PROCEEDINGS OF SPIE

SPIDigitalLibrary.org/conference-proceedings-of-spie

Front Matter: Volume 8770

, "Front Matter: Volume 8770," Proc. SPIE 8770, 17th International School on Quantum Electronics: Laser Physics and Applications, 877001 (15 March 2013); doi: 10.1117/12.2026704

SPIE.

Event: Seventeenth International School on Quantum Electronics: Laser Physics and Applications, 2012, Nessebar, Bulgaria

PROCEEDINGS OF SPIE

17th International School on Quantum Electronics

Laser Physics and Applications

Tanja Dreischuh
Albena Daskalova
Editors

24–28 September 2012
Nessebar, Bulgaria

Organized by
Institute of Electronics of the Bulgarian Academy of Sciences (Bulgaria)

Sponsored by
SPIE
OSA—The Optical Society of America (United States)
EOARD—European Office of Aerospace Research and Development, Air Force Office of
Scientific Research, United States Air Force Research Laboratory (United Kingdom)
Bulgarian Science Fund (Bulgaria)
Bulgarian Academy of Sciences (Bulgaria)
EPS - The European Physical Society
NTUA - The National Technical University of Athens, School of Applied Mathematical and
Physical Sciences (Greece)
IEEE Bulgaria Section
Vivacom Fund (Bulgaria)
Siemens—Bulgaria

Published by
SPIE

Volume 8770

Proceedings of SPIE 0277-786-786X, V. 8770

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

17th International School on Quantum Electronics: Laser Physics and Applications,
edited by Tanja Dreischuh, Albena Daskalova, Proc. of SPIE Vol. 8770, 877001
© 2013 SPIE · CCC code: 0277-786X/13/\$18 · doi: 10.1117/12.2026704

Proc. of SPIE Vol. 8770 877001-1

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *17th International School on Quantum Electronics: Laser Physics and Applications*, edited by Tanja Dreischuh, Albena Daskalova, Proceedings of SPIE Vol. 8770 (SPIE, Bellingham, WA, 2013) Article CID Number.

ISSN: 0277-786X

ISBN: 9780819495686

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445

SPIE.org

Copyright © 2013, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/13/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

SPIEDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print and on CD-ROM. Papers are published as they are submitted and meet publication criteria. A unique, consistent, permanent citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID Number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID Number.

Contents

xi	<i>School Committees</i>
xiii	<i>Introduction</i>

SESSION 1 LASER-MATTER INTERACTIONS

- 8770 02 **The surface nanostructurations by means of near field enhancement with nanospheres (Invited Paper)** [8770-88]
P. Delaporte, D. Grojo, LP3 Lab., CNRS, Aix-Marseille Univ. (France); L. Boarino, INRIM, NanoFacility (Italy); L. Charmasson, LP3 Lab., CNRS, Aix-Marseille Univ. (France); N. De Leo, INRIM, NanoFacility (Italy); K. L. N. Deepak, LP3 Lab., CNRS, Aix-Marseille Univ. (France); M. Laus, G. Panzarasa, Univ. of East Piemonte (Italy); A. Péreira, LPCML, Univ. Claude Bernard Lyon 1 (France); R. Rocci, INRIM, NanoFacility (Italy); K. Sparnacci, Univ. of East Piemonte (Italy); O. Utéza, LP3 Lab., CNRS, Aix-Marseille Univ. (France)
- 8770 03 **Interaction of laser light with the A^{III}B^{VI} layered semiconductors: nonlinear optical applications (Invited Paper)** [8770-39]
K. Allakhverdiev, TÜBITAK Marmara Research Ctr. (Turkey) and Azerbaijan National Academy of Aviation (Azerbaijan)
- 8770 04 **Multiphoton absorption of 1.3 μm wavelength femtosecond laser pulses focused inside Si and SiO₂** [8770-89]
S. Leyder, D. Grojo, P. Delaporte, LP3, CNRS, Aix-Marseille Univ. (France); W. Marine, CINAM, CNRS, Aix-Marseille Univ. (France); M. Sentis, O. Utéza, LP3, CNRS, Aix-Marseille Univ. (France)
- 8770 05 **Near field intensity enhancement and localization in noble metal nanoparticle ensembles** [8770-24]
N. N. Nedyalkov, R. G. Nikov, P. A. Atanasov, Institute of Electronics (Bulgaria)
- 8770 06 **Preparation of metal nanorods substrates for SERS application** [8770-25]
A. O. Dikovska, Institute of Electronics (Bulgaria); G. V. Avdeev, Rostislaw Kaischew Institute of Physical Chemistry (Bulgaria); N. N. Nedyalkov, M. E. Koleva, P. A. Atanasov, Institute of Electronics (Bulgaria)
- 8770 07 **Ag/ZnO nanocomposites prepared by laser methods** [8770-31]
M. E. Koleva, A. O. Dikovska, N. N. Nedyalkov, P. A. Atanasov, Institute of Electronics (Bulgaria); G. B. Atanasova, Institute of General and Inorganic Chemistry (Bulgaria)
- 8770 08 **Structure and optical properties of TiO₂ thin films prepared by pulsed laser deposition** [8770-32]
A. Białous, The Szewalski Institute of Fluid-Flow Machinery (Poland); M. Gazda, Gdańsk Univ. of Technology (Poland); G. Śliwiński, The Szewalski Institute of Fluid-Flow Machinery (Poland)

