Front Matter for Volume 7501


International Conference on Ultrafast and Nonlinear Optics 2009

Solomon Saltiel
Alexander Dreischuh
Ivan Christov
Editors

14–18 September 2009
Burgas, Bulgaria

Organized by
Faculty of Physics, Sofia University “St. Kliment Ohridski” (Bulgaria)

Sponsored by
Faculty of Physics, Sofia University “St. Kliment Ohridski” (Bulgaria)
National Science Fund (Bulgaria)
Science Fund of the Sofia University “St. Kliment Ohridski” (Bulgaria)
The Extreme Light Infrastructure (ELI) Project
Foundation for Theoretical and Computational Physics and Astrophysics (Bulgaria)
SPIE

Published by
SPIE

Volume 7501
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:


ISSN 0277-786X
ISBN 9780819478122

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 © 2009, 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/09/$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 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

vii  Conference Committee
ix  Introduction

ULTRAFAST AND NONLINEAR OPTICS

7501 02  Femtosecond optical parametric generators and amplifiers for the near infrared based on BiB3O6 [7501-15]
V. Petrov, Max-Born-Institute for Nonlinear Optics and Ultrafast Spectroscopy (Germany);
A. Gaydardzhiev, Sofia Univ. (Bulgaria); M. Ghotbi, Max-Born-Institute for Nonlinear Optics and Ultrafast Spectroscopy (Germany); I. Nikolov, I. Buchvarov, Sofia Univ. (Bulgaria);
P. Tzankov, F. Noack, Max-Born-Institute for Nonlinear Optics and Ultrafast Spectroscopy (Germany)

7501 03  Spatial and temporal dynamics of ultra-short pulses coherent beam combining [7501-22]
D. Ursescu, L. Ionel, National Institute for Lasers, Plasma and Radiation Physics (Romania)

7501 04  Limits of the temporal contrast for CPA lasers with beams of high aperture [7501-18]
M. Kalashnikov, A. Andreev, H. Schönnagel, Max-Born-Institut für Nichtlineare Optik und Kurzzeit-Spektroskopie (Germany)

7501 05  High-power diode pumped Nd:YAG master oscillator power amplifier system [7501-26]
A. Gaydardzhiev, Sofia Univ. (Bulgaria); A. Trifonov, T. Fiebig, Boston College (United States);
I. Buchvarov, Sofia Univ. (Bulgaria)

7501 06  Diode-pumped passively mode-locked laser using SHG in periodically poled crystals [7501-31]
H. Iliev, D. Chuchumishev, I. Buchvarov, Sofia Univ. (Bulgaria); V. Petrov, Max-Born-Institute for Nonlinear Optics and Ultrafast Spectroscopy (Germany)

7501 07  Generation of a train of ps-pulses from a diode pumped Nd-laser using electro-optical
negative feedback [7501-30]
A. Gaydardzhiev, D. Draganov, I. Buchvarov, Sofia Univ. (Bulgaria); A. Stalnionis, Standa Ltd. (Lithuania); A. Trifonov, T. Fiebig, Boston College (United States)

7501 08  Quantum theory of Cherenkov radiation in an anisotropic absorbing media [7501-01]
W. Li, C.-X. Yu, S.-B. Liu, Beijing Univ. of Technology (China)

7501 09  Efficient 4-fold self-compression of 1.5-mJ infrared pulses to 19.8 fs [7501-38]
O. D. Mücke, Vienna Univ. of Technology (Austria); S. Ališauskas, Vienna Univ. of Technology (Austria) and Vilnius Univ. (Lithuania); A. J. Verhoef, A. Pugžlys, Vienna Univ. of Technology (Austria); V. Smilgevičius, Vilnius Univ. (Lithuania); J. Pocius, Vilnius Univ. (Lithuania) and Light Conversion Ltd. (Lithuania); L. Giniūnas, R. Danielius, Light Conversion Ltd. (Lithuania); A. Baltuška, Vienna Univ. of Technology (Austria)
Surface harmonics generation with a 10 Hz/100 TW table-top laser system [7501-25]
M. Behmke, Heinrich-Heine-Univ. Düsseldorf (Germany); C. Rödel, M. Heyer, M. Kübel,
T. Toncian, Friedrich-Schiller-Univ. Jena (Germany); D. Hemmers, O. Willi, Heinrich-Heine-Univ.
Düsseldorf (Germany); G. G. Paulus, Friedrich-Schiller-Univ. Jena (Germany); G. Pretzler,
Heinrich-Heine-Univ. Düsseldorf (Germany)

