

The 14th International Symposium on Laser Precision Microfabrication (LPM2013)

The 6th International Symposium on High Power Laser Processing (HPL2013)

The 6th International Congress on Laser Advanced Materials Processing

LAMP2013

July 23–26, 2013

Toki Messe, Niigata, Japan

<http://www.jlps.gr.jp/lamp/lamp2013/>

Advance Program

updated April 9, 2013

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LPM Special Sessions

SP L1: Laser Nanofabrication

Session Organizer : Hong Minghui (National University of Singapore)
 Co-organizer : Craig B. Arnold (Princeton University, USA)

The Laser as a versatile tool has been finding extensive applications in advanced manufacturing and will continue to play a major role in the push toward fabrication of nanoscale structures due to its unique ability to produce non-contact, light based processing in air over a large area at a fast speed. To showcase recent research progress on laser nanofabrication, this session covers the research topics related to nanostructures fabrication, including new processing design, light interactions with materials at the nanoscale, laser surface nano-patterning and nano-materials synthesis by laser ablation and laser induced chemical reactions.

SP L2: High Speed Imaging and Time Resolved Measurements in Laser Processing

Session Organizer : Scott A. Mathews (The Catholic University of America, USA)

The past decade has seen tremendous growth in the number of laser processing techniques being used in both research and industrial production. In addition to entirely new laser processes, the field has seen an expansion in the number of different materials being processed and dramatic advances in laser performance. As a result of this growth, many new processes are not fully understood. In order to fully characterize these processes, many researchers have employed high speed imaging and time resolved measurements to study laser-matter interactions in real time. In many cases, these in situ measurements have revealed important and unexpected information about the physics of the processes. This special session is designed to promote the exchange of ideas and results in the area of high speed imaging and time resolved measurements with the goal of creating a better understanding of the physical mechanisms associated with these novel and ever-expanding laser processes.

List of Sub-Topics (SP L2)

- High Speed and Ultra High Speed Video
- Shadography
- Pump-Probe Imaging
- Imaging of Ultra Fast Laser-Matter Interactions
- In Situ Spectroscopy, Laser Induced Breakdown Spectroscopy
- Time Resolved Holography
- Plasma Dynamics during Laser Processing

SP L3: Ultrashort Pulsed Laser Processing toward Industrial Application

Session Organizer : Yasuhiro Okamoto (Okayama University, Japan)

Ultrashort pulsed laser has been widely used and its nonlinear process has been attracting the interests for industrial applications. In order to realize industrial applications by ultrashort pulsed laser, not only process understanding but also related technology has been investigated and developed. This session covers research topics of ultrashort pulsed laser processing and related technologies towards industrial applications.

Plenary Talks

Paul Denney *Lincoln Electric, USA*

“Laser Additive Manufacturing (LAM) for Tomorrow’s Economy”

Katsumi Midorikawa *RIKEN, Japan*

“Progress of XUV science by high-order harmonic generation”

Dirk Petring *Fraunhofer Institute for Laser Technology ILT, Germany*

“Mission possible: the next generation of multi-kW laser materials processing”

Invited Speakers

LPM

Eric Pei-Yu Chiou *University of California at Los Angeles, USA*

“Photothermal nanoblade for cell surgery and large cargo delivery”

Feng Chen *Shandong University, China*

“Femtosecond laser micromachined dielectric crystals for photonic applications”

Maria Farsari *IESL-FORTH, Greece*

“Beyond the diffraction limit: Laser fabrication of 3D nanostructures”

Nils Hartmann *Universitat Duisburg-Essen, Germany*

“Laser processing of ultrathin organic coatings: Prospects in nanoscale patterning, functionalization and manipulation”

Masahito Katto *University of Miyazaki, Japan*

“Development of ultrashort pulsed VUV laser and its applications”

Takanobu Kisu *Kyushu University, Japan*

“Recent advancement in Laser processing of long-length high-performance RE-123 superconducting wires”

Thomas Lippert *Paul Scherrer Institut, Switzerland*

“Laser-induced forward transfer (LIFT) of functional materials”

Michel Meunier *Ecole Polytechnique de Montreal, Canada*

“Plasmonic enhanced pulsed laser nanoprocessing and cell nanosurgery”

Michael J. Withford *Macquarie University, Australia*

“Integrated optics and photonic devices: femtosecond laser direct write technique and laser written waveguides”

Martin J. Booth *University of Oxford, UK*

“Dynamic optics for three-dimensional laser processing”

Kentaro Tatsukoshi *Asahi Glass Co., Ltd., Japan*

“Through glass via (TGV) formation technology for 3D integrated packaging”

Ludger Overmeyer *LZH, Germany*

“Polymer based planar optronic systems”

LPM SP L1: Laser Nanofabrication

Din Ping Tsai *National Taiwan University / Research Center for Applied Sciences, Taiwan*

“Laser fabrication of plasmonic nanostructures for 3D light manipulation, sensing, and energy”

Naoto Koshizaki *National Institute of Advanced Industrial Science and Technology, Japan*

“Fabrication and application of submicron spherical particles prepared by pulsed laser melting in liquid”

LPM SP L2: High Speed Imaging and Time Resolved Measurements in Laser Processing

Pere Serra *Universitat de Barcelona, Spain*

“Time-resolved imaging of liquid ejection during laser printing”

Valdas Sirutkaitis *Vilnius University, Lithuania*

“Time-resolved digital holography in the investigation of ablation and micro fabrication by femtosecond pulses”

Claudia Unger *Laser Zentrum Hannover e. V., Germany*

“Time-resolved studies of laser-assisted bioprinting”

LPM SP L3: Ultrashort Pulsed Laser Processing toward Industrial Application

Manabu Shiozawa *HITACHI Ltd., Japan*

“Simultaneous multi-bit recording and driveless reading for permanent storage in fused silica”

Arnold Gillner *Fraunhofer-Institut for Laser Technology, Germany*

“Prospects and requirements for industrialisation of ultrashort pulse laser technology”

Bastian Becker *TRUMPF Corporation, Japan*

“Latest ultra short pulsed laser technology for new materials, applications and industries”

HPL

Thomas Seefeld *Bremer Institut fuer angewandte Strahltechnik GmbH*

“New developments in filler wire assisted laser joining of aluminum”

Kogel Hollacher Markus *Precitec KG, Germany*

“Latest approaches in process monitoring for high power processing on hybrid welding”

Kenji Shinozaki *Hiroshima University, Japan*

“Solidification cracking susceptibility of modified 9Cr-1Mo steel weld metal during hot wire laser welding with narrow gap groove”

Muneharu Kutsuna *Advanced Laser Technology Research Center Co., Ltd., Japan*

“Study on mosaic joint of CFRP composite using a Q-switch YAG laser”

Steffen Bonss *Fraunhofer IWS Dresden, Germany*

“Laser heat treatment technologies for wear protection of steam turbine blades”

Kim Young Sik *Korea Institute of Science and Technology Information, Korea*

“Recent technological tendency of laser/arc hybrid welding”

LPM-HPL Joint Session: Tailored Surfaces by Laser Additive Manufacturing (LAM)

Minlin Zhong *Tsinghua University, China*

“Laser cladding in China: from fundamental research to industrial applications”

Eckhard Beyer *Fraunhofer IWS, German*

“High-rate laser deposition”

Jeff Franks *Laserline KK, Japan*

“Cladding & heat treatment with high power, fibre-coupled, diode lasers”

William O’Neil *University of Cambridge, UK*

“Supersonic laser deposition”

Marco Goebel *ILT Fraunhofer, Germany*

“Repair of compressor airfoils by laser metal deposition and process monitoring with a CPC-system”

LPM-HPL Joint Session: Advanced Laser Processing

Alexander F. H. Kaplan *Luleå University of Technology, Sweden*

“Angle- and absorptivity-modulation at inclined wavy processing fronts”

Xinbing Liu *Panasonic Boston Lab., USA*

“Parallel drilling using ps lasers for production applications”

Steve Yalisove *Michigan University, USA*

“Shock melting in ultrafast laser machining”

Program

Oral Session

Day 1: July 23

Day 1: Tuesday, July 23**Room 1****Opening***9:50* Opening Remark**Room 1****Plenary Session**

Chair: S. Katayama

10:00 Tu1-PL-1 **Plenary****Progress of XUV science by high-order harmonic generation**, Katsumi Midorikawa¹, ¹*RIKEN, Japan**10:40* Tu1-PL-2 **Plenary****Laser additive manufacturing (LAM) for tomorrow's economy**, Paul Denney¹, ¹*Lincoln Electric, USA**11:20* Tu1-PL-3 **Plenary****Mission possible: The next generation of multi-kW laser materials processing**, Dirk Petring¹, ¹*Fraunhofer Institute for Laser Technology, Germany**12:00* Lunch Time

1. LPM

Room 1

Patterning I

14:00 Tu1-OL-4

Effect of laser irradiation on ZnO nanocrystal growth by nanoparticle-assisted pulsed laser deposition, Daisuke Nakamura¹, Tetsuya Shimogaki¹, Yuki Muraoka¹, Shihomi Nakao¹, Kousuke Harada¹, Mitsuhiro Higashihata¹, Yoshiki Nakata², Hiroshi Ikenoue¹, Tatsuo Okada¹, ¹*Kyushu University, Japan*, ²*Osaka University, Japan*

14:20 Tu1-OL-5

Fast parallel micromachining using the spatial light modulator and the galvanometer scanner with infrared nanosecond fiber laser, Jarno J.J. Kaakkunen¹, Ilkka Vanttaja¹, Petri Laakso¹, ¹*VTT Technical Research Centre of Finland, Finland*

14:40 Tu1-OL-6

Fabrication of hierarchical structures by direct laser writing and multi-beam-interference, Michael Steger¹, Claudia Hartmann², Stefan Beckemper², Jens Holtkamp², Arnold Gillner², ¹*Fraunhofer Institute for Lasertechnology, Germany*, ²*Chair for Laser Technology, Technical University Aachen, Germany*

15:00 Tu1-OL-7 **Student**

Band-gap emission and second harmonic generation in ZnSe 2D periodic nanostructures fabricated by the interference of three femtosecond laser beams, Jia Pan¹, Tianqing Jia², ¹*State Key Laboratory of Precision Spectroscopy, East China Normal University, People Republic of China*, ²*State Key Laboratory of Precision Spectroscopy, East China Normal University, People Republic of China*

15:20 Tu1-OL-8

Laser surface texturing of steel for improving tribological behavior, Ravi Nathuram Bathe¹, V. Sai Krishna¹, Suwas K. Nikumb², G. Padmanabham¹, ¹*International Advanced research Centre for Powder Metallurgy and New Materials (ARCI), India*, ²*Automotive Portfolio, National Research Council Canada, Canada*

15:40 Coffee Break

3. LPM SP2-1

Room 2

High Speed Imaging and Time Resolved Measurements I

14:00 Tu2-IL-1 **Invited**

Time-resolved imaging of liquid ejection during laser printing, Adrian Patrascioiu¹, Juan Marcos Fernández-Pradas¹, José Luis Morenza¹, Pere Serra¹, ¹*Universitat de Barcelona, Dept. Física Aplicada i Optica, Spain*

14:30 Tu2-OL-2

Time-resolved fast imaging of metal nanoparticle inks during LIFT process, Ludovic Rapp¹, Emeric Biver¹, Julie Ailuno¹, Anne-Patricia Alloncle¹, Philippe Delaporte¹, ¹*Aix-Marseille University, CNRS, LP3 Laboratory, France*

14:50 Tu2-OL-3

Time-resolved soft x-ray imaging of femtosecond laser ablation process in metals, Takuro Tomita¹, Masaharu Nishikino², Noboru Hasegawa², Yasuo Minami³, Ryota Takei³, Motoyoshi Baba³, Takashi Eyama¹, Shodai Takayoshi¹, Takeshi Kaihori², Toshimasa Morita², Yusuke Hirano², Tetsuya Kawachi², Mitsuru Yamagiwa², Tohru Suemoto³, ¹*Faculty of Engineering, The University of Tokushima, Japan*, ²*Quantum Beam Science Directorate, Japan Atomic Energy Agency, Japan*, ³*Institute for Solid State Physics, The University of Tokyo, Japan*

15:10 Tu2-OL-4

Time-resolved phase contrast microscopy with random lasers applied to the monitoring of fs laser-induced microdots in a-SiO₂, Alexandre Mermillod-Blondin¹, Heiko Mentzel¹, Arkadi Rosenfeld¹, ¹*Max-Born-Institute Berlin, Germany*

15:30 Coffee Break

5. LPM

Room 3

Glass Processing I

14:00 Tu3-0L-1 **Student**

Laser-induced structural modifications in glass using a femtosecond laser and a CO₂ laser, Takuto Asada¹, Shinya Nakazumi¹, Takayuki Tamaki¹, ¹Nara National College of Technology, Japan

14:20 Tu3-0L-2

A physico-chemical approach for the modification energy threshold by femtosecond laser irradiation in glasses, Matthieu Lancry¹, Bertrand Poumellec¹, ¹University Paris Sud-CNRS, France