- 8770 09 **Influence of the size of nanoparticles doped in series of azopolymers on the photoinduced birefringence** [8770-40]
D. Nazarova, L. Nedelchev, V. Dragostinova, N. Berberova, Institute of Optical Materials and Technologies (Bulgaria)
- 8770 0A **Laser induced changes of the optical properties of obliquely deposited thin chalcogenide films** [8770-51]
A. Lalova, R. Todorov, Institute of Optical Materials and Technologies (Bulgaria)
- 8770 0B **Time-resolved LIPS of molecular bands for reliable identification of calcite in historical materials** [8770-64]
I. Żmuda-Trzebiatowska, M. Sawczak, The Szewalski Institute of Fluid-Flow Machinery (Poland); P. Siozos, Foundation for Research and Technology-Hellas (Greece); D. Anglos, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); O. Kokkinaki, Foundation for Research and Technology-Hellas (Greece); G. Śliwiński, The Szewalski Institute of Fluid-Flow Machinery (Poland)
- 8770 0C **Two methods of pumping for eximer laser pulse-stretching** [8770-78]
E. A. Shershunova, M. V. Malashin, S. I. Moshkunov, V. A. Yamschikov, V. Y. Khomich, Institute for Electrophysics and Electric Power (Russian Federation)
- 8770 0D **Laser nanostructuring of Au/Ag and Au/Ni films for application in SERS** [8770-81]
R. G. Nikov, N. N. Nedyalkov, P. A. Atanasov, Institute of Electronics (Bulgaria); K. Grochowska, A. Iwulska, G. Sliwinski, The Szewalski Institute of Fluid-Flow Machinery (Poland)
- 8770 0E **Investigation of new stilbazolium dye thin films deposited by pulsed laser deposition** [8770-8]
S. Sotirov, M. Todorova, M. Draganov, P. Penchev, R. Bakalska, Univ. of Plovdiv (Bulgaria); V. Serbezov, Univ. of Plovdiv (Bulgaria) and Vascotec GmbH (Germany)
- 8770 0F **One-step synthesis of hybrid inorganic-organic nanocomposite coatings by novel laser adaptive ablation deposition technique** [8770-14]
V. Serbezov, VSS-VS Ltd. (Bulgaria) and Univ. of Plovdiv (Bulgaria); S. Sotirov, Univ. of Plovdiv (Bulgaria)
- 8770 0G **Hybrid nanocomposite coatings from metal (Mg alloy)-drug deposited onto medical implant by laser adaptive ablation deposition technique** [8770-15]
V. Serbezov, VSS-VS Ltd. (Bulgaria) and Univ. of Plovdiv (Bulgaria); S. Sotirov, S. Serbezov, Univ. of Plovdiv (Bulgaria)

SESSION 2 LASER SPECTROSCOPY AND METROLOGY

- 8770 0H **A magneto-optical trap for radioactive atoms (Invited Paper)** [8770-82]
E. Mariotti, K. Khanbekyan, C. Marinelli, L. Marmugi, L. Moi, CNISM, Univ. degli Studi di Siena (Italy); L. Corradi, A. Dainelli, INFN, Lab. Nazionali di Legnaro (Italy); R. Calabrese, G. Mazzocca, L. Tomassetti, INFN, Ferrara Univ. (Italy); P. Minguzzi, CNISM, Univ. degli Studi di Pisa (Italy)

