

PROCEEDINGS OF SPIE
SPIE – The International Society for Optical Engineering

Photonics Applications I

In Astronomy, Communications, Industry And High Energy Physics Experiments

Ryszard S. Romaniuk
Krzysztof T. Poźniak
Editors

23-26 May 2002
WILGA, Poland,

Organized by

PERG & ELHEP Laboratories, Institute of Electronic Systems
Warsaw University of Technology (Poland)
Student Branch, IEEE Poland Section

Sponsored by

IEEE Poland Section
SPIE Poland Chapter
Institute of Electronic Systems, Warsaw University of Technology (Poland)
Committee of Electronics and Telecommunications, Polish Academy of Sciences
Polish Committee of Optoelectronics, Association of Polish Electrical Engineers
Inter-association Committee of Electronics, Telecommunication and Information Technologies

In Cooperation with

CERN, Geneva (Switzerland)
DESY, Hamburg (Germany)

SPIE Proceedings Series
Volume 5125

Xth SYMPOSIUM ON PHOTONICS APPLICATIONS

Photonics for Astronomy, Communications, Industry and High Energy Physics Experiments

WILGA, Poland, 23-26 May 2002

SPIE Proceedings, vol. 5125, 2003

(SPIE Poland Chapter)

Editors: Ryszard S. Romaniuk and Krzysztof T. Poźniak, Institute of Electronic Systems,
Warsaw University of Technology

Introductory part of volume

Contents

Symposium Sponsors and Organizing Institutions

Symposium Committees

Session Chairmen

Foreword by Editors:

Ryszard Romaniuk, Krzysztof Poźniak, Photonics and Electronics for High Energy Physics (HEP) Experiments

Symposium Opening Lecture:

Ryszard Kossowski, The Beautiful, The True, The Good,

WILGA Symposium on Photonics Applications 2003-2004

Regular Session part of volume

Session I: Optical Fibers, Links and Networks – Part I

Fundamentals of Optical Networking

Dr Ryszard Kossowski, Chair, Institute of Telecommunications, Warsaw University of Technology and Cardinal Stefan Wyszyński University, Warsaw

Artur Gierej, Co-Chair, PERG.IES WUT Group

Adam Grodecki, Co-Chair, PERG.IES.WUT Group

Andrzej Zieliński, National Institute of Telecommunications	1	Present state of telecommunication market in Poland, Invited Paper
Ryszard S. Romaniuk, IES, WUT	2	More light in Polish optical fibres, Invited Paper
Ryszard S. Romaniuk, IES, WUT	3	Intelligence in optical networks
Tomasz Opoka, Feliks Szczot, Opole University of Technology	4	Evolution of optical links towards full optical transparency

Session II: Optical Fibers, Links and Networks - Part II

Technologies, Measurements and Components

Dr Ryszard S. Romaniuk, Chair, Institute of Electronic Systems, Warsaw University of Technology

Artur Gierej, Co-Chair, PERG.IES WUT Group

Adam Grodecki, Co-Chair, PERG.IES.WUT Group

Ryszard S. Romaniuk, Krzysztof Poźniak, Rafał Sałański, IES, WUT	5	HOST - Hybrid optoelectronic telemetric system for Local Community
Ryszard S. Romaniuk, IES, WUT	6	Measurements of nonlinear optical fibers
Cezary Kaczmarek, IES, WUT	7	Soliton propagation in highly birefringent optical fibres
Andrzej Gajda, Ireneusz Rożuk, Szczecin University of Technology	8	Influence of climatic test of ferrules parameters on fiber optics connector quality