14:40 Tu3-0L-3

Femtosecond micromachining of ceramic fibers for electric contact soldering, Valdas Sirutkaitis¹, Domas Paipulas¹, Aleksandr Alesnikov¹, Gediminas Chazėvskis¹, Paulius Ragulis², Žilvinas Kancleris², ¹Vilnius University, Laser Research Center, Lithuania, ²Center for Physical Sciences and Technology, Lithuania

15:00 Tu3-0L-4 **Student**

Controllable 3D crystallization in SiO₂-based glasses by femtosecond laser, Xuan He^{1,2}, Chaxing Fan³, Bertrand Poumellec¹, Francois Brisset¹, Qiming Liu², Guorong Chen³, Xiujuan Zhao², Matthieu Lancry¹, ¹University Paris Sud-CNRS, France, ²Key Laboratory of Artificial Micro- and Nano-structures of Ministry of Education, Wuhan University, China, ³Key Laboratory for Ultrafine Materials, East China University of Science and Technology, China

15:20 Tu3-0L-5

Crack-free microfabrication of glass ceramic using visible LIBWE, Ji-Yen Cheng¹, Huai-Yi Chen², Mansoureh Zarei Mousavi³, Chia-Hao Chang⁴, Chou-Yuan-Yuan Chang¹, ¹Research Center for Applied Sciences, Academia Sinica Taiwan, Taiwan, ²Department of Mechanical and Mechatronic Engineering, National Taiwan Ocean University, Taiwan, ³Department of Chemistry, National Taiwan University, Taiwan, ⁴Institute of Polymer Science and Engineering, National Taiwan University, Taiwan

15:40 Coffee Break

7. HPL 1

Room 4

System I

14:00 Tu4-0H-1

New trends in solid state laser of Trumpf, Tsuyoshi Nakamura¹, Bastian Becker¹, ¹Trumpf Corporation, Japan

14:20 Tu4-0H-2

The manufacture and sensing sensitivity of all-fiber Mach-Zehnder interferometer with different taper structure and fusion-stretching process, Yi-Cheng Hsu¹, Hsun-Heng Tsai¹, Shang-Chao Hung², Hsin-Wen Wang¹, Wei-Jen Cheng¹, ¹Department of Biomechanics Engineering, National Pingtung University of Science and Technology, Taiwan, ²Department of Information Technology and Communication, Shih Chien University Kaohsiung Campus, Taiwan

14:40 Tu4-0H-3

Measurement of calcium hydroxide solution using a fiber-optic Mach-Zehnder interferometer sensor, Jian-Neng Wang¹, Wei-Te Wu², Chien-Hsing Chen³, Ching-Ying Luo¹, ¹National Yunlin University of Science and Technology, Taiwan, ²National Pingtung University of Science and Technology, Taiwan, ³National Chung Cheng University, Taiwan

15:00 Tu4-0H-4

Fundamental study on the laser welding phenomena with high frequency laser beam oscillation, Yosuke Yamazaki¹, Yohei Abe², Akikazu Kitagawa², Kazuhiro Nakata¹, ¹Joining and Welding Research Institute, Osaka University, Japan, ²Hitachi Zosen Corporation, Japan

15:20 Tu4-0H-5

Visualization and analysis of laser cutting of mild and stainless steel with fiber and CO₂ lasers, Ermolaev V Grigory¹, Zaitsev V Alexander¹, Kovalev B Oleg¹, Yudin V Petr¹, ¹Khrstianovich Institute of Theoretical and Applied Mechanics, SB RAS, Russia

15:40 Coffee Break

2. LPM

Room 1

Patterning II

16:00 Tu1-OL-9

Seed-free synthesis of diamond patterns on femtosecond laser pretreated silicon substrates, M. Wang¹, Y.S. Zhou¹, Z.Q. Xie¹, Y. Gao¹, X.N. He¹, L. Jiang², Y.F. Lu¹, ¹University of Nebraska - Lincoln, USA, ²Beijing Institute of Technology, China

16:20 Tu1-OL-10

A novel method to pattern on FCCL with laser selective microremoving, Jimin Chen¹, Hengfeng Yan¹, Furong Liu¹, ¹Institute of Laser Engineering, Beijing University of Technology, China

16:40 Tu1-OL-11

Fast and flexible generation of conductive circuits, Philipp Amend¹, Oliver Hentschel², Christian Scheitler², Marcus Baum², Michael Schmidt³, ¹Bayerisches Laserzentrum GmbH, Germany, ²Chair of Photonic Technologies, Germany, ³School in Advanced Optical Technologies, Germany

17:00 Tu1-OL-12

Microstructuring of transparent dielectric films by TWIN-LIBWE method for OWLS applications, Csaba Vass¹, Balint Kiss¹, Ferenc Ujhelyi², ¹Department of Optics and Quantum Electronics, University of Szeged, Hungary, ²Department of Atomic Physics, Physical Institute, Budapest University of Technology and Economics, Hungary

17:20 Tu1-OL-13

Cavitation bubble dynamics during laser wet etching of transparent sapphire substrates by 1064 nm laser irradiation, X.Z Xie¹, M.F Hu¹, W.F Chen², W.F Chen³, X Wei¹, W Hu¹, X.R Yuan¹, X.Y Gao¹, M.H Hong⁴, ¹School of Electromechanical Engineering, Guangdong University of Technology, China, ²College of Mechanical Engineering, Nanjing University of Aeronautics and Astronautics, China, ³Jiangsu Key Laboratory of Precision and Micro-manufacturing Technology, China, ⁴Department of Electrical and Computer Engineering, National University of Singapore, Singapore

17:40 Tu1-IL-14 **Invited**

Dynamic optics for three-dimensional laser processing, Patrick S Salter¹, Martin J Booth^{1,2}, ¹Dept Engineering Science, Univ of Oxford, UK, ²Centre for Neural Circuits and Behaviour, Univ of Oxford, UK

4. LPM SP2-2

Room 2

High Speed Imaging and Time Resolved Measurements II

16:00 Tu2-IL-5 **Invited Student**

Time-resolved studies of laser-assisted bioprinting, Claudia Unger¹, Lothar Koch¹, Ludger Overmeyer¹, Boris N. Chichkov¹, ¹Laser Zentrum Hannover e.V., Germany

16:30 Tu2-IL-6 **Invited**

Time-resolved digital holography in the investigation of ablation and micro fabrication by femtosecond pulses, Aivaras Urniezius¹, Nerijus Siaulyis¹, Andrius Melninkaitis¹, Viaceslav Kudriasov¹, Valdas Sirutkaitis¹, ¹Laser Research Centre, Vilnius University, Lithuania

17:00 Tu2-OL-7

Fabrication of micro/nano-structures by femtosecond laser direct writing, Chung-Wei Cheng¹, Xian-Zhe Tsai², Chih-Wei Chien¹, Jenq-Shyong Chen², ¹ITRI, Taiwan, ²National Chung Hsing University, Taiwan

17:20 Tu2-OL-8 **Student**

Effects of focal position and liquid properties on under-liquid laser-induced shock process studied by time-resolved photoelasticity imaging technique, Thao Thi Phuong Nguyen¹, Rie Tanabe¹, Yoshiro Ito¹, ¹Department of Mechanical Engineering, Nagaoka University of Technology, Japan

6. LPM

Room 3

Direct Write / LIFT

16:00 Tu3-OL-6

Realization of structural color by direct laser write technique in photoresist, Vyngantas Mizeikis¹, Vytautas Purlys², Ričardas Buividas³, Saulius Juodkazis³, ¹*Division of Global Research Leaders (Research Institute of Electronics), Shizuoka University, Japan*, ²*Laser Research Center, Department of Quantum Electronics, Vilnius University, Lithuania*, ³*Centre for Micro-Photonics, Swinburne University of Technology, Australia*

16:20 Tu3-OL-7

Droplet ejection in laser-induced forward transfer: Mechanism for contamination, R. Pohl¹, C.W. Visser², G.R.B.E. Römer¹, C. Sun², A.J. Huis in't Veld¹, D. Lohse², ¹*Chair of Applied Laser Technology, Faculty of Engineering Technology, University of Twente, The Netherlands*, ²*Physics of Fluids, Faculty of Science and Technology, MESA+ Institute, University of Twente, The Netherlands*

16:40 Tu3-OL-8

On-demand deposition of functional oxide microdots by double-pulse laser-induced dot transfer, Aiko Narazaki¹, Ryozi Kurosaki¹, Tadatake Sato¹, Yoshizo Kawaguchi¹, Hiroyuki Niino¹, ¹*National Institute of Advanced Industrial Science and Technology (AIST), Japan*

17:00 Tu3-IL-9 **Invited**

Beyond the diffraction limit: Laser fabrication of 3D nanostructures, Maria Farsari¹, ¹*IESL-FORTH, Heraklion, Greece*

17:30 Tu3-IL-10 **Invited**

Laser-induced forward transfer (LIFT) of functional materials, Thomas K. Lippert¹, ¹*Paul Scherrer Institut, Switzerland*

8. HPL 2

Room 4

System II

16:00 Tu4-IH-6 **Invited**

Latest approaches in process monitoring for high power processing on hybrid welding, Markus Kogel-Hollacher¹, Christian Staudenmaier¹, ¹*Precitec GmbH & Co. KG, Draisstrasse 1, 76571 Gaggenau, Germany*

16:30 Tu4-OH-7 **Student**

Isochronous high-speed video analysis of plasma plume, melt pool and keyhole behavior during laser metal welding, Felix Tenner¹, Christian Brock¹, Florian Klämpff¹, Michael Schmidt¹, ¹*Institute of Photonic Technologies, University of Erlangen-Nuremberg, Germany*

16:50 Tu4-OH-8 **Student**

Multiple-optics sensing and pattern recognition of high-power laser welding, Deyong You^{1,2}, Xiangdong Gao¹, Seiji Katayama², ¹*School of Electromechanical Engineering, Guangdong University of Technology, China*, ²*Joining and Welding Research Institute, Osaka University, Japan*

17:10 Tu4-OH-9

FPGA-programmed detection of seam defects for the application of laser brazing, Michael Ungers¹, Raphael Rolser¹, Peter Abels¹, ¹*Fraunhofer-Institute for Lasertechnology ILT, Germany*

17:30 Tu4-OH-10 **Student**

Numerical 3D-simulation of dispersed impurity convection in the molten pool at laser surface metal modification., Aleksey Gurin¹, Oleg Kovalev¹, ¹*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russian Federation*

Day 2: Wednesday, July 24

9. LPM SP1-1

Room 1

12. LPM

Room 2

Laser Synthesis of Nano-Materials

Ultrafast Laser
—Beam Shaping—

8:30 We1-IL-1 **Invited**

Laser processing of ultrathin organic coatings: Prospects in nanoscale patterning, functionalization and manipulation, Anja Schroeter^{1,2}, Mareike Mathieu^{1,2}, Benjamin Klingebiel^{1,2}, Crispin Amiri Naini^{1,2}, Steffen Franzka^{1,2}, Nils Hartmann^{1,2}, ¹Department of Chemistry, University Duisburg-Essen, Germany, ²Center for Nanointegration Duisburg-Essen, Germany

9:00 We1-OL-2 **Student**

The voxel onset time as a method for the evaluation of two photon lithography, Sascha Engelhardt^{1,2}, Jenny Tempeler¹, Martin Wehner², ¹Institute for Laser Technology, RWTH Aachen, Germany, ²Fraunhofer Institute for Laser Technology, Germany

9:20 We1-OL-3 **Student**

Nanofabrication in ITX resist by stimulated emission depletion lithography, JuKun Liu¹, TianQing Jia², ¹State Key Laboratory of Precision Spectroscopy, East China Normal University, China, ²State Key Laboratory of Precision Spectroscopy, East China Normal University, China

9:40 We1-OL-4 **Student**

Innovative resonant mid-infrared ablation of bulk polymers: PMMA, Sanjeev Naithani¹, Arnuaud Grisard², David Schaubroeck¹, Eric Lallier², Geert Van Steenberge¹, ¹Centre for Microsystems Technology, ELIS Department, Ghent University-IMEC, Ghent 9052, Belgium, BELGIUM, ²Thales Research & Technology (TRT), 1 Av. Augustin Fresnel, 91767 Palaiseau cedex, France, FRANCE

10:00 Coffee Break

8:30 We2-OL-1

Modulation of crack generation inside a LiF single crystal by interference of laser induced stress waves, Masaaki Sakakura¹, Yuki Ishiguro², Naoaki Fukuda¹, Yasuhiko Shimotsuma², Kiyotaka Miura², ¹Office of Society-Academia Collaboration for Innovation, Kyoto University, Japan, ²Graduate School of Engineering, Kyoto University, Japan

8:50 We2-OL-2

Spatial shaping of femtosecond laser beam for high speed multi-scale surface structuring of materials, Cyril Mauchclair¹, David Pietroy¹, Emmanuel Baubeau², Razvan Stoian¹, Eric Audouard¹, ¹Laboratoire Hubert Curien, UMR 5516 CNRS, Université de Lyon, Université Jean Monnet Saint Etienne, France, ²Impulsion SAS, France