- 8770 0I **Atom-wall interactions and their role in the spectroscopy of spatially constrained atomic vapors (Invited Paper)** [8770-85]
T. A. Vartanyan, V. V. Khromov, S. G. Przhibelskii, St. Petersburg National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); A. S. Pazgalev, Ioffe Physical Technical Institute (Russian Federation)
- 8770 0J **Sub-Doppler optical resolution by confining a vapour in a nanostructure (Invited Paper)** [8770-79]
P. Ballin, E. Moufarej, I. Maurin, A. Lalot, D. Bloch, Lab. de Physique des Lasers, CNRS, Univ. Paris 13 (France)
- 8770 0K **Simultaneous observation of N- and EIT- resonances in 40-micron thin cell filled with Rb and buffer gas** [8770-5]
A. Sargsyan, Institute for Physical Research (Armenia); R. Mirzoyan, Institute for Physical Research (Armenia) and Lab. Interdisciplinaire Carnot de Bourgogne, CNRS, Univ. de Bourgogne (France); S. Cartaleva, Institute of Electronics (Bulgaria); D. Sarkisyan, Institute for Physical Research (Armenia)
- 8770 0L **Bi-chromatic spectroscopy in micrometric optical cells** [8770-33]
D. Slavov, A. Krasteva, S. Cartaleva, Institute of Electronics (Bulgaria)
- 8770 0M **Sub-natural width resonances in Cs vapor confined in micrometric thickness optical cell** [8770-36]
S. Cartaleva, A. Krasteva, Institute of Electronics (Bulgaria); A. Sargsyan, D. Sarkisyan, Institute for Physical Research (Armenia); D. Slavov, Institute of Electronics (Bulgaria); T. Vartanyan, St. Petersburg National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation)
- 8770 0N **Velocity selective optical pumping resonance sign reversal** [8770-37]
A. Krasteva, D. Slavov, G. Todorov, S. Cartaleva, Institute of Electronics (Bulgaria)
- 8770 0O **Light-induced atomic desorption for miniaturization of magneto-optical sensors** [8770-75]
S. Gateva, M. Taslakov, V. Sarova, Institute of Electronics (Bulgaria); E. Mariotti, Univ. degli Studi di Siena (Italy); S. Cartaleva, Institute of Electronics (Bulgaria)
- 8770 0P **Detection of slow atoms confined in a Cesium vapor cell by spatially separated pump and probe laser beams** [8770-83]
P. Todorov, N. Petrov, Institute of Electronics (Bulgaria); I. Maurin, Lab. de Physique des Lasers, CNRS, Univ. Paris 13 (France); S. Saltiel, Lab. de Physique des Lasers, CNRS, Univ. Paris 13 (France) and Sophia Univ. St. Kliment Ohridski (Bulgaria); D. Bloch, Lab. de Physique des Lasers, CNRS, Univ. Paris 13 (France)
- 8770 0Q **Pump-probe spectra modeled with inclusion of a dipole-coupled but not dipole-probed F' state, for the case of $^{85}\text{Rb } 5S_{1/2}(F) \leftrightarrow 5P_{3/2}(F')$ transitions** [8770-84]
A. Żaba, Univ. of Zielona Góra (Poland); E. Paul-Kwiek, Pomeranian Univ. in Slupsk (Poland); K. Kowalski, J. Szonert, Institute of Physics (Poland); D. Woźniak, Univ. of Zielona Góra (Poland); S. Gateva, Institute of Electronics (Bulgaria); V. Cao Long, Univ. of Zielona Góra (Poland); M. Głodź, Institute of Physics (Poland)