Urszula Joanna Błaszczak, Białystok University of Technology	9	The data transmission in CATV networks
Session III: Electronic and Photonic Systems for High Energy Physics (HEP) Experiments Part I – Sub-system Design Dr Krzysztof T. Poźniak, Chair, Institute of Electronic Systems, Warsaw University of Technology Tomasz Jeżyński, Co-Chair, PERG.IES WUT Group and DESY Institute, Hamburg, Germany Zbigniew Łuszczak, Co-Chair, PERG.IES WUT Group and DESY Institute Hamburg, Germany		
Krzysztof T. Poźniak, IES, WUT	10	Electronics and photonics for high energy physics experiments, Invited Paper
Kukka Banzuzi, Donatella Ungaro, Helsinki Institute of Physics, Finland and CERN, Geneva	11	Optical Links in the CMS experiment
Wojciech M. Zabołotny, Krzysztof Poźniak, Ryszard Romaniuk, Marcin Bartoszek, Michał Pietrusiński, Ignacy Kudła, Krzysztof Kierzkowski, Grzegorz Wrochna, Jan Królikowski	12	Distributed control system for TRIDAQ boards
Wojciech Zabołotny, Seweryn Jodłowski, Michał Pietrusiński, Krzysztof Poźniak, Maciej Kudła	13	Multi-channel boundary scan controller
K. T. Poźniak, R. S. Romaniuk, P. Z. Rutkowski, I. M. Kudła, M. Pietrusiński,	14	JTAG test system for RPC muon trigger at CMS experiment
Kukka Banzuzi, Donatella Ungaro, Helsinki Institute of Physics, Finland and CERN, Geneva	15	RPC link board detector control system
Session IV: Electronic and Photonic Systems for High Energy Physics (HEP) Experiments Part II – Numerical Calculations and Technical Solutions Dr Krzysztof T. Poźniak, Chair, Institute of Electronic Systems, Warsaw University of Technology Tomasz Jeżyński, Co-Chair, PERG.IES WUT Group and DESY Institute, Hamburg, Germany Zbigniew Łuszczak, Co-Chair, PERG.IES WUT Group and DESY Institute Hamburg, Germany		
Michał Turała, Institute of Nuclear Physics, Kraków	16	Computer needs and infrastructure for future experiments of particle physics, Invited Paper
Krzysztof T. Poźniak, Mariusz Ptak, Ryszard S. Romaniuk, K. Kierzkowski, I. M. Kudła, M. Pietrusiński, G. Wrochna, K. Banzuzi, D. Ungaro	17	Gigabit optical link test system for RPC muon trigger at CMS experiment
Karol Buńkowski, A. Kalinowski, Maciej Kudła, Krzysztof Poźniak, Grzegorz Wrochna	18	Pattern comparator trigger algorithm – implementation in FPGA
Tomasz Nakielski, Krzysztof T. Poźniak, Ryszard S. Romaniuk, Ignacy M. Kudła	19	Diagnostic and calibration system for the CMS RPC Muon Trigger
Tomasz Jeżyński, Zbigniew Łuszczak, K. T. Poźniak, R. S. Romaniuk, M. Pietrusiński	20	Control and monitoring of data and trigger system (TRIDAQ) for backing calorimeter (BAC) of ZEUS experiment
Zbigniew Łuszczak, Artur Gierej, Marcin Kuthan, Grzegorz Bigos, Grzegorz Grzelak, Krzysztof Poźniak, Ryszard Romaniuk	21	Data quality management system (DQMS) for BAC detector at ZEUS experiment of HERA accelerator
Tomasz Czarski, Krzysztof Poźniak, Ryszard Romaniuk, Stefan Simrock	22	Cavity control system, essential modeling for TESLA linear accelerator
Tomasz Czarski, Krzysztof Poźniak, Ryszard	23	Cavity control system, model simulations for

Romaniuk, Stefan Simrock		TESLA linear accelerator
Wojciech Zabołotny, Krzysztof Poźniak, Ryszard Romaniuk, Tomasz Czarski, Maciej I. Kudła, Krzysztof Kierzkowski, Tomasz Jeżyński, Arne Burghard, Stefan Simrock	24	Design and simulation of FPGA implementation of RF control system for Tesla Test facility
Session V: Optical Fibres, Waveguides and Communication Channel Theory Dr Ryszard S.Romaniuk, Chair, Institute of Electronic Systems, Warsaw University of Technology Tomasz Nakielski, Co-Chair, PERG.IES WUT Group and Institute of Experimental Physics, Warsaw University		
Jerzy Siuzdak, Institute of Telecommunications, WUT	25	Influence of the chromatic dispersion and chirp on the optical impulse shape, Invited Paper
Zbigniew Bielecki, Military Academy of Technology,	26	Some problems optimization of signal-to-noise ratio in infrared radiation receivers, Invited Paper
Michał Półrola,	27	Multimode fiber transmission parameters
Konrad Biwojno, Sławomir Sujecki, Phillip Sewell, Trevor M.Benson	28	Numerical analysis of thermal switching in silicon based integrated optical devices
Maciej Manelski, Gdańsk University of Technology	29	New receiver of FSK/MSK signals
Session VI: Optical Fiber Sensors and Optoelectronics - Industrial Applications Dr Feliks Szczot, Chair, Opole University of Technology, Opole, Poland		
W.Wójcik, A.Kotyra, P.Komada, T.Golec, Lublin University of Technology	30	The fiber-optic system detecting the type of burned fuel in power boilers
W.Wójcik, T.Golec, S.Przyłucki, M.Duk, A.Kotyra	31	Compression methods of flame pulsation signals
M.Podulka, J.Pietras, T.Więcek, Rzeszów University of Technology	32	Laser system of a control of a resin level in the stereolithography building station
Jacek Kuszner, Białystok University of Technology	33	Influence of coupling length between cores on operation of optical fibre temperature sensor
Session VII: Lighting Technology Professor Jan Dorosz, Editor, Optical Radiation Laboratory, Białystok University of Technology		
Jan Dorosz, Władysław Dybczyński, Białystok University of Technology	34	Transfer of luminous flux through optical fibre for illumination, Invited Paper
Jan Dorosz, Władysław Dybczyński, Maciej Rafałowski	35	New constructions of instruments using optical fibres for lighting parameters measurements
Urszula Joanna Błaszczak, Białystok University of Technology	36	The idea of the objective glare measurement
Maciej Zajkowski, Białystok University of Technology	37	Emission of flux light in “side light” fiber optic