9:10 We2-OL-3

Coherent control of two-photon absorption and microfabrication in ITX polymer by shaped ultrashort laser pulses, Tianqing Jia¹, ¹State Key Laboratory of Precision Spectroscopy, Department of Physics, East China Normal University, P.R. China

9:30 We2-OL-4

Visualization of spatio-temporally focused spot, Fei He¹, Jintian Lin¹, Yang Liao¹, Lingling Qiao¹, Ya Cheng¹, Koji Sugioka², Katsumi Midorikawa², ¹Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, China, ²Laser Technology Laboratory, RIKEN - Advanced Science Institute, Japan

9:50 Coffee Break

Poster I and II

10:30 Short Presentation for Poster Session I and II (Room 1)

Poster I (Odd-Numbered Posters)

12:00 Poster Session I and Exhibition (Main Hall A)

☞ Lunch Time (up to 13:50)

Day 2: Wednesday, July 24

15. LPM

Room 3

Room 4

Microwelding

8:30 We3-OL-1

Crack-free mechanism in USLP welding of glass in cooling process, Isamu Miyamoto^{1,2}, Kristian Cvecek³, Michael Schmidt^{2,3,4}, ¹*Osaka University, Japan*, ²*Erlangen Graduate School of Advanced Optical Technologies, Germany*, ³*Bayerisches Laserzentrum, Germany*, ⁴*University Erlangen-Nuremberg, Germany*

8:50 We3-OL-2

Crack-free conditions in USLP welding of glass in heating process, Isamu Miyamoto^{1,2}, Kristian Cvecek³, Michael Schmidt^{2,3,4}, ¹*Osaka University, Japan*, ²*Erlangen Graduate School of Advanced Optical Technologies, Germany*, ³*Bayerisches Laserzentrum, Germany*, ⁴*University Erlangen-Nuremberg, Germany*

9:10 We3-OL-3 *Student*

Experimental and theoretical investigation of physical mechanism of ultrafast laser glass microwelding, Sizhu Wu¹, Dong Wu¹, Koji Sugioka¹, Katsumi Midorikawa¹, ¹*RIKEN, Japan*

9:30 We3-OL-4

Spatially modulated laser beam micro welding of CuSn₆ and nickel-plated DC04 steel for battery applications, Benjamin Mehlmann¹, Alexander Olowinsky¹, Michael Thuilot¹, Arnold Gillner¹, ¹*Fraunhofer Institute for Laser Technology ILT, Germany*

9:50 *Coffee Break*

Poster I and II

10:30 Short Presentation for Poster Session I and II (Room 1)

Poster I (Odd-Numbered Posters)

12:00 Poster Session I and Exhibition (Main Hall A)

⌘ Lunch Time (up to 13:50)

10. LPM SP1-2

Room 1

Laser nanostructuring

14:00 We1-IL-5 **Invited**

Laser fabrication of plasmonic nanostructures for 3D light manipulation, sensing, and energy, C. M. Chang^{1,3,4}, M. L. Tseng^{2,3}, Y.-H. Cheng^{2,3}, K. S. Chung³, Y. L. Chen^{2,3}, D. P. Tsai^{2,3,4}, ¹Graduate Institute of Photonics and Optoelectronics, National Taiwan University, Taiwan, ²Graduate Institute of Applied Physics, National Taiwan University, Taiwan, ³Department of Physics, National Taiwan University, Taiwan, ⁴Research Center for Applied Sciences, Academia Sinica, Taiwan

14:30 We1-OL-6 **Student**

Time-resolved diffraction during the formation of femtosecond laser-induced periodic surface structures on dielectrics, Sandra Höhm¹, Arkadi Rosenfeld¹, Jörn Bonse², Jörg Krüger², ¹Max-Born-Institut, Germany, ²BAM Bundesanstalt für Materialforschung und -prüfung, Germany

14:50 We1-OL-7

Laser direct synthesis of 60 nm silicon nanowires, Xianfan Xu¹, ¹Purdue University, USA

15:10 We1-OL-8

Size scaling of mesoporous silica membranes produced by laser irradiation of nanosphere arrays, David Grojo¹, Lucas Boarino², Natalia De Leo², R. Rocci², G Panzarasa³, Philippe Delaporte¹, M Laus³, K Sparnacci³, ¹Aix-Marseille University, CNRS, LP3 UMR 7341, F-13288, Marseille, France, ²INRIM, NanoFacility, Division Electromagnetism, Strada delle Cacce 91, I-10135 Torino, Italy, ³University of Eastern Piedmont Amedeo Avogadro, Alessandria, Italy

15:30 Coffee Break

13. LPM

Room 2

Ultrafast Laser
—Surface Modification—

14:00 We2-OL-5

Morphology of superblack surfaces machined by femtosecond lasers, Rainer Kling¹, John Lopez³, Clemens Hoenninger², Eric Mottay², ¹Alphanov, 351 Cours de la Libération, Bâtiment A11, 33405 Talence, France, France, ²Amplitude Systemes, 11 avenue de Canteranne, Cité de la Photonique, 33600 Pessac, France, France, ³Université de Bordeaux, CNRS, CEA, Celia UMR 5107, 33405 Talence, France, France

14:20 We2-OL-6

Multiscale textured surfaces by femtosecond laser: Static and dynamic wettability, Stéphane Valette¹, Pavel Bizi-Bandoki¹, Stéphane Benayoun¹, ¹Ecole Centrale de Lyon Laboratoire de Tribologie et Dynamique des Systèmes, France

14:40 We2-OL-7 **Student**

Polypropylene surface wettability modification using femtosecond laser irradiation, Vanessa Belaud¹, Stéphane Valette¹, Guy Stremsdoerfer¹, Eric Audouard², ¹LTDS, France, ²LHC, France

15:00 We2-OL-8 **Student**

Femtosecond laser – polymer interaction: Different ablation regimes, Vanessa Belaud¹, Maxence Bigerelle², Stéphane Valette¹, Guy Stremsdoerfer¹, Eric Audouard³, Stéphane Benayoun¹, ¹LTDS, France, ²Université de Valenciennes, France, ³LHC, France

15:20 We2-OL-9 **Student**

Shape control of periodic microstructures by two interfered laser pluses, Osamu Konda¹, Takumi Sato¹, Fumihito Itoigawa¹, Shingo Ono¹, Michiharu Ota², ¹Nagoya Institute of Technology, Japan, ²AISIN SEIKI CO., LTD, Japan

15:40 Coffee Break

16. LPM

Room 3

Film Deposition / PLD

14:00 We3-0L-5 **Student**

Growth of Nd³⁺-ion doped fluoride thin films by pulsed laser deposition, Naoki Yoshida¹, Mirai Ieda¹, Shingo Ono¹, Kohei Yamanoi², Toshihiko Shimizu², Nobuhiko Sarukura², Yuui Yokota³, Takayuki Yanagida⁴, Akira Yoshikawa³, ¹*Nagoya Institute of Technology, Japan*, ²*Institute of Laser Engineering, Osaka University, Japan*, ³*Institute for Materials Research, Tohoku University, Japan*, ⁴*Kyushu Institute of Technology, Japan*

14:20 We3-0L-6 **Student**

Fabrication of diamond-like carbon (DLC) films with pre-designed gradient profiles using pulsed laser deposition, Yoo Jai Won¹, Hyungson Ki¹, ¹*Ulsan National Institute of Science and Technology, South Korea*

14:40 We3-IL-7 **Invited**

Recent advancement in laser processing of long-length high-performance RE-123 superconducting wires, Takanobu Kisu¹, ¹*Kyushu University, Japan*

15:10 We3-0L-8

Synthesis of various sized microspheres by laser ablation and their lasing characteristics, Daisuke Nakamura¹, Tetsuya Shimogaki¹, Kota Okazaki¹, Mitsuhiko Higashihata¹, Hiroshi Ikenoue¹, Tatsuo Okada¹, ¹*Kyushu University, Japan*

15:30 We3-0L-9

Femtosecond laser-induced nanoparticle precipitation using plasmonic enhancement effects, Hiroaki Nishiyama¹, Shintaro Okamoto¹, ¹*Hokkaido University, Japan*

15:50 *Coffee Break*

18. HPL 3

Room 4

Welding I

14:00 We4-IH-1 **Invited**

Solidification cracking susceptibility of modified 9Cr-1Mo steel weld metal during hot wire laser welding with narrow gap groove, Rittichai Phaonaim¹, Kenji Shinozaki¹, Motomichi Yamamoto¹, Kota Kadoi¹, ¹*Hiroshima University, Japan*

14:30 We4-OH-2 **Student**

The effect of edge surface preparation on welding efficiency of laser welding of low-alloyed steels, Mikhail Sokolov¹, Antti Salminen¹, ¹*Laboratory of Laser Processing, Lappeenranta University of Technology, Finland*

14:50 We4-OH-3

Control of arc behavior by YAG laser in hybrid-welding of thin metal plates, Yuichiro Murata¹, Akihiko Itoh², Jiwang Yan², Yasuo Suga², ¹*Mitsubishi Heavy Industries, LTD., Japan*, ²*Keio University, Japan*

15:10 We4-IH-4 **Invited**

Recent technological tendency of laser/arc hybrid welding, Young Sik Kim¹, Sang Cheol Kil², Jong Do Kim³, ¹*The Senior Research Fellow, Korea Institute of Science and Technology Information, Busan, Republic of Korea*, ²*Korea Institute of Science and Technology Information, Seoul, Republic of Korea*, ³*Korea Maritime University, Busan, Republic of Korea*

15:40 *Coffee Break*

11. LPM SP1-3

Room 1

Laser nanofabrication

16:00 We1-IL-9 **Invited**

Fabrication and application of submicron spherical particles prepared by pulsed laser melting in liquid, Naoto Koshizaki¹, Yoshie Ishikawa², Alexander Pyatenko¹, Yukiko Katou¹, Takeshi Tsuji³, ¹Nanosystem Research Institute, National Institute of Advanced Industrial Science and Technology, Japan, ²Department of Advanced Materials Science, Faculty of Engineering, Kagawa University, Japan, ³Institute of Materials Chemistry and Engineering, Kyushu University, Japan

16:30 We1-OL-10

Growth and stability of laser-fabricated gold nanoparticles in the presence of low salinity electrolytes, Christoph Rehbock¹, Vivian Merk¹, Stephan Barcikowski¹, ¹Technical Chemistry I, University of Duisburg-Essen and Center for Nanointegration Duisburg-Essen, Germany

16:50 We1-OL-11

Hybrid laser-synthesized nanoparticles for strong optical limiting response, Ming Hui Hong¹, Tsung Sheng Kao¹, Wei Qiang Chen², Zhe Xu², Wei Ji², ¹Department of Electrical & Computer Engineering, National University of Singapore, Singapore, ²Department of Physics, National University of Singapore, Singapore

17:10 We1-OL-12

High-yield production of nanoparticles by using wire ablation, René Streubel¹, Gabriele C. Messina², Philipp Wagener¹, Alessandro De Giacomo³, Antonio Santagata⁴, Giuseppe Compagnini², Stephan Barcikowski¹, ¹University of Duisburg-Essen and Center of Nanointegration Duisburg-Essen, Germany, ²University of Catania, Italy, ³University of Bari, Italy, ⁴CNR-IMIP, UOSPotenza, Italy

17:30 We1-OL-13

Nanoparticle formation after pulsed laser ablation in liquid studied with high time resolution small angle x-ray scattering, Philipp Wagener¹, Shyjumon Ibrahimkutty², Andreas Menzel³, Anton Plech², Stephan Barcikowski¹, ¹University of Duisburg-Essen, Germany, ²Karlsruhe Institute of Technology, Karlsruhe, ³Paul-Scherrer-Institute, Switzerland

14. LPM

Room 2

Ultrafast Laser —Glass Processing—

16:10 We2-OL-10 **Student**

Analysis of internal processing phenomena of glass by repetitive irradiation of ultrashort pulse laser, Tomoaki Murakami¹, Etsuji Ohmura¹, ¹Osaka University, Japan

16:30 We2-OL-11

Bubble formation in glasses generated by ultra short laser pulses, Kristian Cvecek¹, Isamu Miyamoto², Michael Schmidt³, ¹Bayerisches Laserzentrum GmbH, Germany, ²Osaka University, Japan, ³Chair of Photonic Technologies, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany

16:50 We2-OL-12

Femtosecond-laser nanostructuring in glass, Yasuhiko Shimotsuma¹, Taiga Asai¹, Masaaki Sakakura², Kiyotaka Miura¹, ¹Department of Material Chemistry, Kyoto University, Japan, ²Office of Society-Academia Collaboration for Innovation, Kyoto University, Japan

17:10 We2-OL-13

Controlling UV-Vis birefringence photo-induced by femtosecond laser in silica, Matthieu Lancry¹, Antoine Weickman¹, Bertrand Poumellec¹, Martynas Beresna², Peter Kazansky², ¹Institut de Chimie Moléculaire et des Matériaux d'Orsay, UMR CNRS-PSUD 8182, Université de Paris Sud, France, ²Optoelectronics Research Centre, University of Southampton, UK

17:30 We2-OL-14

Monolithic electro-fluidic glass microchips fabricated by three-dimensional femtosecond laser direct writing, Jian Xu¹, Dong Wu¹, Sizhu Wu¹, Koji Sugioka¹, Katsumi Midorikawa¹, ¹Laser Technology Laboratory, RIKEN, Japan

