunication Research Institute, Medicor Company, Microelectronics Enterprise, Compass Lighting Technics Company, and also

numerous other companies should be mentioned. The most significant projects were the followings: 'Realization of stand-by unit of data transmission system carried on TV signal' (Dr. Péter Turmezei), 'Design of the network expansion facilities for Gödöllő exchange' (Dr. Péter Turmezei and József Bugyjás), and 'Investigation of life-time of discharge (Glimm-) lamps' (Dr. Marianna Lendvay).




At present the staff members of the Institute work on a project on the optimization of production process at the Continental-TEMIC multi-national company. In the Lighting technology laboratory of the Institute a project on the investigation of light intensity distribution and of colour properties of pulsed LED-based light sources.

**Scientific Activity of the Academic Staff of the Institute**

Beside the teaching activity most of the academic staff members of the Institute perform professional and scientific activity. Some recent examples and results are listed below.

Dr. Lajos Dávid and Dr. Klára Szentiday published a new book entitled Microelectronic Sensors and their Application.

Dr. Ákos Nemcsics was awarded the György Ferenczi Memorial Price for his works in semiconductor research. He also authored a textbook entitled Mechanisms of Operation of Solar Cells.

Several staff members of the Institute participated in the organization of the First International Workshop on Semiconductor Nanocrystals, September 10-12, 2005, Budapest, jointly organized by the Research Institute for Technical Physics and Materials Science, Hungarian Academy of Sciences, and the Kandó Kálmán Faculty of Electrical Engineering, Budapest Tech. Dr. Zsolt József Horváth was the Chairman and Dr. Bálint Pődör and Dr. Péter Turmezei were members of the Organizing Committee. Dr. Bálint Pődör was also the Secretary of the International Scientific Committee, and Dr. Zsolt József Horváth was also a member. The two-volume Proceedings of the Conference were co-edited by Dr. Bálint Pődör and Dr. Zsolt József Horváth.

Four staff members of the Institute obtained already their PhD degree. Further nine members of staff work toward their PhD degree. Below is a list of their respective research subjects.

*József Bugyjás*

Application of efficient mathematical and finite-element programmes to the development and modernization of military equipments. Realization and application of computer-based design systems integrating the elements of electronic, optical and mechanical design.

*Sándor Csiszár*

Static combinatorial optimization methods for the solution of logistics problem, i.e. the vehicle routing problem with time windows. Analytical or optimal solutions can not be given in the case of large problem size. Handling changes and complexity striving for efficiency is one of the most challenging problems in logistics and manufacturing, and is an important field of scientific research. With increasing size of the structures models with distributes intelligence came in the forefront of research supplanting hierarchical ones. Optimality cannot be expected from them, however they are less sensitive for changes and disturbances. Their main advantage is the capability of simple technical realization and further development. At a certain system size and complexity even the distributed intelligence is not fast enough so distributed agents are used for the critical problem segments.

*Judit Kovács*

Study of the possibilities of the human factor in the field of risk evaluation and risk management. Investigation of the possibilities of mathematical modelling in the risk evaluation and general risk evaluation from the point of view of the human factor. Investigation of the process of risk management which is aimed at the choice of the measures against the risk factors and their evaluation of their effects. Development of appropriate risk-communications possibilities based on the obtained results.

*Béla Deák-Kupás*

Development of external (outdoor) protection systems, including the modernization of the design methods of armours, bars, safety glasses, and as well as the development of new, more effective analysis methods.

*Marianna Lendvay*

Reliability analysis of military electronic systems. The objective of the research work is examination and application of reliability analysis methods for concrete military electronic systems. Research object is partly the investigation and comparing of reliability analysis methods for reliability tests of electronic systems, partly evaluation of advantages and disadvantages in respect of application for military electronic systems and working out of reliability analysis of concrete military systems.

*Rita Lovassy*

Generalization of digital circuits using intelligent computational methods and technical applications. Generalization of the basic digital circuits, especially the sequential circuits using fuzzy logical operations. Investigation the properties of these generalized circuits. Development of circuits based on these elemental circuits for the realization of learning algorithms, as well as circuits for memory functions.