Optical parametric amplifier of chirped pulses pumped by two and three beams [7501-12]
S. Ališauskas, R. Butkus, V. Pyragaité, V. Smilgevičius, A. Stabinis, A. Piskarskas, Vilnius Univ.
(Lithuania)

Multi-color, multi-beam interferometry of laser-generated XUV harmonic radiation [7501-11]
D. Hemmers, G. Pretzler, Heinrich-Heine-Univ. Düsseldorf (Germany)

Tilted-pulse-front pumping for phase matching and synchronization [7501-28]
J. A. Fülöp, L. Pálfalvi, G. Almási, J. Hebling, Univ. of Pécs (Hungary)

Femtosecond pulses in air: linear and nonlinear regime [7501-21]
L. M. Kovachev, K. L. Kovachev, I. Tunchev, Institute of Electronics (Bulgaria)

Theoretical and experimental development of the Z-scan method and its application for the
characterization of LiNbO3 [7501-27]
L. Pálfalvi, Univ. of Pécs (Hungary); K. Lengyel, Á. Péter, Research Institute for Solid State
Physics and Optics (Hungary); J. A. Fülöp, T. Reiter, J. Hebling, Univ. of Pécs (Hungary)

Self-focusing and filamentation of optical vortex beams: spatio-temporal analysis [7501-35]
G. Maleshkov, Sofia Univ. (Bulgaria); D. N. Neshev, Australian National Univ. (Australia);
A. Dreischuh, Sofia Univ. (Bulgaria) and Australian National Univ. (Australia)

Observation of saturable absorption of Sn metal film with intense EUV laser pulse [7501-33]
H. Yoneda, Univ. of Electro-Communications (Japan); Y. Inubushi, Osaka Univ. (Japan);
F. Sato, Univ. of Electro-Communications (Japan); S. Moirimoto, T. Kumagaya, Osaka Univ.
(Japan); M. Nagasono, A. Higashiyama, M. Yabashi, T. Ishikawa, RIKEN XFEL (Japan); H. Ohashi,
H. Kimura, RIKEN XFEL (Japan) and Japan Synchrotron Radiation Research Institute (Japan);
T. Togashi, RIKEN XFEL (Japan); R. Kodama, Osaka Univ. (Japan)

Forming of Rydberg wave packet under the action of the pulse of Ti:sapphire laser [7501-09]
V. L. Derbov, Saratov State Univ. (Russian Federation); N. I. Teper, Saratov State
Socio-Economic Univ. (Russian Federation)

Two-dimensional nonlinear photonic quasi-crystals: design, characterization, and
applications [7501-08]
Y. Sheng, K. Koynov, Max-Planck-Institute for Polymer Research (Germany); S. M. Saltiel,
Sofia Univ. (Bulgaria)

Supercontinuum generation in a large mode area photonic crystal fiber [7501-10]
R. Cherif, Engineering School of Communication of Tunis (Sup’Com) (Tunisia); I. Nikolov,
Sincrotrone Elettra-Trieste (Italy); M. Zghal, Engineering School of Communication of Tunis
(Sup’Com) (Tunisia); M. Danailov, Sincrotrone Elettra-Trieste (Italy)
Ionization-induced dynamics of ultrashort laser pulses focused in a dense gas [7501-14]
E. S. Efimenko, A. V. Kim, Institute of Applied Physics (Russian Federation);
M. Quiroga-Teixeiro, Gridcore AB (Sweden)

Nonlinear optical transformation of the polarization state of circularly polarized light with
holographic-cut cubic crystals [7501-16]
N. Minkovski, S. Kourtev, S. M. Saltiel, Sofia Univ. (Bulgaria); L. Canova, A. Jullien, O. Albert,
R. Lopez-Martens, Lab. d’Optique Appliquee, CNRS, Ecole Polytechnique, ENSTA ParisTech
(France)