17:50 We2-OL-15

Large mode area waveguides by femtosecond laser photoinscription in chalcogenide glasses, Ciro D'Amico¹, Guanghua Cheng², Razvan Stoian¹, ¹Laboratoire Hubert Curien, UMR 5516 CNRS, Université Jean Monnet, 42000 St Etienne, France, ²State Key Laboratory of Transient Optics and Photonics, CAS, 710119 Xi'an, Shaanxi, China

Banquet

18:30 from the venue to Banquet on foot

19:00 Banquet (Hotel Nikko Niigata, Room "Toki-no-ma")

17. LPM

Room 3

Fundamental Aspects

16:10 We3-OL-10

Ultrashort laser pulse modification of transparent solids: What can be learnt from simulations and energy balance?, Vladimir P. Zhukov¹, Yuri P. Meshcheryakov², Nadezhda M. Bulgakova³, Nadezhda M. Bulgakova⁴, ¹*Institute of Computational Technologies SB RAS, Russia*, ²*Design and Technology Branch of Lavrentyev Institute of Hydrodynamics SB RAS, Russia*, ³*Optoelectronics Research Center, University of Southampton, United Kingdom*, ⁴*Institute of Thermophysics SB RAS, Russia*

16:30 We3-OL-11 *Student*

A study of laser beam absorption using the FDTD method, Chun Deng¹, Hyungson Ki¹, ¹*Ulsan National Institute of Science and Technology, South Korea*

16:50 We3-OL-12

Ablation of copper by a single ultrashort laser pulse, S. Y. Wang¹, Yunpeng Ren², C. P. Chang¹, C. W. Cheng¹, J. K. Chen², D. Y. Tzou², ¹*ITRI, Taiwan*, ²*University of Missouri, USA*

17:10 We3-OL-13

Laser processing of glass, sapphire and ceramics: Intensive pulses for hard and brittle materials, Christof Siebert¹, Simone Russ², Severin Luzius¹, Jan Wieduwilt¹, Birgit Faisst¹, ¹*TRUMPF Laser- und Systemtechnik GmbH, Germany*, ²*TRUMPF Laser GmbH + Co. KG, Germany*

17:30 We3-OL-14 *Student*

Processing conditions for laser-induced subsurface modifications in Si, P. C. Verburg¹, G. R.B.E. Römer¹, A. J. Huis in 't Veld^{1,2}, ¹*University of Twente, Faculty of Engineering Technology, Chair of Applied Laser Technology, The Netherlands*, ²*TNO Technical Sciences; Mechatronics, Mechanics and Materials, The Netherlands*

17:50 We3-OL-15 *Student*

Analysis of femtosecond laser drilling in porous ceramics, Young Min Lee¹, Hae Woon Choi¹, ¹*Keimyung University, Korea*

19. HPL 4

Room 4

Welding II

16:10 We4-OH-5

Full argon solutions for YAG and CO₂ laser welding: Focus on tailored blanks and overlap zinc coated plate applications, Francis Briand¹, Gaia Ballerini¹, Philippe Lefebvre¹, Katsusuke Niki², ¹*Air Liquide, France*, ²*Japan Air Gases, Japan*

16:30 We4-OH-6 *Student*

Investigation of spatter formation in laser welding of copper using high-speed online X-ray imaging, Andreas Heider¹, Meiko Boley¹, Rudolf Weber¹, Thomas Graf¹, ¹*Institut fuer Strahlwerkzeuge (IFSW), University of Stuttgart, Germany*

16:50 We4-OH-7

A study on the compressible plume dynamics inside a transient keyhole during laser welding, Pang Shengyong¹, Chen Weidong¹, Zhou Jianxin¹, Liao Dunming¹, ¹*Huazhong University of Science and Technology, China*

17:10 We4-OH-8

Laser beam welding of ultra-high strength steel sheets, Martin Dahmen¹, Xingfeng Han¹, Stefan Lindner², Zhen Sun^{1,3}, ¹*Fraunhofer-Institut Lasertechnik, Germany*, ²*Outokumpu Nirosta GmbH, Germany*, ³*Paul-Scherrer-Institut, Switzerland*

17:30 We4-OH-9

Thick-section laser welding processes, Jon Blackburn¹, Chris Allen¹, Sullivan Smith¹, Paul Hilton¹, ¹*TWI Ltd, UK*

17:50 We4-OH-10 *Student*

Analysis of microstructure and mechanical properties of hot-stamping heat treatment in TWB laser joints of Al-Si coated boron steel and 500 grade steel, Myeong Hwan Oh¹, Jong Pan Kong², Hyeon Jeong Shin¹, Min Suck Kwon³, Chung Yun Kang², ¹*National Core Research Center, Pusan National University, Korea*, ²*Pusan National University, Korea*, ³*Hyundai Hysco Co.,Ltd. Lightweight and Pipe R&D Team, Korea*

Banquet

18:30 from the venue to Banquet on foot

19:00 Banquet (Hotel Nikko Niigata, Room "Toki-no-ma")

Day 3: Thursday, July 25

20. LPM

Room 1

24. LPM

Room 2

Glass Processing II

Beam Delivery Architectures and Optical Systems for Micro Processing

8:30 Th1-OL-1

Drilling micro-through holes in glass substrates with pulsed CO₂ lasers, Nakamura Reona¹, Katsura Tomotaka¹, Fujikawa Shuichi¹, Magara Takuji¹, Inagawa Takahiro², Aono Yuko², Tokura Hitoshi²,
¹Advanced Technology R&D center, Mitsubishi Electric Corp., Japan, ²Graduate School of Science and Engineering, Tokyo Institute of Technology., Japan

8:50 Th1-OL-2 **Student**

Acceleration effect of quartz micromachining by high repetition rate shots of ns pulsed CO₂ laser, Kota Yamasaki¹, Hiroshi Ikenoue¹, Daisuke Nakamura¹, Yousuke Watanabe², Tatsuo Okada¹,
¹Kyushu Univ., Japan, ²GIGAPHOTON Inc., Japan

9:10 Th1-OL-3

Quasi-steady crack propagation analysis with few repetition steps in laser scribing of glass, Keisuke Yahata¹, Seiji Shimizu¹, Masanao Murakami¹, Etsuji Ohmura²,
¹Mitsubodhi Diamond Industrial Co., Ltd., Japan, ²Osaka University, Japan

9:30 Th1-IL-4 **Invited**

Through glass via (TGV) formation technology for 3D integrated packaging, Kentaro Tatsukoshi¹,
¹Asahi Glass Co., Ltd., Japan

10:00 Coffee Break

8:10 Th2-IL-1 **Invited**

Polymer based planar optronic systems, Ludger Overmeyer¹,
¹LZH, Germany

8:40 Th2-OL-2

Laser direct ablation for patterning printed wiring boards using ultrafast lasers and high speed beam delivery architectures, Hisashi Matsumoto¹, Mark A Unrath¹, Haibin Zhang¹, Robert F Hainsey¹,
¹Electro Scientific Industries, Inc., USA

9:00 Th2-OL-3

Ultra highspeed variable focus liquid lenses for use in laser micromachining applications, M. Duocastella¹, C. B. Arnold¹,
¹Princeton University, USA

9:20 Th2-OL-4

Optical systems and objective lenses for high brilliance laser sources - design and application results, Peter Dr. Triebel¹, Lutz Reichmann¹, Hans-Juergen Feige¹, Juergen Dr. Finster¹, Matthias Bening¹, Joerg Wunderlich¹, Helmut Bernitzki¹, Uwe Schuhmann¹,
¹JENOPTIK Optical Systems GmbH, Germany

9:40 Th2-OL-5

Arbitrary polarization distribution control of parallel femtosecond pulses with spatial light modulators, Satoshi Hasegawa¹, Yoshio Hayasaki¹,
¹Center for Optical Research and Education (CORE), Utsunomiya University, Japan

10:00 Coffee Break

Day 3: Thursday, July 25

28. LPM

Room 3

Nano Fabrication

8:30 Th3-OL-1

Speckle-free laser marking of metals with liquid-crystal-based spatial light modulator, Krystian L. Wlodarczyk¹, Jarno J. J. Kaakkunen², Pati Vahimaa³, Duncan P. Hand¹, ¹*Heriot-Watt University, United Kingdom*, ²*VTT Technical Research Centre of Finland, Finland*, ³*University of Eastern Finland, Finland*

8:50 Th3-OL-2

Fabrication of plasmonic device by interfering femtosecond laser processing, Yoshiki Nakata¹, Yoshiki Matsuba¹, Keiichi Murakawa¹, Noriaki Miyanaga¹, ¹*Osaka University, Japan*

9:10 Th3-OL-3

Multifunctional biochips fabricated by hybrid femtosecond laser 3D micromachining, Dong Wu¹, Si Zhu Wu¹, Jian Xu¹, Koji Sugioka¹, Katsumi Midorikawa¹, ¹*RIKEN, Japan*

9:30 Th3-OL-4

Porous nanogratings existence and related form birefringence in binary and ternary silica-based glasses, Matthieu Lancry¹, Bertrand Poumellec¹, Francois Brisset¹, ¹*Institut de Chimie Moléculaire et des Matériaux d'Orsay, Université de Paris Sud, France*

9:50 Coffee Break

32. HPL 5

Room 4

Welding III

8:20 Th4-IH-1 Invited

New developments in filler wire assisted laser joining of aluminum, Thomas Seefeld¹, ¹*BIAS - Bremer Institut fuer angewandte Strahltechnik GmbH, Germany*

8:50 Th4-OH-2

Laser narrow-gap welding of hot crack sensitive thick aluminum plates, Renald Schedewy¹, Eckhard Beyer^{1,2}, Berndt Brenner¹, Dirk Dittrich¹, ¹*Fraunhofer IWS, Germany*, ²*University of Technology Dresden, Germany*

9:10 Th4-OH-3

Laser welding of Eco-Mg AZ 31 and Al 5052 alloys, Min-Jung Kang¹, Young-Nam Ahn¹, Cheolhee Kim¹, ¹*Korea Institute of Industrial Technology, Korea*

9:30 Th4-OH-4

Laser-MIG welding process combination for thick wall applications of the aluminum alloy EN AW-6082-T6, Oliver Seffer¹, Rabi Lahdo¹, Friedrich Schneider¹, André Springer¹, Stefan Kaieler¹, ¹*Laser Zentrum Hannover e.V., Germany*

9:50 Th4-OH-5 Student

The effects of hot-stamping heat treatment on tensile properties and the microstructure in TWB laser welding with filler wire of Al-Si coated boron steel, Hyeon Jeong Shin¹, Myeong Hwan Oh¹, Jong Pan Kong², Min Suck Kwon³, Chung Yun Kang², ¹*National Core Research Center, Pusan National University, Korea*, ²*Pusan National University, Korea*, ³*Hyundai Hysco Co.,Ltd.Lightweight and Pipe R&D Team, Korea*

10:10 Coffee Break

21. LPM

Room 1

3D Fabrication I

10:20 Th1-IL-5 **Invited**

Integrated optics and photonic devices: Femtosecond laser direct write technique and laser written waveguides, Michael J Withford¹, Michael Withford¹, ¹Macquarie University, Australia

10:50 Th1-IL-6 **Invited**

Femtosecond laser micromachined dielectric crystals for photonic applications, Feng Chen¹, Javier Vazquez de Aldana², ¹School of Physics, State Key Laboratory of Crystal Materials, Shandong University, China, ²Laser Microprocessing Group, Universidad de Salamanca, Spain

11:20 Th1-OL-7 **Student**

Low threshold whispering-gallery-mode Nd: Glass laser fabricated by femtosecond laser 3D direct writing, Jintian Lin¹, Jiangxin Song¹, Fei He¹, Yingxin Xu², Wei Fang², Ya Cheng¹, Koji Sugioka³, Katsumi Midorikawa³, ¹State Key Laboratory of High Field Laser Physics, Shanghai Institute of Optics and Fine Mechanics, China, ²State Key Laboratory of Modern Optical Instrumentation, Department of Optical Engineering, ZJU, China, ³Laser Technology Laboratory, RIKEN - Advanced Science Institute, Japan

11:40 Th1-OL-8 **Student**

Fabrications of an embedded microstructure for side-LED by laser direct write process, Chen Yi Chian¹, Pan Cheng Tang^{1,2}, Wu Y. J.¹, ¹Department of Mechanical and Electro-Mechanical Engineering, National Sun Yat-Sen University, Kaohsi, Taiwan, ²Center for Nanoscience & Nanotechnology, National Sun Yat-Sen University; National Science Council C, Taiwan

25. LPM

Room 2

Ultrafast Laser
—Surface Structuring—

10:20 Th2-OL-6

Self-repeating surface morphology on ultrashort laser pulse-treated vanadium surface, Miklós Füle^{1,2}, Zsolt Szkiva², Koji Sugioka³, László Nánai¹, ¹Department of General and Environmental Physics, University of Szeged, Hungary, ²High intensity Laser Laboratory, Department of Experimental Physics, University of Szeged, Hungary, ³Laser Technology Laboratory, RIKEN, Japan