*György Meszlényi*

Laser beam technologies of stents for coronary arteries. Investigation of the effect of the laser beam cutting on the microstructure of various austenitic steels. Determination of the relationships between certain characteristics of the material and manufacturing technology (cutting, etching, heat treatment) and of the structural properties of stents for coronary arteries (radial strength, trackability, flexibility). Development a modelling system to describe the connection between the laser beam manufacturing technology and the mechanical properties of the stents for coronary arteries.

*Károly Molnár*

Investigation of discomfort glare. The glare effect of natural lighting is studied using an artificial window with variable dimensions and light flux. Development of a subjective evaluation method for the glaring in analogy with the Hopkinson-type evaluation. Assessment of the disturbing effect of glaring in function of the size, position, and light flux of the light source, as well as in function of the background light flux.

*Ildikó Szenes*

Modelling of the origins of noise due to physical and chemical processes. Development an alternative method for measurement of charge transfer coefficient which is based on a noise and on immittance measurement. The determination of the charge transfer coefficient of redoxi reaction is usually carried out by taking the current-voltage characteristics in a wide potential range. Development and construction of an appropriate measuring instrument and its calibration and testing on electrochemical systems.

**Memberships in International and Hungarian Scientific and Technical Societies and Committees**

*Memberships in International Professional Organizations*

György Gröller, Materials Research Society.

Dr. Zsolt József Horváth, Europeran Physical Society.

Dr. Ákos Nemcsics, Materials Research Society, Deutsche Physikalische Gesellschaft, European Physical Society.

Dr. Bálint Pődör, European Physical Society, Institute of Electrical and Electronic Engienners (IEEE).

*Memberships in Hungarian Professional Organizations*

Dr. Bálint Pődör, Committee for Electronic Devices and Technologies, Hungarian Academy of Sciences, Complex Committee for Materials Science, Hungarian Academy of Sciences, Scientific Society for Telecommunication.

Dr. Marianna Lendvay, Scientific Society for Telecommunication, Educational, Reliability, Terminological, and 'Six-sigma' Committees of the EOQ Hungarian National Committee.

Dr. Zsolt József Horváth, Committee for Electronic Devices and Technologies, Hungarian Academy of Sciences, Roland Eötvös Physical Society.

Dr. János Borsányi, Ligthing Techniques Society (member of the presidium), Hungarian Electrotechnical Society.

Dr. Ákos Nemcsics, Vacuum Technology and Thin Films Group of the Roland Eötvös Physical Society (board member).

Dr. György Baróti, János Bólyai Mathematical Society (Chairman of the Dániel Arany Mathematical Competition Committee).

György Gröller, Ligthing Techniques Society, Hungarian Electrotechnical Society; Scientific Society for Silicate Industry.

Károly Molnár, Ligthing Techniques Society.

The Institute considers it important to initiate and introduce the students into the professional community and societies. E.g. each year the graduating students specializing in lighting technology give a short presentation on their final year project before the audience of professionals in the Lighting Techniques Society, Hungarian Electrotechnical Society. Such events even assist them in finding jobs after graduation.

An other example is the fact that a recent final year project, *Handling of Wastes of Electronic Equipments* by Zoltán Szeder very soon was also published in a book form by a commercial publisher, and is also available in the library of the Faculty.

**Externally Founded Projects and Grants**

In 1996 a PHARE grant was obtained to participate in the work of a quality assurance sub-project. As a result two university level textbooks were published by the Technical Publishing House. The authors of one of them, including Dr. Marianna Lendvay were awarded by a book prize of the Hungarian Quality Society in 1999.

In order to ensure the practical conditions of education a quality assurance laboratory equipped with up-to-date hardware equipments and softwares was established with the help of a FEFA grant.

A new lighting technology laboratory was established having a dark corridor and measurement equipment procured thanks to two TEMPUS grants. The laboratory infrastructure allows performing industrial measurements, mainly in the field of the light distribution of light sources.

The Institute established and maintains contacts with several Polytechnics and Universities abroad, to assist the students in further developing their professional knowledge. In the framework of the ERASMUS project each year several students can travel to Germany to spend a semester in Hannover, Furtwangen and Mannheim. The best ones can register for the appropriate Master`s programmes to obtain their postgraduate degrees. Students of each module taught in the Institute can apply for grants.

**Laboratories of the Institute**

*Technology and Materials Science Laboratories*

In a revolving order students can acquire practical training starting with the basics of cutting, continuing with familiarizing with CNC technology, the PCB production, electrical installation technology and mechanical measuring technology.