- 8770 OR **Speckle suppression in pattern projection profilometry with a thin sinusoidal phase grating by polychromatic illumination** [8770-38]
N. Berberova, Institute of Optical Materials and Technologies (Bulgaria); E. Stoykova, Institute of Optical Materials and Technologies (Bulgaria) and Korea Electronics Technology Institute (Korea, Republic of); J. S. Park, H. Kang, Korea Electronics Technology Institute (Korea, Republic of); V. Sainov, Institute of Optical Materials and Technologies (Bulgaria)
- 8770 OS **Monitoring of bread cooling by statistical analysis of laser speckle patterns** [8770-49]
T. Lyubenova, E. Stoykova, E. Nacheva, B. Ivanov, Institute of Optical Materials and Technologies (Bulgaria); I. Panchev, Univ. of Food Technologies (Bulgaria); V. Sainov, Institute of Optical Materials and Technologies (Bulgaria)
- 8770 OT **Influence of quantum dots size dispersion on the fluorescence spectrum** [8770-65]
E. Alipieva, Institute of Electronics (Bulgaria); A. S. Zlatov, V. A. Polischuk, National Research Univ. of Information Technologies, Mechanics and Optics (Russian Federation); A. P. Briukhovetskiy, D. E. Grigoriev, National Research Univ. Moscow Power Engineering Institute (Russian Federation)
- 8770 OU **Misalignment analysis in a phase-stepping electronic speckle pattern interferometer for full-field displacement measurement** [8770-30]
A. Baldjiev, E. Stoykova, V. Sainov, Institute of Optical Materials and Technologies (Bulgaria)
- 8770 OV **Fiberized fluorescent dye microtubes** [8770-44]
V. Vladdev, T. Eftimov, Paisii Hilendarski Univ. of Plovdiv (Bulgaria)
- 8770 OW **Study the effect of gray component replacement level on reflectance spectra and color reproduction accuracy** [8770-10]
I. Spiridonov, M. Shopova, R. Boeva, Univ. of Chemical Technology and Metallurgy (Bulgaria)
- 8770 OX **Investigation of effect of different total area coverage values of inks on reflection spectra and color gamut** [8770-11]
I. Spiridonov, M. Shopova, R. Boeva, Univ. of Chemical Technology and Metallurgy (Bulgaria)

SESSION 3 LASER REMOTE SENSING AND ECOLOGY

- 8770 OY **Remote monitoring of aerosol layers over Sofia during Sahara dust transport episode (April, 2012)** [8770-57]
D. Stoyanov, I. Grigorov, A. Deleva, N. Kolev, Z. Peshev, G. Kolarov, Institute of Electronics (Bulgaria); E. Donev, D. Ivanov, Sofia Univ. St. Kliment Ohridski (Bulgaria)
- 8770 OZ **Lidar observations and characterization of biomass burning aerosols over Sofia: Long-range transport of forest wildfire smoke** [8770-73]
Z. Y. Peshev, T. N. Dreischuh, E. N. Toncheva, D. V. Stoyanov, Institute of Electronics (Bulgaria)
- 8770 10 **Rayleigh-fit approach applied to improve the removal of background noise from lidar data** [8770-23]
I. Grigorov, G. Kolarov, Institute of Electronics (Bulgaria)

- 8770 11 **Lidar observations of high-altitude aerosol layers (cirrus clouds)** [8770-76]
A. D. Deleva, I. V. Grigorov, Institute of Electronics (Bulgaria)
- 8770 12 **Efficiency of determining electron temperature and concentration in thermonuclear plasmas by Thomson scattering lidar** [8770-69]
T. N. Dreischuh, L. L. Gurdev, D. V. Stoyanov, Institute of Electronics (Bulgaria)
- 8770 13 **A study of the response of intermodal interference patterns at a fiber coupler output** [8770-77]
K. Zhelyazkova, T. Eftimov, P. Balzhiev, Paisii Hilendarski Univ. of Plovdiv (Bulgaria)

SESSION 4 LASERS IN BIOLOGY AND MEDICINE

- 8770 14 **Optical tweezers and cell biomechanics in macro- and nano-scale (Invited Paper)** [8770-28]
A. A. Serafetinides, M. Makropoulou, E. Spyratou, National Technical Univ. of Athens (Greece)
- 8770 15 **Specific light exposure during pre-irradiation time for selective photodynamic effect on breast cancer cells** [8770-17]
V. N. Mantareva, Institute of Organic Chemistry (Bulgaria); A. Kril, Institute of Experimental Morphology, Pathology and Anthropology with Museum (Bulgaria); I. Angelov, Institute of Organic Chemistry (Bulgaria); L. Avramov, Institute of Electronics (Bulgaria)
- 8770 16 **Surface modification of collagen-based biomaterial induced by pulse width variable femtosecond laser pulses** [8770-21]
A. Daskalova, Institute of Electronics (Bulgaria); A. Selimis, Foundation for Research and Technology-Hellas (Greece); A. Manousaki, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); D. Gray, A. Ranella, Foundation for Research and Technology-Hellas (Greece); C. Fotakis, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece)
- 8770 17 **UV laser ablation patterns in intraocular lenses** [8770-27]
D. P. Lagiou, C. Evangelatos, A. Apostolopoulos, E. Spyratou, C. Bacharis, M. Makropoulou, A. A. Serafetinides, National Technical Univ. of Athens (Greece)
- 8770 18 **Venous saturation and blood flow behavior during laser-induced photodissociation of oxyhemoglobin** [8770-29]
S. A. Mamilov, S. S. Yesman, Institute of Applied Problems of Physics and Biophysics (Ukraine); M. M. Asimov, Institute of Physics (Belarus); A. I. Gisbrecht, Institute of Electronics (Bulgaria)
- 8770 19 **Near infrared optical tweezers and nanosecond ablation on yeast and algae cells** [8770-45]
D. G. Kotsifaki, M. Makropoulou, A. Serafetinides, National Technical Univ. of Athens (Greece)