10:40 Th2-OL-7

Microstructuring of steel using pico- and femtosecond laser pulses, Steffen Weissmantel¹, Peter Lickschat¹, Joerg Schille¹, Alexander Kratzsch¹, Guenter Reisse¹, ¹University of Applied Sciences Mittweida, Germany

11:00 Th2-OL-8

Surface structuring with ultrafast Bessel beams, Ilya Alexeev¹, Kristian Cvecek², Chuan T Yeoh¹, Michael Schmidt¹, ¹Friedrich-Alexander-University of Erlangen-Nuremberg, Germany, ²Bayerisches Laserzentrum GmbH, Germany

11:20 Th2-OL-9

Evolution of femtosecond laser induced surface structures at low number of pulses near the ablation threshold, Juergen Reif¹, Olga Varlamova¹, ¹BTU Cottbus and Cottbus JointLab, Germany

11:40 Th2-OL-10

Effect of multiple shots of femtosecond laser pulses on periodic surface nanostructuring, Godai Miyaji¹, Kenzo Miyazaki¹, ¹Institute of Advanced Energy, Kyoto University, Japan

Poster II (Even-Numbered Posters)

12:00 Poster Session II and Exhibition (Main Hall A)

⌘ Lunch Time (up to 13:50)

29. LPM

Room 3

Advanced Micro and Nano Processing

10:20 Th3-OL-5

Laser interaction with plasmonic nanoantennas for controlled growth and fabrication of carbon nanotube bolometers, M. Mahjouri-Samani¹, Y.S. Zhou¹, W. Xiong¹, P. Hilger¹, Y.F. Lu¹, ¹*University of Nebraska - Lincoln, USA*

10:40 Th3-OL-6

3D fabrication of biodegradable scaffolds for tissue engineering using Mask Projection Excimer laser StereoLithography, Szabolcs Beke¹, Ilaria Romano¹, Alberto Diaspro¹, Fernando Brandi¹, ¹*Department of Nanophysics, Italian Institute of Technology, Italy*

11:00 Th3-OL-7

CW diode laser for water assisted free form high quality cutting of silicon wafers, Pablo Romero¹, Nerea Otero¹, Ivette Coto¹, Cristina Leira¹, Alejandro Gonzalez¹, ¹*AIMEN Technology Centre, Spain*

11:20 Th3-OL-8 **Student**

Miniaturized reaction chamber for optimized laser-assisted carbon nanotube growth, Yoeri van de Burgt¹, Wouter van Loon¹, Rajesh Mandamparambil², Yves Bellouard¹, ¹*Eindhoven University of Technology, Netherlands*, ²*Holst Centre/TNO – Netherlands Organization for Applied Scientific Research, Netherlands*

11:40 Th3-OL-9

PMMA microchannel was polished by using irradiation binding method, Xuefei Shen¹, Tao Chen², ¹+86-10-82710101, *China*, ²+86-10-82710101, *China*

33. HPL 6

Room 4

Welding IV

10:30 Th4-IH-6 **Invited**

Study on mosaic joint of CFRP composite using a Q-switch YAG laser, Muneharu Kutsuna¹, Hiroki Inoue¹, ¹*Advanced Laser Technology Research Center Co., Ltd., Japan*

11:00 Th4-OH-7 **Student**

Microstructural and mechanical properties of Cu and Al dissimilar high-speed welding, Su-Jin Lee¹, Hiroshi Nakamura¹, Yousuke Kawahito¹, Seiji Katayama¹, ¹*Joining and Welding Research Institute (JWRI), Osaka University, Japan*

11:20 Th4-OH-8

Numerical simulation of laser brazing of silicon carbide and WC-Co alloy, Kimiaki Nagatsuka¹, Yoshihisa Sechi², Ninshu Ma³, Kazuhiro Nakata¹, ¹*Joining and Welding Research Institute, Osaka University, Japan*, ²*Kagoshima Prefectural Institute of Industrial Technology, Japan*, ³*JSOL Corporation, Japan*

11:40 Th4-OH-9

Effect of contact force on formation behaviour of bubbles in SUS304 / PET dissimilar materials laser spot joining, Yukio Miyashita¹, Teppei Watanabe², Yu Kurakake², ¹*Nagaoka University of Technology, Japan*, ²*Graduate Student, Nagaoka University of Technology, Japan*

Day 3: July 25

Poster II (Even-Numbered Posters)

12:00 Poster Session II and Exhibition (Main Hall A)

⌘ Lunch Time (up to 13:50)

22. LPM

Room 1

3D Fabrication II

14:00 Th1-OL-9

Selective, laser-induced etching of fused silica at high scan-speeds, Martin Hermans^{1,2}, Jens Gottmann^{1,2}, Frank Riedel¹, ¹*RWTH-Aachen University, Chair for Lasertechnology, Steinbachstraße 15, 52074 Aachen, Germany*, ²*LightFab UG(haftungsbeschränkt), Steinbachstraße 15, 52074 Aachen, Germany*

14:20 Th1-OL-10

Spiral-shaped piezoelectric energy harvester produced by three-dimensional molding process based on microstereolithography, Shoji Maruo¹, Kenji Sugiyama¹, Kensaku Monri¹, ¹*Yokohama National University, Japan*

14:40 Th1-OL-11

Laser 3D nanostructuring of polymers: Mechanisms study and targeted applications, Mangirdas Malinauskas¹, Albertas Žukauskas¹, Sima Rekštytė¹, Gediminas Gervinskas², Gediminas Seniutinas², Valdas Sirutkaitis¹, Saulius Juodkasis², ¹*Laser Research Center, Department of Quantum Electronics, Vilnius University, Lithuania*, ²*Micro-Photonics Centre, Engineering and Industrial Sciences Faculty, Swinburne University of Technology, Australia*

15:00 Th1-OL-12 **Student**

Fabrication and applications of fiber tip microoptical components, Albertas Žukauskas¹, Vasileia Melissinaki², Mangirdas Malinauskas¹, Maria Farsari², Roaldas Gadonas¹, ¹*Department of Quantum Electronics, Vilnius University, Lithuania*, ²*Institute of Electronic Structure and Laser, Foundation of Research and Technology Hellas, Greece*

15:20 Th1-OL-13

Picosecond laser micro-drilling, engraving and surface texturing of tungsten carbide, Xincai Wang¹, Gnian Cher Lim², Hongyu Zheng³, ¹*Singapore Institute of Manufacturing Technology, A*STAR, Singapore*, ²*Singapore Institute of Manufacturing Technology, A*STAR, Singapore*, ³*Singapore Institute of Manufacturing Technology, A*STAR, Singapore*

15:40 Coffee Break

26. LPM

Room 2

Ultrafast Laser
—Nanotechnology—

14:00 Th2-OL-11

Plasmonic modification of faraday effect in metal-ion-doped glasses irradiated with femtosecond laser, Seisuke Nakashima^{1,2}, Koji Sugioka², Katsumi Midorikawa², Kohki Mukai¹, ¹*Yokohama National University, Japan*, ²*RIKEN – Advanced Science Institute, Japan*

14:20 Th2-OL-12

Fabrication of gold nanoantennas for infrared near-field enhancement by fs-laser radiation, Dirk Wortmann¹, Martin Reininghaus¹, Zhao Cao¹, Thomas Taubner², ¹*Lehrstuhl fuer Lasertechnik, RWTH Aachen University, Germany*, ²*Phys. Institut 1A, RWTH Aachen University, Germany*

14:40 Th2-OL-13

Imprinting of nanogratings with femtosecond-laser-induced surface plasmon polaritons, Kenzo Miyazaki¹, Godai Miyaji¹, ¹*Kyoto University, Japan*

15:00 Th2-OL-14

Nanoscale patterned interfaces for cell adhesion control by direct-write multiphoton lithography, Hojeong Jeon^{1,2}, Jeremy E. Barton³, Keven E. Healy^{3,4}, Costas P. Grigoropoulos², ¹*Biomedical Research Institute, Korea Institute of Science and Technology, Korea*, ²*Laser Thermal Laboratory, Department of Mechanical Engineering, University of California, Berkeley, US*, ³*Department of Bioengineering, University of California, Berkeley, US*, ⁴*Department of Materials Science and Engineering, University of California, Berkeley, US*

15:20 Th2-OL-15 **Student**

Cell spreading on titanium dioxide film with periodic nanostructures produced by femtosecond laser irradiation, Togo Shinonaga¹, Masahiro Tsukamoto², Yuichiro Ito¹, Akiko Nagai³, Kimihiro Yamashita³, Takao Hanawa³, Nobuhiro Matsushita⁴, Xie Guoqiang⁵, Nobuyuki Abe², ¹*Graduate School of Engineering, Osaka University, Japan*, ²*Joining and Welding Research Institute, Osaka University, Japan*, ³*Institute of Biomaterials and Bioengineering, Tokyo Medical and Dental University, Japan*, ⁴*Materials and Structures Laboratory, Tokyo Institute of technology, Japan*, ⁵*Institute for Materials Research, Tohoku University, Japan*

15:40 Coffee Break

30. LPM

Room 3

Bio Applications

14:00 Th3-IL-10 **Invited**

Photothermal nanoblade for cell surgery and large cargo delivery, Eric P. Y. Chiou¹,
¹*Mechanical and Aerospace Engineering Department, University of California at Los Angeles, USA*

14:30 Th3-IL-11 **Invited**

Plasmonic enhanced pulsed laser nanoprocessing and cell nanosurgery, Michel Meunier¹, Remi Lachaine¹, Bastien St-Louis-Lalonde¹, Etienne Boulais¹, Jean-Jacques Lebrun², ¹*Laser Processing and Plasmonic Laboratory, École Polytechnique de Montréal, Canada*, ²*University McGill, Canada*

15:00 Th3-OL-12 **Student**

Picosecond laser interaction with grass tissues, Jaehun Kim¹, Hyungson Ki¹, ¹*Ulsan National Institute of Science and Technology, 1*

15:20 Th3-OL-13 **Student**

Laser tool for single cell transfer, Dominik Riestler¹, Alp Özmert¹, Martin Wehner¹, ¹*Fraunhofer ILT, Steinbachstr. 15, 52074 Aachen, Germany*

15:40 *Coffee Break*

34. HPL 7

Room 4

Surface Treatment I

14:00 Th4-IH-10 **Invited**

Laser heat treatment technologies for wear protection of steam turbine blades, Steffen Bonss¹, Berndt Brenner¹, Frank Tietz¹, Eckhard Beyer², ¹*Fraunhofer IWS, Winterbergstrasse 28, 01277 Dresden, Germany*, ²*TU Dresden, Institute of Manufacturing Technology, George-Baehr-Strasse 3c, 01069 Dresden, Germany*

14:30 Th4-OH-11 **Student**

A study of laser heat treatability of steel sheets, Sangwoo So¹, Hyungson Ki¹, ¹*Ulsan National Institute of Science and Technology, South Korea*

14:50 Th4-OH-12 **Student**

Laser surface alloying of AISI 304 austenitic stainless steel with niobium, Mio Cheng Chan¹, Weng Kin Chan¹, Chi Tat Kwok¹, Kin Ho Lo¹,
¹*University of Macau, Macau, China*

15:10 Th4-OH-13

Microstructure of MC-Fe composite layer on carbon steel by laser surface alloying, Takuto Yamaguchi¹, Hideki Hagino¹, Mamoru Takemura¹, Atsushi Nakahira², ¹*Technology Research Institute of Osaka Prefecture, Japan*, ²*Osaka Prefecture University, Japan*

15:30 Th4-OH-14 **Student**

Corrosion and hydrogen embrittlement of laser-surface melted AISI 430 ferritic stainless steel, Weng Kin Chan¹, Chi Tat Kwok¹, Kin Ho Lo¹,
¹*University of Macau, Macau, China*

15:50 *Coffee Break*

23. Joint Special Session Room 1

Laser Additive Manufacturing

16:00 Th1-IJ-14 **Invited**

Laser cladding in China: From fundamental research to industrial applications, Minlin Zhong¹, ¹*Tsinghua University, China*

16:30 Th1-IJ-15 **Invited**

Repair of compressor airfoils by laser metal deposition and process monitoring with a CPC-system, Marco Goebel¹, R. Poprawe¹, A. Gasser², S. Mann², ¹*RWTH-Aachen, Germany*, ²*Fraunhofer Institute for Laser Technology, Germany*

17:00 Th1-IJ-16 **Invited**

Cladding & heat treatment with high power, fibre-coupled, diode lasers, Jeff Franks¹, ¹*Laserline KK, Japan*

17:30 Th1-IJ-17 **Invited**

High-rate laser deposition, Eckhard Beyer¹, Eckhard Beyer², Steffen Nowotny¹, ¹*Fraunhofer IWS Dresden, Germany*, ²*Technische Universität Dresden, Germany*

18:00 Th1-IJ-18 **Invited**

Supersonic laser deposition, William O'Neill¹, Andrew Cockburn¹, Martin Sparkes¹, Rocco Lupoi², Luo Fang³, ¹*University of Cambridge, UK*, ²*Trinity College, Ireland*, ³*Zhejiang University of Technology, China*