*Laboratory for Technical Drawing and Documentation*

Apart from the basic mechanical and electronic drawing with the help of AutoCAD the students learn the computer aided drawing as well.

*Electronics Technology Laboratory*

The PCB production, applying thin and thick layer technology, the production of hybrid circuits is simulated.

*Electronics Laboratory*

Provides practical training. Its outcome is expertise on core subjects and special electronic subjects. The laboratory activity involves circuit simulation, circuit constructions and their measuring and their computer based simulations.

*CAD/CAM Laboratory*

Within each speciality directions students learn how to use and apply the appropriate design softwares for the solution of the special design problems.

*Electronics Circuit Laboratory*

Measurements related to analog and telecommunication circuits are carried out, as well as measurements related to computer-aided CMOS circuit modellig and design.

*Sensors and Microcircuits Laboratory*

One of our professional modules deals with the sensors (light-, heat-, gas-, etc. sensors). Measurements are carried out related to sensor parameters and application models. A needle manipulator measuring facility can also be found here, for the measurement of semiconductor wafers with transistors and integrated circuits.

*Lighting Technology Laboratory*

Measurements on lighting technology are carried out in connection with the requirements of lighting technology module.

**Selected Publications of the Staff Members of the Institute in Year 2005**

**Balázs Zoltán**: A szupravezetők műszaki alkalmazásai, II. Matematika, fizika, számítástechnika főiskolai oktatók XXIX. konferenciája, 2005

**Bugyjás József,** Dr. Sipos Jenő: A végeselemmódszer kialakulása és katonai műszaki alkalmazásai, Bolyai Szemle 2005/2, 77-92, 2005

**Csiszár Sándor**: Initial Route Construction for the Vehicle Routing Problem with Time Windows, 22nd International Conference 'Science in Practice' - Schweinfurt (2005)

**Gröller György, Nemcsis Ákos:** Polimer alapú színes kijelzők és fényforrások XXX. Kolorisztikai Szimpozium, 2005

**Zs. J. Horváth**, E. Ayyildiz, V. Rakovics, H. Cetin, **B. Pődör** : Schottky Contacts to InP, Phys. Stat. Sol. (c), 2, 1423-1427, 2005

**Zs. J. Horváth**, M. Serényi, M. Ádám, I. Szabó, V. Rakovics, **P. Turmezei**, Z. Zolnai, N. Q. Khan: Electrical Behaviour of Sputtered Al/SiGe/Si Structures, Acta Phys. Slovaca, 55, 241-245, 2005

**Zs. J. Horváth**, K. Jarrendhal, M. Serényi, M. Ádám, **B. Pődör**, J. Balázs, Zs. Czigány: Electrical and Optical Behaviour of Sputtered Amorphous and Polycrystalline Si-Ge Multilayers and SiGe Layersdeposited on Monocrystalline Si substrates, Proc. Solar Renewable Energy News -Research and Application International Conference, SREN 2005, April 2-8, 2005, Florence, pp. 27-29

G. Pető, G. Molnár, L. Dózsa, Z. E. **Horváth, Zs**. J. Horváth, E. Zsoldos, C. A. Dimitriadis, L. Papadimitriou: Thickness Dependent Formation and Properties of GdSi2/Si(100) Interfaces, Appl. Phys. A, 975-981, 2005

P. Basa, P. Szöllősi, B. Máté, Cs. Dücső, M. Ádám, T. Lohner, P. Petrik, B. Pécz, L. Tóth, L. Dobos, L. Dózsa, **Zs. J. Horváth**: Electrical and Optical Properties of Si-rich Silicon Nitride Layers: Effect of Annealing, Proc. Hungarian-Korean Joint Seminar 'Engineering Aspects of Nanomaterials and Technologies', January 24-27, 2005, Budapest, Hungary, (Ed. E. Czoboly), pp. 113-117

**Kovács Judit:** A lineáris egyenletrendszerek Gauss-féle eliminációval történő megoldásának szerepe a villamosmérnök szakos hallgatók matematika oktatásában, Bolyai Szemle 2005/1

**Dr. Lendvay Marianna, Kupás-Deák Béla**: Készüléképítés, BMF Kiadó, 2005

**Dr. Lendvay Marianna,** Dr. Lehotai L., Dr. Novothny F., **Szenes I.:** Biztonságtechnikai, környezetvédelmi és minőségbiztosítási alapismeretek (Átdolgozott kiadás), BMF KKVFK, 2005