Spectroscopic investigations of dispersion-shifted fiber with thin active Bi-doped ring and
high nonlinear refractive index [7501-03]
A. S. Zlenko, U. G. Akhmetshin, V. A. Bogatyryov, L. I. Bulatov, V. V. Dvoyrin, S. V. Firstov,
E. M. Dianov, Fiber Optics Research Ctr. (Russian Federation)

Femtosecond laser spectroscopy of europium complexes in solutions [7501-05]
G. B. Hadjichristov, Georgi Nadjakov Institute of Solid State Physics (Bulgaria); I. L. Stefanov,
S. S. Stanimirov, I. K. Pelkov, Sofia Univ. (Bulgaria)

Optical properties of thin polymer films [7501-13]
S. N. Kasarova, N. G. Sultanova, Univ. “Assen Zlatarov”-Burgas (Bulgaria); T. Petrova,
V. Dragostinova, Central Lab. of Optical Storage and Processing of Information (Bulgaria);
I. D. Nikolov, Sofia Univ. (Bulgaria)

Laser-induced thermo-lens in ion-implanted optically transparent polymer [7501-06]
I. L. Stefanov, V. G. Ivanov, Sofia Univ. (Bulgaria); G. B. Hadjichristov, Georgi Nadjakov
Institute of Solid State Physics (Bulgaria)

Stochastic motion in continuous nonlinear dynamical system that describes optical
switching [7501-40]
I. M. Uzunov, Technical Univ. of Sofia (Bulgaria)

Dissipative finite degrees of freedom dynamical system and description of optical systems
with saturable amplification, saturable losses, and filtering [7501-39]
I. M. Uzunov, Technical Univ. of Sofia (Bulgaria)

Frequency conversion in regular and stochastic quasi-phase matched structures [7501-02]
Z. D. Genchev, Institute of Electronics (Bulgaria)

Phase modulation in the process of third harmonic generation [7501-32]
I. Ivanov, S. Saltiel, Sofia Univ. (Bulgaria)

Time-domain calculation of surface nonlinear susceptibilities [7501-34]
M. Stamova, F. Rebentrost, Max-Planck-Institut für Quantenoptik (Germany)

Bose-Einstein condensates with F=1 and F=2: reductions and soliton interactions of
multi-component NLS models [7501-19]
V. S. Gerdjikov, N. A. Kostov, T. I. Valchev, Institute for Nuclear Research and Nuclear Energy
(Bulgaria)
Circular dichroism in magnesium sulfite hexahydrate doped with cobalt [7501-20]
Zh. Bunzarov, Sofia Univ. (Bulgaria); I. Iliev, T. Dimov, P. Petkova, Shumen Univ. (Bulgaria);
Tz. Kovachev, L. Lyutov, Y. Tzoukrovski, Sofia Univ. (Bulgaria)

Author Index
Conference Committee

Conference Chairs

Solomon Saltiel, Sofia University “St. Kliment Ohridski” (Bulgaria)
Alexander Dreischuh, Sofia University “St. Kliment Ohridski” (Bulgaria)

Local Organizing Committee

Veselina Saltiel, Sofia University “St. Kliment Ohridski” (Bulgaria)
Ivan Stefanov, Sofia University “St. Kliment Ohridski” (Bulgaria)
Martin Kadankov, Sofia University “St. Kliment Ohridski” (Bulgaria)
Alexander Gaydardzhiev, Sofia University “St. Kliment Ohridski” (Bulgaria)
Plamen Fiziev, Sofia University “St. Kliment Ohridski” (Bulgaria)

Program Committee

Algis Piskarskas, Vilnius University (Lithuania)
Aleksey Zheltikov, M.V. Lomonosov Moscow State University (Russia)
Dimitris Charalambidis, University of Crete and FORT-Hellas (Greece)
Gerard Mourou, Laboratoire d’Optique Appliquee, ENSTA (France)
Ivan Christov, Sofia University “St. Kliment Ohridski” (Bulgaria)
Nikola Sabotinov, Bulgarian Academy of Sciences (Bulgaria)
Yuri Kivshar, The Australian National University (Australia)