27. LPM Room 2

**Ultrafast Laser
—Ablation—**

16:00 Th2-OL-16 **Student**

Contrastive study on laser ablation of single-crystal silicon by 1030 nm femtosecond laser and 355 nm nanosecond laser, Huan Yang¹, Jun Duan¹, Xiaoyan Zeng¹, ¹*Huazhong University of Science and Technology, China*

16:20 Th2-OL-17

Modification and machining on back surface of a silicon substrate by femtosecond laser pulses at 1552 nm, Yoshiro Ito¹, Hiroki Sakashita¹, Ryusuke Suzuki¹, Mitsuru Uewada¹, Rie Tanabe¹, ¹*Department of Mechanical Engineering, Nagaoka University of Technology, Japan*

16:40 Th2-OL-18

Mechanism of selective removal of transparent conductive oxide layers: Femtosecond- vs. picosecond-laser pulse ablation, Victor Matylitsky¹, Juerg Aus der Au¹, ¹*High Q Laser GmbH, Austria*

17:00 Th2-OL-19

Highspeed laser micro processing using ultrashort laser pulses, Joerg Schille^{1,2}, Lutz Schneider¹, Mathias Mueller¹, Udo Loeschner¹, Robby Ebert¹, Nicholas Goddard², Patricia Scully², Horst Exner¹, ¹*Laser Institute at the University of Applied Sciences Mittweida, Germany*, ²*The University of Manchester, School of Chemical Engineering and Analytical Science, GB*

17:20 Th2-OL-20

Ablation of CIGS thin-films by femtosecond laser with variable pulse duration, Paulius Gecys¹, Edgaras Markauskas¹, Juozas Dudutis¹, Gediminas Raciukaitis¹, ¹*Center for Physical Sciences and Technology, Lithuania*

17:40 Th2-OL-21 **Student**

Ultrashort pulsed laser cutting of intraocular lens polymers, Johannes Heberle¹, Florian Klämpfl¹, Ilya Alexeev¹, Michael Schmidt¹, ¹*Institute of Photonic Technologies, University of Erlangen-Nürnberg, Germany*

31. LPM

Room 3

Room 4

Nanoparticle

16:00 Th3-OL-14

Fabrication of spherical particles using laser-induced melting of submicron-sized materials, Takeshi Tsuji¹, Yuuma Higashi¹, Masaharu Tsuji¹, Hideki Fujiwara², Yoshie Ishikawa³, Naoto Koshizaki⁴, ¹*Kyushu University, Japan*, ²*Hokkaido University, Japan*, ³*Kagawa University, Japan*, ⁴*National Institute of Advanced Industrial Science and Technology, Japan*

16:20 Th3-OL-15

Silver and gold clusters and nanostructures produced by pulsed laser ablation, Alexander V. Bulgakov¹, Sergey V. Starinski², Anton B. Evtushenko², Yuri G. Shukhov², Lidiya S. Kibis³, Andrei I. Boronin³, Vladimir I. Zaikovskii³, ¹*School of Chemistry, University of Edinburgh, West Mains Road, EH9 3JJ, Scotland*, ²*Kutateladze Institute of Thermophysics SB RAS, 1 Lavrentyev Ave., 630090 Novosibirsk, Russia*, ³*Borisev Institute of Catalysis SB RAS, 5 Lavrentyev Ave., 630090 Novosibirsk, Russia*

16:40 Th3-OL-16

Optical properties of YAG:Ce nanoparticles prepared by laser ablation in liquid, Hiroyuki Wada¹, Noriyuki Tsuruoka¹, Yasunori Inoue², Tokuo Yodo³, Michikazu Hara², Hajime Yamamoto⁴, Osamu Odawara¹, ¹*Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, Japan*, ²*Materials & Structures Laboratory, Tokyo Institute of Technology, Japan*, ³*Electronics, Information and Communication Engineering, Osaka Institute of Technology, Japan*, ⁴*Professor Emeritus, Tokyo University of Technology, Japan*

17:00 Th3-OL-17 Student

Determination of the effective refractive index of porous ITO layers, Marcus Baum¹, Ilya Alexeev¹, Michael Schmidt¹, ¹*Institute of Photonic Technologies, Friedrich-Alexander-University Erlangen-Nuremberg, Germany*

17:20 Th3-OL-18 Student

Aligned ZnO nanorod arrays using electrospray ionization method to fabricated the ZnO seed layer, Hung Kun Hao¹, Pan Cheng Tang^{1,2}, Z. H. Liu^{1,2,3}, Wang W. C.^{1,2}, Lee C. C.^{1,2}, ¹*Department of Mechanical and Electro-Mechanical Engineering, National Sun Yat-Sen University, Kaohsi, Taiwan*, ²*Center for Nanoscience & Nanotechnology, National Sun Yat-Sen University; National Science Council C, Taiwan*, ³*Electronics and Optoelectronics Research Laboratories, Industrial Technology Research Institute, Hsi, Taiwan*

17:40 Th3-OL-19 Student

Laser generation of small monodisperse gold nanoparticles in saline solution independent from ligands, Lisa Gamrad¹, Christoph Rehbock¹, Stephan Barcikowski¹, ¹*University of Duisburg-Essen and Center for Nanointegration Duisburg-Essen CENIDE, Germany*

Day 4: Friday, July 26

35. LPM SP3-1

Room 1

37. LPM

Room 2

Ultrashort Pulsed Laser Processing toward Industrial Application I

Surface Modification I

8:30 Fr1-IL-1 **Invited**

Simultaneous multi-bit recording and driveless reading for permanent storage in fused silica, Manabu Shiozawa¹, Takao Watanabe¹, Eriko Tatsu¹, Mariko Umeda¹, Toshiyuki Mine¹, Yasuhiko Shiomotsu², Masaaki Sakakura³, Miki Nakabayashi², Kiyotaka Miura², Koichi Watanabe¹, ¹Central Research Laboratory, Hitachi, Ltd., Japan, ²Department of Material Chemistry, Graduate School of Engineering, Japan, ³Kyoto University Office of Society-Academia Collaboration for Innovation, Japan

9:00 Fr1-IL-2 **Invited**

Prospects and requirements for industrialisation of ultrashort pulse laser technology, Arnold Gillner¹, Jens Holtkamp¹, Stephan Eifel¹, Malte Schulz-Ruhtenberg¹, ¹Fraunhofer Institute for Laser Technology, Germany

9:30 Fr1-OL-3

Novel fusion welding technology of Si/glass by USLP, Isamu Miyamoto^{1,2}, Yashuhiro Okamoto³, ¹Osaka University, Japan, ²Erlangen Graduate School of Advanced Optical Technologies, Germany, ³Okayama University, Japan

9:50 Fr1-OL-4

3D micro structures in glass by in-volume selective laser-induced etching with high speed micro scanner, Jens Gottmann^{1,2}, Martin Hermans^{1,2}, Jürgen Ortman^{1,2}, Nikolai Repiev¹, Frank Riedel¹, Ingomar Kelbassa^{1,3}, Reinhart Poprawe^{1,3}, ¹Lehrstuhl für Lasertechnik, RWTH Aachen University, Steinbachstrasse 15, 52074 Aachen, Germany, ²LightFab UG (haftungsbeschränkt), Steinbachstrasse 15, 52074 Aachen, Germany, ³Fraunhofer Institut für Lasertechnik, Steinbachstrasse 15, 52074 Aachen, Germany

10:10 Coffee Break

8:30 Fr2-OL-1

Effect of laser patterning on properties of crystalline Si photovoltaic cells and substrates, Antanas Vinčiūnas¹, Bogdan Voisiat¹, Gediminas Račiukaitis¹, Irena Šimkienė¹, Rasa Suzanovičienė¹, Alfonsas Rėza¹, Regina Mažeikienė¹, ¹Center for Physical Sciences and Technology, Lithuania

8:50 Fr2-OL-2

Passivation of silicon surface by laser rapid heating, Toshiyuki Sameshima¹, Hiroshi Abe¹, Masahiko Hasumi¹, Tomohisa Mizuno², Naoki Sano³, ¹Tokyo University of Agriculture & Technology, Japan, ²Kanagawa University, Japan, ³Aurea Works Corporation, Japan

9:10 Fr2-OL-3 **Student**

Laser texturing of surfaces in thin film silicon solar, Tobias Knüttel¹, Stefan Haas², Stefan Bergfeld³, ¹IEK-5 Photovoltaics at Forschungszentrum Jülich GmbH and ⁴JET Technologies GmbH, Germany, ²Institute of Energy and Climate Research (IEK-5) – Photovoltaics at Forschungszentrum Jülich GmbH, Germany, ³JET Technologies GmbH, Germany

9:30 Fr2-OL-4

Analysis and improvement of electric failure for pulse laser annealing ITO thin film after wet etching, Ching-Jen Lee¹, Hsuan-Kai Lin², Wei-Chen Hsu², Chun-Han Li³, ¹National Sun Yat-Sen University, Taiwan, ²National Pingtung University of Science and Technology, Taiwan, ³Industrial Technology Research Institute South, Taiwan

9:50 Coffee Break

Day 4: Friday, July 26

39. LPM

Room 3

VUV and UV Lasers

8:50 Fr3-IL-1 **Invited**

Development of ultrashort pulsed VUV laser and its applications, Masahito Katto¹, Masanori Kaku², Atushi Yokotani², Kenzo Miyazaki³, Noriaki Miyanaga⁴, Shoichi Kubodera², ¹*CRCC, University of Miyazaki, Japan*, ²*Faculty of Engineering, University of Miyazaki, Japan*, ³*Institute of Advanced Energy, Kyoto University, Japan*, ⁴*Institute of Laser Engineering, Osaka University, Japan*

9:20 Fr3-OL-2

Efficient excimer lasers with semiconductor opening switch in the pumping circuit, Alexei Nicolaevich Panchenko¹, ¹*Institute of High Current electronics, Russia*

9:40 Fr3-OL-3 **Student**

Longitudinally excited N₂ laser with high beam quality, WenLong Gong¹, Kazuyuki Uno¹, Shunsuke Shitajima¹, Tetsuya Akitsu¹, Takahisa Jitsuno², ¹*Interdisciplinary Graduate School of Medicine and Engineering, Univ. Yamanashi, Japan*, ²*Institute of Laser Engineering, Osaka University, Japan*

10:00 Coffee Break

41. HPL 8

Room 4

Surface Treatment II

8:40 Fr4-OH-1

Laser technologies in car body tool manufacturing, Jan Hannweber¹, Steffen Bonss¹, Stefan Kuehn¹, Udo Karsunke¹, Dirk Poegen¹, Berndt Brenner¹, Eckhard Beyer², ¹*Fraunhofer IWS, Winterbergstrasse 28, 01277 Dresden, Germany*, ²*TU Dresden, Institute of Manufacturing Technology, George-Baehr-Strasse 3c, 01069 Dresden, Germany*

9:00 Fr4-OH-2 **Student**

Dynamic observation of laser cladding phenomena with high speed video camera, Nobuyuki Abe¹, Daichi Tanigawa², Masahiro Tsukamoto¹, Yoshihiro Tatsumi³, Mikio Yoshihiro³, ¹*Joining and Welding Research Institute, Osaka University, Japan*, ²*Graduate school of Engineering, Osaka University, Japan*, ³*Osaka Fuji Corporation, Japan*

9:20 Fr4-OH-3

Particles transport and bead forming in direct material deposition: Theory and experiment, Dmitriy V Bedenko¹, Alexander V Zaitsev¹, Oleg B Kovalev¹, ¹*Khristianovich Institute of Theoretical and Applied Mechanics SB RAS, Russia*

9:40 Fr4-OH-4

Mechanism of formability extension in laser assisted shear forming of dual phase steels, Pablo Romero¹, Nerea Otero¹, Jose Antonio Benito^{2,3}, Pablo Rodriguez^{2,3}, ¹*AIMEN - Technology Centre, Spain*, ²*EUETIB (UPC), Spain*, ³*Fundació CTM Centre Tecnològic, Spain*

10:00 Coffee Break

36. LPM SP3-2

Room 1

Ultrashort Pulsed Laser Processing toward Industrial Application II

10:30 Fr1-IL-5 **Invited**

Latest ultra short pulsed laser technology for new materials, applications and industries, Bastian Becker¹, Christof Siebert², Oliver Heckl², Sascha Weiler³, ¹TRUMPF Corporation, Japan, ²TRUMPF Laser- und Systemtechnik GmbH, Germany, ³TRUMPF Inc., USA

11:00 Fr1-OL-6

100-W output power, 50-μJ pulse energy femtosecond fiber amplifier for industrial micro-machining, Franck Morin¹, Yoann Zaouter¹, Clemens Hoenninger¹, Eric Mottay¹, Brendan Dunne², ¹Amplitude Systemes, France, ²NEXCIS Photovoltaic Technology, France

11:20 Fr1-OL-7

Formation of internal modified line with high aspect ratio in sapphire by sub-nanosecond pulsed fiber laser, Yasuhiro Okamoto¹, Tomohiro Takekuni¹, Akira Okada¹, ¹Okayama University, 1