- 8770 1A **Study the penetration of IR laser radiation in human teeth: determination of the absorbed and scattered parts** [8770-54]
P. Uzunova, Medical Univ. of Sofia (Bulgaria); S. Rabadgiiska, Technical Univ. of Sofia (Bulgaria); T. Uzunov, Medical Univ. of Sofia (Bulgaria); H. Kisov, Technical Univ. of Sofia (Bulgaria); N. Kaimakanova, Paisii Hilendarski Univ. of Plovdiv (Bulgaria); M. Deneva, E. Dinkov, M. Nenchev, Technical Univ. of Sofia (Bulgaria)
- 8770 1B **The impact of myoglobin on the efficiency of the therapeutic effect of low intensity laser radiation** [8770-62]
M. M. Asimov, Institute of Physics (Belarus); R. M. Asimov, Sensotronica Ltd. (Belarus); A. Gisbrecht, Institute of Electronics (Bulgaria)
- 8770 1C **Endogenous and exogenous fluorescence of gastrointestinal tumors: initial clinical observations** [8770-87]
E. Borisova, L. Plamenova, Institute of Electronics (Bulgaria); M. Keremedchiev, B. Vladimirov, Queen Jovanna Univ. Hospital (Bulgaria); L. Avramov, Institute of Electronics (Bulgaria)

SESSION 5 LASER SYSTEMS AND NONLINEAR OPTICS

- 8770 1D **Dynamical tailoring of intense femtosecond gas-plasma THz sources (Invited Paper)** [8770-90]
M. Massaouti, Foundation for Research and Technology-Hellas (Greece); S. Tzortzakis, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece)
- 8770 1E **Ultrashort laser pulse filamentation with Airy and Bessel beams (Invited Paper)** [8770-61]
A. Couairon, Ctr. de Physique Theorique, CNRS, Ecole Polytechnique (France); A. Lotti, Ctr. de Physique Theorique, CNRS, Ecole Polytechnique (Italy) and Univ. dell'Insubria (Italy); P. Panagiotopoulos, Foundation for Research and Technology-Hellas (Greece); D. Abdollahpour, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); D. Faccio, Heriot-Watt Univ. (United Kingdom); D. G. Papazoglou, S. Tzortzakis, Foundation for Research and Technology-Hellas (Greece) and Univ. of Crete (Greece); F. Courvoisier, J. M. Dudley, Institut FEMTO-ST, CNRS, Univ. de Franche-Comté (France)
- 8770 1F **Second-harmonic generation from complex chiral samples (Invited Paper)** [8770-80]
M. Vanbel, S. Vandendriessche, M. A. van der Veen, Univ. of Leuven (Belgium); D. Slavov, Institute of Electronics (Bulgaria); P. Heister, Technische Univ. München (Germany); R. Paesen, Transnational Univ. Limburg (Belgium) and Univ. Hasselt (Belgium); V. K. Valev, Katholieke Univ. Leuven (Belgium); M. Ameloot, Transnational Univ. Limburg (Belgium) and Univ. Hasselt (Belgium); T. Verbiest, Katholieke Univ. Leuven (Belgium)
- 8770 1G **The long range filament stability: balance between non-paraxial diffraction and third-order nonlinearity** [8770-48]
L. M. Kovachev, Institute of Electronics (Bulgaria); D. A. Georgieva, Technical Univ. of Sofia (Bulgaria)
- 8770 1H **Controllable bright beam self-focusing initiated by singular dark beams** [8770-18]
G. Maleshkov, L. Stojanov, I. Stefanov, A. Dreischuh, Sofia Univ. (Bulgaria)