**Dr. Lendvay Marianna,** Dr. Bencsik: Quality Assurance for Electronic Systems Using Fault Tree Analysis, 9th IEEE International Conference on Intelligent Engineering Systems (INES 2005), Cruising on Mediterranean Sea, September 16-19 2005 [CD: /INES 2005 /lendvay-bencsik.pdf] ISBN 0-7803-9474-7, IEEE Catalog Number: 05EX1202C

Dr. A. L. Bencsik, I. Nagy, **Dr. M. Lendvay**: Characteristics of the Mechatronics Curriculum to the BSc Level Mechatronics Course at the Budapest Tech, 6th International Workshop on Research and Education in Mechatronics (REM 2005), Annecy, France, June 30-July 1, 2005 [CD: /REM 2005 ESIA FRANCE/Education/bencsik-nagy-lendvay.pdf] ISBN 2-9516453-6-8

**Dr. Lendvay Marianna**, Dr. Bencsik L. Attila: Examination Method for Quality Assurance of Electronic, Electromechanical Components, In proceedings of 2nd Romanian-Hungarian Joint Symposium on Applied Computational Intelligence (SACI 2005), Timisoara, Romania, May 12-14, 2005, pp. 459-466, ISBN 963 7154 39 6

**Dr. Lendvay Marianna**: A hibafa elemzés alkalmazása elektronikus rendszerek megbízhatóságára, OGÉT 2005

**Nemcsis Ákos,** B. A. Joyce, P. C. Kelires, A. G. Naumovets, D. D. Vvedensky: Growth Information Carried by Reflection High-Energy Electron Diffraction in Quantum Dots: Fundamentals, Applications, and FRontiers Eds., NATO Sci. Ser. 2nd Mat., Phys. and Chem., Vol. 190, Springer Dodrecht, pp. 221-237

**Nemcsics Ákos**, Kiss Ernő: Napelemek építészeti felhasználása, Bába Kiadó, Szeged (2005) ISBN 963 7337 180, pp. 65-69 +105-106

M. Serényi, J. Betko, **Á. Nemcsics**, N. Q. Khanh, D. K. Basa, M. Morvic: Study on the RF Sputtered Hydrogenated Amporphous Silicon-Germanium Thin Films, Microelectronics Reliability, 2005

**Ákos Nemcsics**: Earth as a Large Heat Capacity Structure in Energy Efficient Building, Energy Efficiency, 4th International Conference, Visegrád, 2005

T. Lohner, M. Serényi, Z. Zolnai, P. Petrik, **Á. Nemcsics**, N. Q. Khanh: Spectroellipsometric Characterization of Sputtered Amorphous Silicon Germanium Thin Films, E-MRS Sping Meeting, Strassbourg, May 2005

**Á. Nemcsics**: The RHEED Behaviour at LT-GaAs Growth, 13th Euro MBE Workshop, Grindelwald, March 2005

**B. Pődör,** Gy. Kovács, G. Remenyi: Experiments on the Temperature Scaling in the Integer Quantum Hall Regime in Two-Dimensional Electron Gas in InGaAs/InP, Proceedings of the First International Workshop on Semiconductor Nanocrystals, SEMINANO2005, September 10-12, 2005, Budapest, Vol. 2, pp. 337-340

**B. Pődör,** I. G. Savelev, Gy. Kovács, G. Remenyi: Negative Magnetoresistance due to Electron-Electron Interaction in Two-Dimensional Electron Gas in InGaAs/InP, Proceedings of the First International Workshop on Semiconductor Nanocrystals, SEMINANO2005, September 10-12, 2005, Budapest, Vol. 2, pp. 341-344

**B. Pődör**: Hole Scattering in GaSb: SCATTERING on Space Charge Regiions Versus Dipole Scattering, Acta Physica Pol. A 108, 837-844, 2005

**B. Pődör, Zs. J. Horváth**, P. Basa (eds.): Electron Interaction in Two-Dimensional Electron Gas in InGaAs/InP Proceedings of the First International Workshop on Semiconductor Nanocrystals, SEMINANO2005, September 10-12, 2005, Budapest, Vols. 1 and 2