11:40 Fr1-OL-8

High density perforation of thin Al-foils with ultra short pulse lasers, Claudia Hartmann¹, Nelli Hambach¹, Michael Jüngst¹, Stephan Keller¹, Jens Holtkamp¹, Arnold Gillner¹, ¹Fraunhofer Institute for Lasertechnology, Steinbachstr. 15, 52074 Aachen, Germany

12:00 Lunch Time

38. LPM

Room 2

Surface Modification II

10:20 Fr2-OL-5

Formation of microstructure on liquid metal surface under pulsed action, Alexei Nikolaevich Panchenko¹, ¹Institute of High Current Electronics, Russia

10:40 Fr2-OL-6 **Student**

Effects of laser peening parameters on plastic deformation of crystal state controlled carbon steels, Miho Tsuyama¹, Kohei Mizuta¹, Yukio Miyamoto¹, Toshiya Shibayanagi², Masahiro Tsukamoto³, Hitoshi Nakano¹, ¹Interdisciplinary Graduate School of Science and Engineering, Kinki University, Japan, ²Faculty of Engineering, Toyama University, Japan, ³Joining and Welding Research Institute, Osaka University, Japan

11:00 Fr2-OL-7 **Student**

Effect of beam diameters and scan speed on laser surface alloying of Cu on Al substrate with pulsed Nd-YAG laser, Seyed Abbas Vaziri¹, Mohammad Taghi Roshanzamir², ¹Metallurgical Engineering Group, Tarbiat Modares University, Iran, ²Department of Mechanical Engineering, Science and Research Branch Islamic Azad University, Tehran, I, Iran

11:20 Fr2-OL-8 **Student**

Picosecond-laser treatment of graphene containing films used in electro-chemical sensors, Romualdas Trusovas¹, Gediminas Račiukaitis¹, Raimonda Celiešiūtė², Rasa Pauliukaite², ¹Department of Laser Technologies, Center for Physical Sciences and Technology, Lithuania, ²Department of Nanoengineering, Center for Physical Sciences and Technology, Lithuania

11:40 Fr2-OL-9 **Student**

Laser micro texturing at tool surface for reduction in cutting force, Hiroki Kiyota¹, Fumihiro Itoigawa¹, Takashi Nakamura¹, ¹Nagoya Institute of Technology, Japan

12:00 Lunch Time

40. LPM

Room 3

VUV and UV Laser Applications

10:30 Fr3-0L-4

Femtosecond-laser-driven-cluster-based plasma source for submicron soft X-ray and multicharged ions imaging of nano-thickness objects., A. Faenov², T. Pikuz¹, Y. Fukuda¹, S. Jinno¹, H. Sakaki¹, M. Kanasaki⁴, H. Kotaki¹, S. Bulanov¹, A. Pirozhkov¹, A. Yogo¹, Y. Hayashi¹, I. Skobelev², Y. Kato³, M. Kando¹, K. Kondo¹,
¹Quantum Beam Science Directorate, Japan Atomic Energy Agency, Japan, ²Joint Institute for High Temperatures, Russian Academy of Sciences, Russia, ³The Graduate School for the Creation of New Photonics Industries, Japan, ⁴Graduate School of Maritime Sciences, Kobe University, Japan

10:50 Fr3-0L-5

A breakthrough 40 W UV laser for micromachining, Rajesh S Patel¹, James Bovatsek¹, Ashwini Tamhankar¹, ¹Spectra Physics, 3635 Peterson Way, Santa Clara, CA 95054, USA, USA

11:10 Fr3-0L-6

F₂ laser induced surface modification of iron thin films into corrosion resistant property, Masayuki Okoshi¹, Yuta Awaiharu¹, Tsugito Yamashita², Narumi Inoue¹, ¹National Defense Academy, Japan, ²Kanto Gakuin University, Japan

11:30 Fr3-0L-7

Practical aspects of surface generated third harmonic for highly precise beam-workpiece alignment, Kristian Cvecek¹, Johannes Strauss³, Ilya Alexeev³, Isamu Miyamoto², Michael Schmidt³,
¹Bayerisches Laserzentrum GmbH, Germany, ²Osaka University, Japan, ³Chair of Photonic Technologies, Friedrich-Alexander-University of Erlangen-Nuremberg, Germany

11:50 Lunch Time

42. HPL 9

Room 4

Cutting and Drilling

10:30 Fr4-0H-5

Experimental measurement of absorptance during laser cutting of steel, Koji Hirano¹, Remy Fabbro², ¹Nippon Steel & Sumitomo Metal Corporation, Japan, ²PIMM Laboratory, CNRS-Arts et Métiers ParisTech, France

10:50 Fr4-0H-6

Laser cutting of carbon fiber reinforced plastics (CFRP) by IR and UV lasers irradiation, Hiroyuki Niino^{1,2}, Yoshizo Kawaguchi^{1,2}, Tadatake Sato^{1,2}, Aiko Narazaki^{1,2}, Ryoza Kurosaki², Mayu Muramatsu^{1,2}, Yoshihisa Harada^{1,2}, Koji Wakabayashi^{1,3}, Takahiro Nagashima^{1,3}, Zyunpei Kase^{1,3}, Masafumi Matsushita^{1,4}, Koichi Furukawa^{1,4}, Michiteru Nishino^{1,5}, ¹Advanced Laser and Process Technology Research Association (ALPROT), Japan, ²National Institute of Advanced Industrial Science and Technology (AIST), Japan, ³MIYACHI CORPORATION, Japan, ⁴Shin Nippon Koki Co., Ltd., Japan, ⁵Mitsubishi Chemical Corporation, Japan

11:10 Fr4-0H-7

CO₂ laser hole drilling of fused silica: Experiment and modeling, Barada Nayak¹, Ravindra Akarapu¹, Joel Carberry¹, Anping Liu¹,
¹Corning Inc., USA

11:30 Fr4-0H-8

Through hole forming method using pulse UV laser, Susumu Nakamura¹, Kaoru Itagaki², Naohiko Soma³, ¹Nagaoka National College of Technology, Japan, ²Itagaki Kinzoku Co., Ltd., Japan, ³Wavelock Advanced Technology Co., Ltd., Japan

11:50 Lunch Time

43. LPM/HPL Joint Session *Room 1*

Advanced Laser Processing

Chair: K. Itoh

13:30 Fr1-IJ-9 **Invited**

Angle- and absorptivity-modulation at inclined wavy processing fronts, Alexander F. H. Kaplan¹,
¹*Luleå University of Technology, Sweden*

14:00 Fr1-OJ-10

Laser high-speed and high-quality cutting of CFRP sheets, and laser direct joining of CFRP to metal, Seiji Katayama¹, Kwang-Woon Jung¹, Yousuke Kawahito¹,
¹*Joining and Welding Research Institute, Osaka University, Japan*

14:20 Fr1-OJ-11 **Student**

Optical trap assisted nanostructuring of glasses and polymeres, Ulf Quentin¹, Ilya Alexeev¹, Michael Schmidt¹,
¹*Institute of Photonic Technologies, University of Erlangen-Nuremberg, Germany*

14:40 Fr1-IJ-12 **Invited**

Shock melting in ultrafast laser machining, Steve Yalisove¹,
¹*Michigan Univ., USA*

15:10 Fr1-IJ-13 **Invited**

Parallel drilling using ps lasers for production applications, Xinbing Liu¹,
¹*Panasonic Boston Lab., USA*

Room 1

Closing

Chair: H. Niino

15:40 **Outstanding Awards**

Closing Remark

16:00 *close*

Poster Session

The authors for odd- and even-numbered posters should be present in front of their posters on July 24 and July 25, respectively.

July 24, 10:30 Short Presentation for Poster Session I & II (Room 1)

July 24, 12:00 Poster Session I and Exhibition (Main Hall A)

July 25, 12:00 Poster Session II and Exhibition (Main Hall A)

P-1

Laser ablation of carbon fiber reinforced plastics: Laser-ionization TOF mass spectrometric study, Aiko Narazaki^{1,2}, Tadatake Sato^{1,2}, Yoshizo Kawaguchi^{1,2}, Hiroyuki Niino^{1,2}, ¹National Institute of Advanced Industrial Science and Technology (AIST), Japan, ²Advanced Laser and Process Technology Research Association (ALPROT), Japan

P-2 **Student**

A study on the laser drilling monitoring program of via holes using vision camera and searching algorithm, Hyun-Jin Kim¹, Soon-Kon Kim¹, Byoung-Deok Choi¹, Kwang-Ryul Kim¹, Hong-Jin Park², ¹College of Information and Communication Engineering, SungKyunKwan University, Suwon 440-746, Korea, "South Korea", ²LTS, 38-13, Ojeon-dong, Uiwang-si, Gyeonggi-do, 437-817, Korea, "South Korea"

P-3

Towards realization of imaging power meter~radiometric calibration of CCD camera beam profilers~, Takayuki Numata¹, ¹National Metrology Institute of Japan (NMIJ), Japan

P-4 **Student**

The optical coupling structure of a fiber-optics Mach-Zehnder interferometer by CO₂ laser irradiation, Chien-Hsing Chen¹, Chih-Yu Hsu², Jian-Neng Wang³, Pei-Hsing Huang⁴, Chih-To Wang⁵, Ying-Ting Chen⁵, Tai-Huei Wei¹, Yi-Cheng Hsu², Lai-Kwan Chau⁵, Wei-Te Wu², ¹Department of Physics, National Chung Cheng University, Taiwan, ²Department of Biomechatronics Engineering, National Pingtung University of Science and Technology, Taiwan, ³Department of Construction Engineering, National Yunlin University of Science and Technology, Taiwan, ⁴Department of Mechanical Engineering, National Pingtung University of Science and Technology, Taiwan, ⁵Department of Chemistry and Biochemistry, National Chung Cheng University, Taiwan

P-5 **Student**

Microfabrication with vibration assisted femtosecond laser system, Ji-Wook Yoon^{1,2}, Won-Suk Choi¹, Jae-Gu Kim¹, Kyoung-Hyun Whang¹, Jung-Kyu Park³, Sung-Hak Cho^{1,2}, ¹KIMM (Korea Institute of Machinery and Materials) nano machining laboratory, Korea, ²Department of Nano-Mechatronics, UST (University of Science and Technology)-KIMM, Korea, ³Laser System Industrialization Center, Jeonnam Technology, Korea

P-6

Modification of embedded gratings in flexible polymeric sheets using femtosecond laser irradiation, Jung-Kyu Park¹, Ji-Wook Yoon², Sung-Sik Woo¹, Yong-Woo Yi¹, Sung-Hak Cho², ¹Laser System Industrialization Center, Republic of Korea, ²Korea Institute of Machinery and Materials (KIMM), Republic of Korea

P-7

Deposition of TiO₂ films for photocatalytic reaction on glass/quartz and polyethylene substrates by laser induced forward transfer, Masateru Saito¹, Satoshi Kurumi¹, Kaoru Suzuki¹, ¹Department of Electrical Engineering College of Science & Technology Nihon University, Japan

P-8

Direct patterning of photomasks using picosecond laser pulse induced chromium oxidation, Mizue Mizoshiri¹, Kimihiro Ozaki¹, ¹National Institute of Advanced Industrial Science and Technology (AIST), Japan

P-9

Low-threshold surface modification of metals irradiated by picosecond soft X-ray laser pulses. Observation and modeling., T Pikuz¹, A Faenov², M Ishino¹, S Starikov², V Stegailov², G Norman³, V Fortov², I Skobelev², N Inogamov⁵, V Zhakhovsky⁶, S Tamotsu⁴, M Tanaka¹, N Hasegawa¹, M Nishikino¹, T Kaihori¹, M Kando¹, T Kawachi¹,
¹Quantum Beam Science Directorate, Japan Atomic Energy Agency, Kizugawa, Kyoto 619-0215, Japan, ²Joint Institute for High Temperatures, Russian Academy of Sciences, Moscow 125412, Russia, ³Moscow Institute of Physics and Technology, Dolgoprudnyi, Moscow region, 141700, Russia, ⁴Graduate School of Humanities and Science, Nara Women's University, Nara 630-8506, Japan, ⁵Landau Institute for Theoretical Physics, Russian Academy of Science, Chernogolovka, Moscow region, Russia, ⁶6 Department of Physics, University of South Florida, Tampa, Florida 33620, USA

P-10 **Student**

Surface laser ablation of polymethyl-methacrylate using 1027 nm femtosecond laser, Camilo Florian Baron¹, ¹Universitat de Barcelona, Spain

P-11

Fast cutting and drilling of transparent materials via femtosecond laser filamentation, Simas Butkus¹, Domas Paipulas¹, Romualdas Sirutkaitis², Eugenijus Gaižauskas¹, Valdas Sirutkaitis¹, ¹Laser Research Center, Vilnius University, Lithuania, ²Institute of Biochemistry, Vilnius University, Lithuania

P-12

On ripple formation in various metals and super-hard tetrahedral amorphous carbon films in consequence of femtosecond laser irradiation, Steffen Weissmantel¹, Manuel Pfeiffer¹, Hagen Gruettner¹, Andy Engel¹, Katja Guenter¹, Franka Marquardt¹, Guenter Reisse¹, ¹University of Applied Sciences Mittweida, Germany