Session Chairs

1 Ultrafast Lasers
   Ivan Christov, Sofia University “St. Kliment Ohridski” (Bulgaria)

2 Laser Spectroscopy
   Dragomir Neshev, The Australian National University (Australia)

3 Nonlinear Phenomena and Applications I
   Gerhard Paulus, Friedrich-Schiller-Universität Jena (Germany)

4 Nonlinear Phenomena and Applications II
   Valentin Petrov, Max-Born-Institut Berlin (Germany)

5 Nonlinear Phenomena and Applications III
   Miltcho Danailov, Sincrotrone Trieste (Italy)
6 Attosecond Science
Paris Tzallas, Foundation for Research and Technology - Hellas (Greece)

7 Hot Topics
Ivan Christov, Sofia University “St. Kliment Ohridski” (Bulgaria)
Introduction

The International Conference on Ultrafast and Nonlinear Optics (UFNO 2009), organized by the Department of Quantum Electronics of the Faculty of Physics, Sofia University “St. Kliment Ohridski”, and co-sponsored by the Science Fund of Sofia University (Bulgaria), the National Science Fund (Bulgaria), SPIE, the Extreme Light Infrastructure Project (EU), and by the Foundation for Theoretical and Computational Physics and Astrophysics (Bulgaria), took place 14–18 September 2009 in the city of Burgas, Bulgaria.

The organization of UFNO 2009 was initiated by the late Professor Solomon Saltiel who continued to work tirelessly as a co-Chair of the Conference until his unexpected death on May 7, 2009. Despite the great loss for his family, colleagues, and for the whole scientific community, the UFNO 2009 Committee was determined to go forward with the organization of a successful conference, which was decided to be dedicated to the memory of Solomon Saltiel.

Solomon Saltiel was born in 1947 in Sofia, Bulgaria. In 1973 and 1976 he got his M.Sc. and Ph.D. degrees in Physics from the Moscow State University (Russia). His Doctoral Thesis defended in 1995 at Sofia University (Bulgaria) was devoted to Multiphoton Processes in Crystals and Semiconductor Glasses. Since 1996 he was full Professor in Physics at Sofia University. In 2004 Solomon Saltiel became Corresponding Member of Bulgarian Academy of Science. His scientific activities were closely related to the topics of UFNO 2009: nonlinear optics, cascade nonlinear-optical processes, optical phase conjugation, nonlinear-optical susceptibilities, high resolution laser spectroscopy, pico- and femtosecond lasers, generation and measurement of ultra short pulses, just to mention a few. He authored three student textbooks, two book chapters, several review papers in nonlinear optics, and more than 190 publications in refereed journals. Prof. Solomon Saltiel was an extremely good teacher, eager to transfer his knowledge and scientific curiosity to young scientists. He supervised 6 PhD and 28 Master students, who are working now in various research centers around the world. Prof. Saltiel was Vice-President of the Bulgarian Physical Society, member of the Optical Society of America and of the European Physical Society, Scientific Secretary of the Scientific Board of Radiophysics, Physical and Quantum Electronics of the Higher Testimonial Committee of Bulgaria.

The main goal of the International Conference on Ultrafast and Nonlinear Optics (UFNO’09) was to create a networking platform enabling exchange of recent research advances in the field of ultrafast and nonlinear optics, stimulate discussions about novel concepts and applications, to promote dissemination of scientific results, and to support discussions and network among researchers. Eighty researchers from 20 countries (Australia, Austria, Belgium, China, England,
France, Germany, Greece, Hungary, Israel, Italy, Japan, Lithuania, Romania, Russia, Sweden, Switzerland, Tunisia, USA, and Bulgaria) participated at UFNO 2009. Seventeen invited talks, 25 contributed talks and 19 posters were presented during the Conference. This proceedings volume is comprised of 32 selected full-text papers by conference participants.

The Organizing Committee would like to thank all lecturers and participants for their contribution to this Conference. We are also grateful to SPIE for providing the three Best Student Paper Awards, and for publishing these proceedings.

Alexander Dreischuh
Ivan Christov