Session VIII: Materials Science and Optoelectronic Technologies

Dr Ryszard Kisiel, Chair, Institute of Microelectronics and Optoelectronics,
Warsaw University of Technology
Dr Maria Chorąży, Co-Chair, Electronics Monthly

Jerzy Helsztyński, Wiesław Jasiewicz, Kazimierz Jędrzejewski, Lech Lewandowski, Krzysztof Poźniak	38	Fiber Bragg gratings – technology and measurement Invited Paper
M.Suchańska, S.Kałuża, R.Belka, M.Płaza, Kielce University of Technology	39	Features of crystals with incommensurate phases, Invited Paper
Marcin Gnyba, Mikko Keränen	40	Optical investigation of molecular structure of sophisticated materials for photonics
B.Cyrul, K.Darłak, J.Domin, Rzeszów University of Technology	41	The vibrational analysis of the fourth positive System in $^{12}\text{C}^{18}\text{O}$ isotope molecule
Ryszard Kisiel,	42	Lead-free technologies for electronic equipment assembly

Session IX: Photonics for Astronomy

Dr hab. Grzegorz Wrochna, Chair, Soltan Institute for Nuclear Studies, Warsaw
Rafał Sałański, Co-Chair, PERG.IES WUT Group

Grzegorz Wrochna	43	Cosmic perspectives of particle physics, Invited Paper
Grzegorz Wrochna, Lech Mankiewicz, Ryszard Romaniuk, Rafał Sałański	44	Apparatus to search for optical flashes of astronomical origin
Grzegorz Koralewski, Lech Mankiewicz, Krzysztof Poźniak, Przemysław Szamocki, Grzegorz Wrochna	45	Low cost CCD cameras for amateur astronomy
Grzegorz Wrochna	46	CCD image enhancement techniques for high noise devices
Grzegorz Koralewski	47	Tutorial on photometry with VESTA CCD camera

Session X: Biomedical Applications of Electronics and Photonics

Dr Wojciech Zabołotny, Chair, Institute of Electronic Systems, Warsaw University of Technology

Wesam Bachir, Zbigniew Dunajski	48	Improving signal to noise ratio of fetal magnetocardiograph by third order flux transformer
Przemysław Grot, Zbigniew Dunajski	49	Data analysis of magnetocardiograms stored in the international database and their importance in diagnosing congenital heart disease

Session XI: Software for Optical Networks and the Internet

Professor Małgorzata Suchańska, Chair, Kielce University of Technology, Kielce, Poland

Konrad Płachecki, Sławomir Przyłucki	50	Algorithms of buffering packets in computer network IP
Sławomir Przyłucki, Konrad Płachecki, Mariusz Duk	51	New algorithm for selforganizing neural classifier suitable for easy hardware implementation

Session XII: Digital Holography, 3D Object Measurements and Recognition

Dr Ryszard S.Romaniuk, Chair, Institute of Electronic Systems, Warsaw University of Technology

Tomasz Kozacki, Romuald Józwicki	52	Computer simulation in the digital holography for incoherent illumination
Tomasz Kozacki	53	Incoherent techniques for the improvement of the reconstruction quality in digital holography
Tomasz Kucharski, Paweł Książewski, Robert Sitnik	54	Reflective LCD based shape measurement low-cost system for popular multimedia applications
Jacek Kacperski, Tomasz Sykuła, Małgorzata Kujawińska, Leszek Sałbut	55	Automated system for interferometric out-of-plane and in-plane microelements measurement

Author Index