- 8770 1I **Upconversion fluorescence emission of Er³⁺/Yb³⁺ codoped transparent glass ceramics: kinetics of the excited states** [8770-67]
P. Yankov, Technical Univ. of Sofia (Bulgaria); N. Saliyski, I. Gugov, The Univ. of Chemical Technology and Metallurgy (Bulgaria); C. Rüssel, Friedrich-Schiller-Univ. Jena (Germany)
- 8770 1J **Nonlinear regime of propagation of femtosecond optical pulses in single-mode fiber** [8770-34]
A. M. Dakova, D. I. Dakova, Paisii Hilendarski Univ. of Plovdiv (Bulgaria)
- 8770 1K **Branching probe beams by fractional vortex dipoles: guiding vs. anti-guiding** [8770-86]
G. Maleshkov, Sofia Univ. (Bulgaria); P. Hansinger, Friedrich-Schiller-Univ. Jena (Germany); N. Dimitrov, A. Dreischuh, Sofia Univ. (Bulgaria); G. G. Paulus, Friedrich-Schiller-Univ. Jena (Germany)
- 8770 1L **An experimental study on discharge parameters of high-power Ne-Cu⁺, He-Hg⁺ and He-Sr⁺ lasers excited in nanosecond pulsed longitudinal discharge** [8770-20]
K. A. Temelkov, S. I. Slaveeva, N. K. Vuchkov, Institute of Solid State Physics (Bulgaria)
- 8770 1M **Electrical conductivity of the LiNbO₃ heterostructures grown by ion sputtering method** [8770-6]
V. Ievlev, M. Sumets, A. Kostuchenko, Voronezh State Univ. (Russian Federation)
- 8770 1N **Laser characterization of the depth profile of complex refractive index of PMMA implanted with 50 keV silicon ions** [8770-13]
I. L. Stefanov, H. Y. Stoyanov, E. Petrova, S. C. Russev, G. G. Tsutsumanova, Sofia Univ. (Bulgaria); G. B. Hadjichristov, Georgi Nadjakov Institute of Solid State Physics (Bulgaria)
- 8770 1O **Experimental verification of focusability of coherent annular laser beams** [8770-19]
D. N. Astadjov, Georgi Nadjakov Institute of Solid State Physics (Bulgaria); O. Prakash, Raja Ramanna Ctr. for Advanced Technology (India)
- 8770 1P **Spatial coherence of low-cost 532nm green lasers** [8770-22]
D. N. Astadjov, Georgi Nadjakov Institute of Solid State Physics (Bulgaria); O. Prakash, Raja Ramanna Ctr. for Advanced Technology (India)
- 8770 1Q **Development of a tunable, competition less flash-lamp pumped Nd:YAG laser generated of a chosen pair of two lines** [8770-50]
H. Kisov, M. Deneva, M. Nenchev, Technical Univ. of Sofia (Bulgaria)

Author Index

School Committees

Organizing Committee Chair

Albena Daskalova, Institute of Electronics (Bulgaria)

Organizing Committee

Anna Dikovska, Vice-chair, Institute of Electronics (Bulgaria)

Irina Bliznakova, Secretary, Institute of Electronics (Bulgaria)

Tanja Dreischuh, Institute of Electronics (Bulgaria)

Elena Taskova, Institute of Electronics (Bulgaria)

Petko Todorov, Institute of Electronics (Bulgaria)

Ivan Grigorov, Institute of Electronics (Bulgaria)

Chavdar Ghelev, Institute of Electronics (Bulgaria)

Nikolay Petrov, Institute of Electronics (Bulgaria)

Aleksandra Zhelyazkova, Institute of Electronics (Bulgaria)

International Advisory Committee

Alexandros Serafetinides, Chair, National Technical University of Athens (Greece)

Stefan Andersson-Engels, Lund University Medical Laser Center (Sweden)

Peter Balling, Aarhus University (Denmark)

Marc Beurskens, JET-EFDA, Culham Science Center (United Kingdom)

Dmitry Budker, University of California, Berkeley (United States)

Arnaud Couairon, Centre de Physique Théorique Ecole Polytechnique (France)

Maria Dinescu, National Institute for Lasers, Plasma Radiation Physics (Romania)

Costas Fotakis, Institute of Electronic Structure and Lasers, Foundation for Research and Technology (Greece)