P-13 **Student**

Study of the ablation of transparent materials with near-infrared femtosecond laser, Francesc Caballero Lucas¹, Camilo Florian Baron¹, Juan Marcos Fernández Pradas¹, José Luis Morenza Gil¹, Pere Serra Coromina¹, ¹Universitat de Barcelona, Spain

P-14

Formation of periodic micro/nano-holes in borosilicate glass by femtosecond laser pulses, Md. Shamim Ahsan^{1,2}, Man Seop Lee³, ¹School of Science, Engineering and Technology, Khulna University, Bangladesh, ²Advanced Photonics Research Institute (APRI), Gwangju Institute of Science and Technology (GIST), South Korea, ³Department of Electrical Engineering, Korea Advanced Institute of Science and Technology (KAIST), South Korea

P-15 **Student**

Time-resolved micro-Raman measurement of temperature dynamics during high-repetition-rate ultrafast laser microprocessing, Fumiya Hashimoto¹, Richter Sören², Stefan Nolte², Yasuyuki Ozeki¹, Kazuyoshi Itoh¹, ¹Osaka University, Japan, ²Friedrich-Schiller-University, Germany

P-16 **Student**

Two-wavelength time-resolved interference observations of femtosecond-laser-induced phenomena, Shin-ichi Fukuda¹, Kazuki Toyoda¹, Yoshinori Hashizume¹, Yoshio Hayasaki¹, ¹Center for Optical Research and Education (CORE), Utsunomiya University, Japan

P-17 **Student**

Holographic laser sweep using femtosecond fiber laser, Kazuki Sakuma¹, Satoshi Hasegawa¹, Hidetomo Takahashi², Michiharu Ota², Yoshio Hayasaki¹, ¹Center for Optical Research and Education (CORE), Utsunomiya University, Japan, ²AISIN SEIKI CO., LTD., Japan

P-18

Consideration of a local aluminum-induced crystallization process guided along the μ -holes fabricated with ultra-short laser pulses, Kwang H. Oh¹, Sungsik Woo¹, Ik Bu Sohn², Yong Woo Yi¹, Seongjae Boo³, ¹Laser Advanced System Industrialization Center, Jeonnam Technopark, Republic of Korea, ²Advanced Photonics Research Institute, Gwangju Institute of Science and Technology, Republic of Korea, ³Solar City Center, Korea Institute of Industrial Technology, Republic of Korea

P-19 **Student**

Double-clad waveguide fabrication and ring-shaped laser generation in Nd:YAG crystal by femtosecond laser micromachining, Hongliang Liu¹, Feng Chen¹, Javier Rodríguez Vázquez de Aldana², ¹*School of Physics, Shandong University, China,* ²*Departamento Física Aplicada, Facultad de Ciencias, Universidad de Salamanca, Spain*

P-20 **Student**

Micromachining of polydimethylsiloxane using laser plasma soft X-rays, Shintaro Fukami¹, Shuichi Torii¹, Tetsuya Makimura¹, Kota Okazaki², Daisuke Nakamura², Akihiko Takahashi³, Tatsuo Okada², Hiroyuki Niino⁴, Koichi Murakami¹, ¹*Institute of Applied Physics, University of Tsukuba, Japan,* ²*Graduate School of Information Science and Electrical Engineering, Kyushu University, Japan,* ³*Graduate School of Health Science, Kyushu University, Japan,* ⁴*Research Institute for Innovation in Sustainable Chemistry, AIST, Japan*

P-21 **Student**

Micromachining of PMMA using laser plasma soft X-rays for fabrication of 3D molds in a micrometer scale, Nobuhiko Sugiura¹, Shuichi Torii¹, Tetsuya Makimura¹, Yoshiyuki Ichinosawa², Kouta Okazaki³, Daisuke Nakamura³, Akihiko Takahashi⁴, Tatsuo Okada³, Hiroyuki Niino⁵, Kouichi Murakami¹, ¹*Institute of Applied Physics, University of Tsukuba, Japan,* ²*Optics Precision Co., Ltd., Japan,* ³*Graduate school of Information Science and Electrical Engineering, Kyushu University, Japan,* ⁴*Graduate school of Medical Sciences, Kyushu University, Japan,* ⁵*ISC, National Institute of Advanced Industrial Science and Technology (AIST), Japan*

P-22

Laser controlling the wettability of graphene, Kun-Tso Chen¹, Sung-Ho Liu¹, Chien-Jung Huang¹, Chun-Han Li¹, Jeng-Rong Ho², ¹*Industrial Technology Research Institute, Taiwan,* ²*National Central University, Taiwan*

P-23

Effect of laser irradiation on properties of YSZ and GDC thin films, Mindaugas Maciulevičius¹, Brigita Abakevičienė², Jolita Sakaliūnienė², Kęstutis Šlapikas², Gediminas Račiukaitis¹, Sigitas Tamulevičius², ¹*Center for Physical Sciences and Technology, Lithuania,* ²*Institute of Material Science, Kaunas University of Technology, Lithuania*

P-24

Laser surface modification for rapidly oxide layer formation on Ti-6Al-4V, Ting-Fu Hong¹, Kuan-Ping Chi¹, Hsuan-Kai Lin¹, Yii-Der Wu², ¹*National Pingtung University of Science and Technology, Taiwan,* ²*Metal Industries Research & Development Centre, Taiwan*

P-25

Fabrication of micro 3D pattern array using laser direct write lithography system, Sumio Nakahara¹, Kyoji Matsushima², ¹*Kansai University, Dept. of Mechanical Engineering, Japan,* ²*Kansai University, Dept. of Electrical Engineering, Japan*

P-26

Ti:sapphire laser ablation of silicon in different ambients, Miklós Füle^{1,2}, Anett Gárdián³, Judit Budai³, Zsolt Tóth³, ¹*Department of General and Environmental Physics, University of Szeged, Hungary,* ²*High intensity Laser Laboratory, Department of Experimental Physics, University of Szeged, Hungary,* ³*Department of Optics and Quantum Electronics, University of Szeged, Hungary*

P-27

Fabrication of micron and submicron period metal reflection gratings by imprinting technique, Balint Kiss¹, Roland Flender¹, Csaba Vass¹, ¹*Department of Optics and Quantum Electronics, University of Szeged, Hungary*

P-28 **Student**

Minimization limits of laser induced back-side ablation for the series connection of thin-film silicon solar modules, Bugra Turan¹, Stefan Haas¹, ¹*Forschungszentrum Jülich GmbH, Institut für Energie- und Klimaforschung 5 - Photovoltaik, Germany*

P-29 **Student**

Reduction of produced heat affected zone of CFRP by controlling atmospheric, Kazuki NAKAI¹, Tatsuya Nariyama², Masahiro Tsukamoto³, Tatsuya Miyagawa¹, Kenjiro Takahashi³, Shinichiro Masuno³, Nobuyuki Abe³, ¹*Graduate School of Engineering, Osaka University, Japan,* ²*Graduate School of Science and Engineering, Kinki University, Japan,* ³*Joining and Welding Research Institute, Osaka University, Japan*

P-30 **Student**

Ultraviolet nanosecond laser cutting of carbon fiber reinforced plastic for reduction of heat affected zone, Tatsuya Nariyama¹, Kazuki Nakai², Masahiro Tsukamoto³, Kazuya Miyagawa¹, Shinichiro Masuno³, Kenjiro Takahashi³, Hitoshi Nakano¹, Nobuyuki Abe³, ¹*Graduate School of Science and Engineering, Kinki University, Japan,* ²*Graduate School of Engineering, Osaka University, Japan,* ³*Joining and Welding Research Institute, Osaka University, Japan*

P-31

Effect of gas jet forces on the melt removal mechanism in laser cutting process, Karim Kheloufi¹, El Hachemi Amara², ¹*Center of Development of Advanced Technologies, Algeria,* ²*Center of Development of Advanced Technologies, Algeria*

P-32

Three-phase boundary enhancement in SOFC anodes by laser drilling technique, Mindaugas Maciulevičius¹, Brigita Abakevičienė², Mindaugas Gedvilas¹, Edvinas Navickas², Sigitas Tamulevičius², Gediminas Račiukaitis¹, ¹*Center for Physical Sciences and Technology, Lithuania,* ²*Institute of Materials Science of Kaunas University of Technology, Lithuania*

P-33 **Student**

Off-axis laser beam cutting utilizing a reluctance force lens drive actuator, Yoshihiro Morimoto¹, Tadahiko Shinshi², Shuichi Fujikawa³, Naoyuki Nakamura³, Takahiro Nakai³, Teruaki Fukuoka³, ¹*Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, Japan,* ²*Precision and Intelligence Laboratory, Tokyo Institute of Technology, Japan,* ³*Mitsubishi Electric Corporation, Japan*

P-34 **Student**

Glass marking by longitudinally excited CO₂ laser with short laser pulse, Kazuma Dobashi¹, Kazuyuki Uno¹, Tetsuya Akitsu¹, Takahisa Jitsuno², ¹*University of Yamanashi, Japan,* ²*ILE, Osaka University, Japan*

P-35

Hydrogen absorption property of nano-Pd/zeolite composite fabricated using a novel laser ablation, Teppei Nishi¹, Akio Itoh¹, Naoko Takahashi¹, Noritomo Suzuki¹, Satoru Kosaka¹, Tatsumi Hioki¹, Tomoyoshi Motohiro¹, ¹*Toyota Central R&D Labs., Inc., Japan*

P-36

On-the-fly system algorithm development for a large-area using scanner system, Kwangho Yoon¹, Jaehoon Lee², ¹*Korea Institute of Machinery & Materials, Republic of KOREA,* ²*Korea Institute of Machinery & Materials, Republic of KOREA*

P-37 **Student**

The growth of NdF₃ and YbF₃ thin films by pulsed laser deposition for VUV detectors, Takayuki Tsuji¹, Tatsuya Ishimaru¹, Shingo Ono¹, Yuui Yokota², Takayuki Yanagida³, Akira Yoshikawa², ¹*Nagoya Institute of Technology, Japan,* ²*Institute for Materials Research, Tohoku University, Japan,* ³*Kyushu Institute of Technology, Japan*

P-38

Preparation of superhard tetrahedral amorphous carbon, nano-crystalline diamond and cubic boron nitride films by means of excimer laser ablation and annealing, Steffen Weissmantel¹, Guenter Reisse¹, Katja Guenter¹, Rene Bertram¹, Hagen Gruettner¹, Maren Nieher¹, Dirk Rost¹, ¹*University of Applied Sciences Mittweida, Germany*

P-39 **Student**

Synthesis of Si nanoparticles by pulsed laser ablation in liquid, Seong Shan Yap¹, Chen Hon Nee¹, Wee Ong Siew¹, Yen Sian Lee¹, Yee Yeh Kee¹, Teck Yong Tou¹, ¹*Faculty of Engineering, Multimedia University, Malaysia*

P-40 **Student**

3D waveguide fabrication in PDMS polymer biochip by femtosecond laser for mechanism study of symbiosis, Nobuaki Ishikawa¹, Yasutaka Hanada¹, Ikuko Ishikawa², Koji Sugioka³, Katsumi Midorikawa³, ¹*Hirosaki Univ., Japan,* ²*RIKEN BSI, Japan,* ³*RIKEN ASI, Japan*

P-41 **Student**

Vision correction via multi-layer pattern corneal surgery, Han-Yin Sun^{1,2,3}, Hsiang-Chen Wang^{4,5}, Shun-Fa Yang^{1,6}, ¹*Institute of Medicine, Chung Shan Medical University, Taiwan,* ²*Department of Optometry, College of Medical Science and Technology, Taiwan,* ³*Department of Ophthalmology, Chung Shan Medical University Hospital, Taiwan,* ⁴*Graduate Institute of Opto-Mechatronics, National Chung Cheng University, Taiwan,* ⁵*Advanced Institute for Manufacturing with High-tech Innovations (AIM-HI), Taiwan,* ⁶*Department of Medical Research, Chung Shan Medical University Hospital, Taiwan*

P-42

New method to analyze time evolution of intercellular adhesion force by femtosecond laser-induced impulse, Takanori Iino¹, Man Hagiyama², Tadahide Furuno³, Akihiko Ito², Yoichiro Hosokawa¹, ¹*Nara Institute of Science and Technology, Japan*, ²*Kinki University, Japan*, ³*Aichi Gakuin University, Japan*

P-43

Vibration measurement by heterodyne interferometry with double sideband suppressed carrier approach, Hui-Kang Teng¹, Kuo-Chen Lang², ¹*Nan-Kai University of Technology, Taiwan, Republic of China*, ²*Nan-Kai University of Technology, Taiwan, Republic of China*

P-44

Laser welding of aluminium and copper sheets for lithium-ion batteries, Tae-Soon Park¹, Cheolhee Kim¹, ¹*Korea Institute of Industrial Technology, South Korea*

P-45

Jetting dynamics in film-free laser printing at different fluences, J.Marcos Fernandez-Pradas¹, Adrian Patrascioiu¹, Jose Luis Morenza¹, Pere Serra¹, ¹*Universitat de Barcelona, Dept. de Fisica Aplicada i Optica, Spain*

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