Wolfgang Husinsky, Vienna University of Technology (Austria)

Lubomir Kovachev, Institute of Electronics (Bulgaria)

Shane Mayor, California State University, Chico (United States)

Kenzo Miyazaki, Kyoto University (Japan)

Luigi Moi, Università degli Studi di Siena (Italy)

David Sarkisyan, Laser Spectroscopy Laboratory, Institute for Physical Research (Armenia)

Gerard Sliwinski, The Szwedowski Institute (Poland)

Henricus Sterenborg, Erasmus Medical Center (The Netherlands)

Stelios Tzortzakis, Institute of Electronic Structure and Lasers, Foundation for Research and Technology (Greece)

Xuan Wang, Università degli Studi di Napoli Federico II (Italy)

Ludger Wöste, Freie Universität Berlin (Germany)

International Program Committee

Carmen Afonso, Instituto de Optica, CSIC (Spain)

Salvatore Amoruso, CNR-INFN (Italy) and Università degli Studi di Napoli Federico II (Italy)

Peter Atanasov, Institute of Electronics (Bulgaria)

Lachezar Avramov, Institute of Electronics (Bulgaria)

Stefka Cartaleva, Institute of Electronics (Bulgaria)

Lyubomir Kovachev, Institute of Electronics (Bulgaria)

Feruccio Renzoni, University College London (United Kingdom)

Nikola Sabotinov, Institute of Solid State Physics (Bulgaria)

Dimitar Stoyanov, Institute of Electronics (Bulgaria)

Valery Tuchin, Saratov State University (Russia)

Session Chairs

Petar Atanasov, Institute of Electronics (Bulgaria)

Philippe Delaporte, LP3 Laboratoire, CNRS, Aix-Marseille Université (France)

Lachezar Avramov, Institute of Electronics (Bulgaria)

Alexandros Serafetinides, National Technical University of Athens (Greece)

Stefka Cartaleva, Institute of Electronics (Bulgaria)

Dimitar Stoyanov, Institute of Electronics (Bulgaria)

Lyubomir Kovachev, Institute of Electronics (Bulgaria)

Thierry Verbiest, Katholieke Universiteit Leuven (Belgium)

Introduction

The International School on Quantum Electronics: Laser Physics and Applications (ISQE) has been organized biennially since 1978 by the Institute of Electronics of the Bulgarian Academy of Sciences. The School has already turned into a well-known forum, where both senior and young scientists can present and discuss the recent developments in the field of lasers and their applications in material processing, spectroscopy, nonlinear optics, remote sensing, medicine, and ecology.

The 17th International School on Quantum Electronics (ISQE 2012) took place from 24 to 28 September 2012, in Nessebar, Bulgaria. More than 90 scientists from 16 countries participated in this edition of the School and presented around 100 contributions. A wide range of subjects reflecting the current trends in laser physics were discussed during the invited lectures and two poster sessions. ISQE 2012 was recognized as a high scientific level European conference and was financially supported by SPIE, the Optical Society of America, European Office of Aerospace Research and Development, Bulgarian Science Fund, the European Physical Society, Bulgarian Academy of Sciences, the National Technical University of Athens (Greece), IEEE Bulgaria Section, and the Vivacom-fund (Bulgaria), to which the organizing committee expresses deep gratitude. During the School, a scientific exhibition was organized where leading companies in the domain of quantum electronics (Siemens, Bulgaria; Toptica Photonics AG; Astel Ltd.; Coherent, Bulgaria; Andor Technology; and American Elements) demonstrated their recent developments and presented scientific lectures. To encourage and acknowledge excellence in research and scientific presentation skills, SPIE, EPS, and OSA sponsored the best student paper awards. In addition to the prizes, the winners were given also the opportunity to present their papers before the conference audience during a special oral session at the end of the School.

This Proceedings volume contains 61 invited and contributed papers covering the School topics of laser-matter interactions, laser spectroscopy and metrology, laser remote sensing and ecology, lasers in biology and medicine, and laser systems and nonlinear optics. All the submitted manuscripts were peer-reviewed by experts in the respective fields using the SPIE review process.

The editors of the volume would like to thank all the lecturers and participants for their contributions, as well as the reviewers for their time and effort and for their careful evaluation of the papers. We hope that the readers will find this collection

of papers interesting and useful and we would like to invite them to take part in the next 18th ISQE, which will be held in 2014.

Tanja Dreischuh
Albena Daskalova